# Bachelor of Engineering (Honours) in Electrical Engineering (4-year Curriculum) 2013-14

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Appendix I Subject Description Forms

Appendix II Minor Programme in Electrical Engineering

Important

This Definitive Programme Document is subject to review and changes which the Programme Host Faculty/Department can decide to make from time to time. Students will be informed of the changes as and when appropriate.
1 Preamble

The overarching aim of the University’s 4-year undergraduate curriculum is to nurture and develop students with abilities/attributes that will prepare them to become preferred leaders for the professions and responsible global citizens in the 21st century. The 4-year BEng (Hons) in Electrical Engineering programme is a major electrical engineering degree programme in Hong Kong. It addresses the manpower demand of the electrical engineering profession, with particular emphasis on power systems, energy utilisation and related disciplines. This programme complies with the new university curriculum framework, which features a broad-based curriculum, emphasis on fundamentals, provision of opportunities for multidisciplinary studies, freshman experience, enhanced communication skills, work-integrated education, capstone project, and outcome-based education. At the same time, the programme addresses the societal need for a new generation of competent electrical engineers who can practice in their profession in Hong Kong, Mainland China, and the neighbouring regions.

2 Aims and Rationale

2.1 Programme Philosophy

The programme aims to provide the students with a sound education in electrical engineering and to furnish an opportunity for detailed study in a choice of related specialist areas. The programme is designed to produce electrical engineers who will be able to practise their profession worldwide while being particularly competent to do so in the context of Hong Kong and Mainland China.

Modern engineers are often required to undertake different activities and may change employment in the course of their career development. The programme thus aims to prepare graduates for their working life, rather than only for their first jobs. Emphasis is therefore placed on the understanding of fundamental concepts and theories which will always be applicable and valid. The teaching of technologies or modern tools which may have a shorter duration of applicability cannot be neglected either, but it is important not to emphasise training at the expense of education.

More and more industrial employers wish to recruit engineers who have a broad-based education, but at the same time possess adequate professional knowledge to undertake detailed technical work in design and production. Therefore, the programme is designed to produce graduates who have not only developed a thorough understanding of electrical engineering, but also acquired a broad and general appreciation of activities in other related disciplines. The students are guided to learn the interfaces between specialist engineering areas and to be prepared to work in a multidisciplinary work environment which usually involves colleagues from other engineering backgrounds.

Students must become aware that ‘a good engineering solution’ is one which has to fulfil economic, financial, and social criteria as well as to comply with engineering design specifications. This necessitates the inclusion of the study of economics, accounting and management with particular reference to engineering activities, as well as the inter-relations between engineering activities and society as a whole.
Language competence of students is strengthened through the English and Chinese subjects stipulated in the General University Requirements (GUR), and is further enhanced by discipline specific professional communication subjects. The teaching approach adopted in the curriculum, which involves seminars, discussions, in-class feedback, assessed presentations, demonstration of project work and written laboratory reports, aim to develop students’ verbal and written communication skills.

It is important to train and educate our students not only in cognitive ability in technical areas but also in lifelong skills. Hence, students are exposed to situations where they are assisted to learn:

(i) to develop their intellectual abilities (creative thinking, critical/independent judgement making, ability to analyze and synthesize, and to cope with real-life conditions such as indeterminacy, lack of information and time pressure); and

(ii) to develop their social abilities (ethics, personal and public relations, team work, handling of responsibility/authority etc).

In this undergraduate programme, the fundamentals of science and engineering are taught in the non-deferrable subjects in Year 1 and Year 2. The core electrical engineering knowledge areas are covered in Year 3 and the advanced core areas and specialisms are introduced in Year 4. The University Core Curriculum is distributed throughout the programme to ensure a proper balance between underpinning, language, broadening and discipline specific subjects.

Students are provided with training at the Industrial Centre (IC) so that they learn the applications of engineering technologies. They are also required to undertake industrial attachment during the summer at the end of the third year of study, which gives them exposure to the workplace and the real industrial working environment.

The Department believes it is advantageous for engineering undergraduate students to undertake a sandwich training year since experience has shown that working in industry broadens the outlook of students, helps them develop a deeper appreciation of their electrical engineering studies in the industrial context, and certainly makes them more mature. Subject to timetable constraints, students may make use of the evenings during the sandwich year to study subjects which have been deferred previously or to take some final year subjects in advance. Students are able to maintain their links with the Department whilst earning their professionally recognised training experience.

2.2 Programme Objectives

(i) To provide students with a broad base of knowledge in the fundamentals of electrical engineering and its current applications.

(ii) To prepare students for working life including the skills needed for lifelong learning.

(iii) To produce engineers with the understanding of their obligations to society.
### 2.3 Programme Outcomes

Programme outcomes refer to the intellectual abilities, knowledge, skills and attributes that a graduate from this programme should possess. To attain the aim of developing all-round students with professional competence, the programme outcome statements are encompassed in the following two categories of learning outcomes.

**Category A: Professional/academic knowledge and skills**

On successful completion of the programme, a student will have shown that he or she can:

- A1 Apply fundamental principles of mathematics, science and engineering to identify, formulate and solve practical problems in the areas of electrical engineering and related disciplines.
- A2 Design and conduct experiments with appropriate techniques and tools; and interpret and analyse the data.
- A3 Design a system, component or process according to given specifications and requirements in the areas of electrical engineering and related disciplines.
- A4 Identify constraints, other than technical considerations, which may influence engineering problems, systems or projects.
- A5 Keep abreast of developments in electrical engineering and related disciplines and be aware of the need of lifelong learning.
- A6 Appreciate and understand the ethical, managerial and social responsibilities of a professional engineer.

**Category B: Attributes for all-roundedness**

On successful completion of the programme, a student will have shown that he or she can:

- B1 Communicate effectively via graphic, numeric, verbal and written media with proficiency in both English and Chinese.
- B2 Reason critically and develop alternative views or solutions.
- B3 Work in multi-disciplinary teams with professional interpersonal skills.

The Programme Outcomes are in line with the Programme objectives and the mapping is shown in Table 2.3.1.

<table>
<thead>
<tr>
<th>Programme Outcomes</th>
<th>Programme Objectives</th>
</tr>
</thead>
<tbody>
<tr>
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<td>(i)</td>
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<tr>
<td>A1</td>
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<td>B1</td>
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<td>B3</td>
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</tbody>
</table>

*Table 2.3.1 Mapping between Programme Objectives and Programme Outcomes*

The Subject Learning Outcomes are designed to be in alignment with the Programme Outcomes. The Subject Learning Outcomes are given in each subject and they can be found in the Subject Descriptions Forms (SDF) in Appendix I.
The programme and subject outcomes will be assessed in stages according to a Learning Outcomes Assessment Plan (LOAP) adopted by the Departmental Learning and Teaching Committee.

Relationship between Institutional Learning Outcomes and Intended Learning Outcomes (ILO) of the programme is shown in Table 2.3.2.

<table>
<thead>
<tr>
<th>Programme Outcomes</th>
<th>Professional competence</th>
<th>Critical thinker</th>
<th>Effective communicator</th>
<th>Innovative problem solver</th>
<th>Lifelong learner</th>
<th>Ethical leader</th>
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</thead>
<tbody>
<tr>
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<td></td>
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<tr>
<td>A2</td>
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<td>√</td>
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<td>A4</td>
<td>√</td>
<td>√</td>
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<tr>
<td>B3</td>
<td></td>
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</tbody>
</table>

*Table 2.3.2 Relationship between Institutional Learning Outcomes and Intended Learning Outcomes (ILO) of the programme*
3 General Information

3.1 Programme Title

Bachelor of Engineering (Honours) in Electrical Engineering
電機工程學(榮譽)工學士學位

3.2 Duration and Mode of Attendance

A student normally takes 4 years full-time with an option of an additional year for sandwich. The maximum period of registration is 8 years.

3.3 Final Award

The award is a bachelor degree with honours in Electrical Engineering and it carries no speciality or stream.

3.4 Implementation Dates

September, 2012 (Initial implementation)

3.5 Minimum Entrance Requirements

(i) For Entry with Hong Kong Diploma of Secondary Education (HKDSE) Examination Qualifications

The general entrance requirements are 4 core subjects and 1 elective subject with:

Level 3: in English Language and Chinese Language AND
Level 2: in Mathematics, Liberal Studies and one elective subject.
The elective subject should preferably be Physics, Biology, Chemistry, Combined Science or Information & Communication Technology. Besides, applicants should preferably have studied any one of the extended modules in Mathematics.

(ii) Alternative Entry Route

<table>
<thead>
<tr>
<th>A Higher Diploma in Electrical Engineering</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Associate Degree in Engineering</td>
<td>OR</td>
</tr>
<tr>
<td>Equivalent qualifications</td>
<td></td>
</tr>
</tbody>
</table>
3.6 Study Options

In line with the University’s Regulations, students in this programme are offered the option of either continuing with the single-discipline Major (i.e. BEng (Hons) in Electrical Engineering), a Major plus a Minor.

Minor study will be a free choice by students and not mandatory. Students who opt for Minor study will be subject to the following regulations:

(i) A Minor programme is a collection of subjects totalling 18 credits with at least 50% (9 credits) of the subjects at Level 3 or above. The subjects under a Minor should have a coherent theme introducing students to a focused area of study.

(ii) Students interested in a Minor must submit their applications to and obtain approval from the Minor-offering department, starting from their second year of study;

(iii) Students are expected to complete their approved Minor as part of their graduation requirements. Students who wish to withdraw from a Minor need to apply for approval officially from the Minor offering department, prior to the end of the add/drop period of the Semester when they indicate their intention to graduate;

(iv) Students with approved Minor will be given a higher priority in taking the Minor subjects over the students who take the subjects as free-electives;

(v) Subject to approval by the Minor-offering department, students may count up to 6 credits from their Major/General University Requirements (GUR) [including Language Communication Requirement (LCR) subjects at proficiency level] towards their chosen Minor;

(vi) Only students with a GPA of 2.5 or above can be considered for Minor study enrolment. The Minor-offering department may set a quota (normally capped at 10 students or 20% of the Major intake quota, whichever is higher) and additional admission requirements for their Minor; and

(vii) Students are required to obtain a GPA of at least 2.0 for both Major and Minor programmes, and also an overall GPA of at least 2.0 in order to satisfy the requirement for graduation with a Major plus a Minor.

For other students who opt to study a ‘Minor’ in Electrical Engineering must take 18 credits of EE subjects, of which 9 credits must be at Level 3 or above (see Appendix II).

3.7 Summer Training/Industrial Placement

Summer Training at the Industrial Centre (IC) and practical work experience in industry are vital components to attain the programme outcomes. The training/industrial placement is credit-bearing and compulsory in the programme, constituting the Work-Integrated Education (WIE) activities as stipulated by the University. Details of the required credits, structure and assessment of the WIE and IC training are given in Sections 4.7 and 4.8.
3.8 Student Exchange Programme

Student exchanges to Universities overseas for a semester or an academic year are possible through various exchange schemes organised by the University or individual departments. While the number of exchanges is limited, students are encouraged to participate to enhance their all-roundedness and broaden their experience.

Block credit-transfers may be given to exchanged-out students. However, in order to ensure attaining pre-requisite knowledge for smooth integration of study, the students will be counselled on subject selections in the visited Universities before they leave for the exchange.

3.9 External Recognition

The BEng (Hons) in Electrical Engineering degree programme has been internally validated by the University. Professional accreditation by The Hong Kong Institution of Engineers (HKIE) will be sought in due course.

3.10 Summer Term Teaching

Usually, there will be no summer term teaching on engineering subjects. Industrial Centre Training and External Training will take place during summers of the second and third year.

3.11 Daytime and Evening Teaching

Subjects will be offered predominantly during the day. Some subjects, particularly the elective subjects in the senior years, may be made available only in the evening or on Saturdays.

3.12 Medium of instruction

English is the medium of instruction (the only exceptions are for a small number of programmes/subjects which have got special approval to be taught and examined in Chinese, due to the nature and objectives of the programmes/subjects concerned). Chinese could only be used in small group discussions/tutorials/practical sessions if and when necessary.

In the presence of non-Cantonese-speaking students, English should be used all the time.
4 Curricula

4.1 University Graduation Requirements

All candidates qualifying for a 4-year Full-time Undergraduate Degree offered from 2012/13 onward must meet:

(i) the University Graduation Requirements, and

(ii) the specific graduation requirements of their chosen programme of study (Majors and Minors).

The minimum University Graduation Requirements are explained in the sections below. For the graduation requirements of specific programmes of study (majors and minors), candidates should refer to the relevant section of this Definitive Programme Document or consult the programme-offering departments concerned.

Summary of University Graduation Requirements

(i) Complete successfully a minimum of 120 credits.

(ii) Earn a cumulative GPA of 2.00 or above at graduation.

(iii) Complete successfully the mandatory Work-Integrated Education (WIE) component as specified by their programme/Major.

(iv) Satisfy the following GUR requirements:

| (a) Language and Communication Requirements | 9 credits |
| (b) Freshman Seminar | 3 credits |
| (c) Leadership and Intra-Personal Development | 3 credits |
| (d) Service-Learning | 3 credits |
| (e) Cluster Areas Requirement (CAR) | 12 credits |
| (f) China Studies Requirement | (3 of the 12 CAR credits) |
| (g) Healthy Lifestyle | Non-credit bearing |

Total = 30 credits

(v) Satisfy the residential requirement.

(vi) Satisfy any other requirements as specified in this Definite Programme Document.
4.2 General University Requirements (GUR)

(i) Language and Communication Requirements (LCR)

**English**

All students must successfully complete two 3-credit English language subjects as stipulated by the University (Table 4.2.1). These subjects are designed to suit students’ different levels of English language proficiency at entry, as determined by their HKDSE score or the English Language Centre (ELC) entry assessment (where no HKDSE score is available).

<table>
<thead>
<tr>
<th>HKDSE</th>
<th>Subject 1</th>
<th>Subject 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 5 or equivalent</td>
<td>Advanced English for University Studies (ELC1014)</td>
<td>Any one of the LCR Proficient elective subject in English (see Table 4.2.2)</td>
</tr>
<tr>
<td></td>
<td>3 credits</td>
<td>3 credits</td>
</tr>
<tr>
<td>Level 4 or equivalent</td>
<td>English for University Studies (ELC1012/ELC1013)</td>
<td>Advanced English for University Studies (ELC1014)</td>
</tr>
<tr>
<td></td>
<td>3 credits</td>
<td>3 credits</td>
</tr>
<tr>
<td>Level 3 or equivalent</td>
<td>Practical English for University Studies (ELC1011)</td>
<td>English for University Studies (ELC1012/ELC1013)</td>
</tr>
<tr>
<td></td>
<td>3 credits</td>
<td>3 credits</td>
</tr>
</tbody>
</table>

*Table 4.2.1: Framework of English LCR subjects*

Students who can demonstrate that they have achieved a level beyond that of the LCR proficient level subjects as listed in Table 4.2.2 (based on an assessment by ELC) may apply for subject exemption or credit transfer of the LCR subject or subjects concerned.

<table>
<thead>
<tr>
<th>For students entering with HKDSE Level 5 or at an equivalent level or above</th>
<th>Advanced English Reading and Writing Skills (ELC2011)</th>
<th>3 credits each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persuasive Communication (ELC2012)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>English in Literature and Film (ELC2013)</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.2.2: LCR Proficient level subjects in English*

**Chinese**

All students are required to successfully complete one 3-credit Chinese language subject as stipulated by the University (Table 4.2.3). These Chinese subjects are designed to suit students’ different levels of Chinese language proficiency at entry, as determined by their HKDSE score or the Chinese Language Centre (CLC) entry assessment (where no HKDSE score is available). Students can opt to take additional Chinese LCR subjects (Table 4.2.5) in their free electives.
Students who can demonstrate that they have achieved a level beyond that of the course “Advanced Communication Skill in Chinese” as listed in Table 4.2.3 (based on an assessment made by CLC) may apply for subject exemption or credit transfer of the LCR subject concerned.

<table>
<thead>
<tr>
<th>HKDSE</th>
<th>Required Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 4 &amp; 5 or equivalent</td>
<td>Advanced Communication Skills in Chinese (CBS1102P) 3 credits</td>
</tr>
<tr>
<td>Level 3 or equivalent</td>
<td>Fundamentals of Chinese Communication (CBS1101P) 3 credits</td>
</tr>
</tbody>
</table>

*Table 4.2.3: Framework of Chinese LCR subjects*

Students who are non-Chinese speakers (NCS), or whose Chinese standards are at junior secondary level or below, are also required to take one LCR-Chinese subject specially designed to suit their language background and entry standard (Table 4.2.4)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-requisite/exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese I (for non-Chinese speaking students) 3 credits</td>
<td>• For non-Chinese speaking students at beginners’ level</td>
</tr>
<tr>
<td>Chinese II (for non-Chinese speaking students) 3 credits</td>
<td>• For non-Chinese speaking students; and • Students who have completed Chinese I or equivalent</td>
</tr>
<tr>
<td>Chinese III (for non-Chinese speaking students) 3 credits</td>
<td>• For non-Chinese speaking students at higher competence levels; and • Students who have completed Chinese II or equivalent</td>
</tr>
<tr>
<td>Chinese Literature – Linguistics and Cultural Perspectives (for non-Chinese speaking students) 3 credits</td>
<td>• For non-Chinese speaking students at higher competence levels</td>
</tr>
</tbody>
</table>

*Table 4.2.4: Chinese LCR Subjects for non-Chinese speakers or students whose Chinese standards are at junior secondary level or below*
<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-requisite/exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese and the Multimedia</td>
<td>• For students entering with HKDSE level 4 or above; or</td>
</tr>
<tr>
<td></td>
<td>• students with advanced competence level as determined by the entry assessment; or</td>
</tr>
<tr>
<td></td>
<td>• students who have completed “Fundamentals of Chinese Communication”</td>
</tr>
<tr>
<td>Creative Writing in Chinese</td>
<td>• For students entering with HKDSE level 4 or above; or</td>
</tr>
<tr>
<td></td>
<td>• students with advanced competence level as determined by the entry assessment; or</td>
</tr>
<tr>
<td></td>
<td>• students who have completed “Fundamentals of Chinese Communication”</td>
</tr>
<tr>
<td>Elementary Cantonese</td>
<td>• For students whose native language is not Cantonese</td>
</tr>
<tr>
<td>Putonghua in the Workplace</td>
<td>• Students who have completed “Fundamentals of Chinese Communication” or could demonstrate the proof with basic Putonghua proficiency</td>
</tr>
<tr>
<td></td>
<td>• For students whose native language is not Putonghua</td>
</tr>
</tbody>
</table>

3 credits each

Table 4.2.5: Other LCR Electives in Chinese

**Writing Requirement**

In addition to the LCR in English and Chinese mentioned above, all students must also, among the Cluster Areas Requirement (CAR) subjects they take (see section (v) on page 13), pass one subject that includes the requirement for a substantial piece of writing in English and one subject with the requirement for a substantial piece of writing in Chinese.

**Reading Requirement**

All students must, among the CAR subjects they take, pass one subject that includes the requirement for the reading of an extensive text in English and one subject with the requirement for the reading of an extensive text in Chinese.

A list of approved CAR subjects for meeting the Writing Requirement (with a “W” designation) and for meeting the Reading Requirement (with an “R” designation) is shown at: https://www2.polyu.edu.hk/as/Polyu/GUR/

Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from the DSR-Chinese and CAR-Chinese Reading and Writing Requirements. However, this group of students would still be required to take Chinese LCR subject to fulfil their Chinese LCR.

**Note:** In addition to the LCR in General Education Requirements, students also have to complete 4 credits of discipline-specific language requirements (2 credits in English and 2 credits in Chinese) as specified in the curriculum requirements of their Major.
(ii) Freshman Seminar

All students must successfully complete, normally in their first year of study, one 3-credit Freshman Seminar offered by their chosen Broad Discipline. The purpose is to (a) introduce students to their chosen discipline and enthuse them about their major study, (b) cultivate students’ creativity, problem-solving ability and global outlook, (c) give students an exposure to the concepts of, and an understanding of, entrepreneurship, and (d) engage students, in their first year of study, in desirable forms of university learning that emphasises self-regulation, autonomous learning and deep understanding.

A list of Freshman Seminars offered by the Broad Disciplines can be found at: https://www2.polyu.edu.hk/as/Polyu/GUR/

(iii) Leadership and Intra-Personal Development

All students must successfully complete one 3-credit subject in the area of Leadership and Intra-Personal Development, which is designed to enable students to (a) understand and integrate theories, research and concepts on the qualities (particularly intra-personal and interpersonal qualities) of effective leaders in the Chinese context, (b) develop greater self-awareness and a better understanding of oneself, (c) acquire interpersonal skills essential for functioning as an effective leader, (d) develop self-reflection skills in their learning, and (e) recognise the importance of the active pursuit of knowledge on an intra-personal and interpersonal level and its relationship to leadership qualities.

A list of designated subjects for meeting the leadership and intra-personal development requirement is available at: https://www2.polyu.edu.hk/as/Polyu/GUR/

(iv) Service-Learning

All students must successfully complete one 3-credit subject designated to meet the service-learning requirement, in which they are required to (a) participate in substantial community service or civic engagement activities that will benefit the service users or the community at large in a meaningful way, (b) apply the knowledge and skills acquired from their Major or other learning experiences at the University to the community service activities, and (c) reflect on their service learning experience in order to link theory with practice for the development of a stronger sense of ethical, social and national responsibility.

These subjects may take the form of:
- An open-to-all GUR service-learning subject
- A GUR service-learning subject targeted at a particular student group (e.g. a Broad Discipline), or
- A customised DSR subject (core or elective) with the Major (Minor with all the required features and components to meet the Service-Learning Requirement

Students who have satisfied the Service-Learning Requirement via a customised DSR subject will be required to take another 3-credit subject to make up total credit requirement.

A list of designated subjects for meeting the service-learning requirement is available at: https://www2.polyu.edu.hk/as/Polyu/GUR/
(v) Cluster Areas Requirements (CAR)

To expand students’ intellectual capacity beyond their disciplinary domain and to enable them to tackle professional and global issues from a multidisciplinary perspective, students are required to successfully complete at least one 3-credit subject in each of the following four Cluster Areas:

- Human Nature, Relations and Development (HRD)
- Community, Organisation and Globalisation (COG)
- History, Culture and World Views (HCW)
- Science, Technology and Environment (STE)

A list of CAR subjects under each of the four Cluster Areas is available at: https://www2.polyu.edu.hk/as/Polyu/GUR/

(vi) China Studies Requirement

Of the 12 credits of CAR described in section (v) above, students are required to successfully complete a minimum of 3 credits on CAR subjects designated as “China-related”. The purpose is to enable students to gain an increased understanding of China (e.g., its history, culture and society, as well as emerging issues or challenges).

A list of approved CAR subjects for meeting the China Studies Requirement is available at: https://www2.polyu.edu.hk/as/Polyu/GUR/

(vii) Healthy Lifestyle

Healthy lifestyle is the platform for all-round development. All students are required to successfully complete a non-credit-bearing programme in healthy lifestyle offered by the Student Affairs Office. The programme will cover: (a) fitness evaluation, (b) concepts on health and fitness, (c) sports skills acquisition, and (d) exercise practicum. More details can be found at: http://www.polyu.edu.hk/sao/hlr/.

4.3 Discipline Specific Requirements (DSR)

A student in the BEng (Hons) in Electrical Engineering programme should complete 95 credits of discipline-specific requirements (DSR) as detailed below:

(i) Common underpinning subjects for Broad Discipline of Engineering (12 credits)

The following subjects must be taken:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>Introductory Linear Algebra or Introductory Probability</td>
<td>2</td>
</tr>
<tr>
<td>Physics I</td>
<td>3</td>
</tr>
<tr>
<td>Physics II</td>
<td>3</td>
</tr>
</tbody>
</table>

(ii) Common DSR subjects for Broad Discipline of Engineering (32 ~ 38 credits)

The following DSR subjects of the Faculty of Engineering must be taken:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>Engineering Economics</td>
<td>3</td>
</tr>
<tr>
<td>Information Technology</td>
<td>3</td>
</tr>
</tbody>
</table>
Engineering Management 3 credits
Project Management¹ 3 credits
Mathematics I and II 6 credits
Professional Communication in English 2 credits
Professional Communication in Chinese² 2 credits
Science 3 credits
(any ONE from Fundamentals of Materials Science and Engineering, Biology, Chemistry)
Society and the Engineer 3 credits
Physics Experiments 1 credit
Multidisciplinary Project³ 6 credits

¹ This is a Level 4 Specialist Elective.

² Students who are non-Chinese speakers or those whose Chinese standards are at junior secondary level or below will be exempted from the Discipline-Specific Chinese Language requirement, the Faculty Board of Engineering has agreed that all FENG students of this category can take a replacement subject of any level to make up for credit requirement.

³ This is an elective. Students who do not choose this subject should instead take two EE Level 3 electives.

(iii) DSR subjects in Electrical Engineering discipline (48 ~ 54 credits)

The following DSR subjects in Electrical Engineering must be taken:

<table>
<thead>
<tr>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE2001A</td>
</tr>
<tr>
<td>EE2002A</td>
</tr>
<tr>
<td>EE2003A</td>
</tr>
<tr>
<td>EE2004A</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE3001A</td>
</tr>
<tr>
<td>EE3002A</td>
</tr>
<tr>
<td>EE3003A</td>
</tr>
<tr>
<td>EE3004A</td>
</tr>
<tr>
<td>EE3005A</td>
</tr>
<tr>
<td>EE3006A</td>
</tr>
<tr>
<td>EE3007A</td>
</tr>
<tr>
<td>EE3008A</td>
</tr>
<tr>
<td>EE3009A</td>
</tr>
<tr>
<td><strong>Electives (for students who do not take Multidisciplinary Project)</strong></td>
</tr>
<tr>
<td>EE4003A</td>
</tr>
<tr>
<td>EE4004A</td>
</tr>
<tr>
<td>EE4006A</td>
</tr>
<tr>
<td>EE4xxxA</td>
</tr>
<tr>
<td>EE4xxxA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE4003A</td>
</tr>
<tr>
<td>EE4004A</td>
</tr>
<tr>
<td>EE4006A</td>
</tr>
<tr>
<td>EE4xxxA</td>
</tr>
<tr>
<td>EE4xxxA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

---

Table 4.3
4.4 Curricula for Various Levels

The time-tabled student hours for each subject and the type of activity (lecture [Lt], tutorial [Tu] and laboratory [Lab]) are given in the Tables 4.4.1 - 4.4.4. The abbreviations used in these tables are:

- AF: Accounting and Finance
- AP: Applied Physics
- AMA: Applied Mathematics
- APSS: Applied Social Sciences
- BSE: Building Services Engineering
- CBS: Chinese & Bilingual Studies
- CEE: Civil and Environmental Engineering
- EE: Electrical Engineering
- ELC: English Language Centre
- ENG: Engineering Faculty
- GEC: General Education Centre
- IC: Industrial Centre
- ISE: Industrial and Systems Engineering
- MM: Management and Marketing

A normal student in the BEng (Hons) programme may complete 31, 30, 34 and 30 credits in Year 1, 2, 3 and 4, respectively, as shown in the indicative progression patterns in Tables 4.4.1 to 4.4.5. In other words, a student must complete a nominal number of 125 academic credits, in addition to the credits earned in IC training, and the other General University Requirements including WIE, before graduation.

Subjects are referenced by a Departmental prefix (e.g. EE corresponds to Electrical Engineering) followed by a reference number. Each subject is also categorised as non-deferrable (Non-Def), deferrable (Def) or Elective. In the reference numbers, the first digit (i.e. 1, 2, 3 or 4) indicates the level of the subject.

‘Non-def’ are those subjects which form the backbone of the vertical integration must be taken by every student in the prescribed semester, unless prevented from doing so due to non-compliance with prerequisites.

‘Def’ are those subjects which must be satisfactorily completed before the student becomes eligible for an award but the timing of the subject is determined by the student.

‘Electives’ are those subjects which are optional. Electives give students choices in composing their study programme. All elective subjects are deferrable.

Tables in Section 4.5 show the times (semesters) in which these subjects are recommended to be taken if the programme are to be completed in the minimum time.
### Table 4.4.1

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Department</th>
<th>Contact Hours</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Assessment Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA1100</td>
<td>Basic Mathematics - an introduction to Algebra and Differential Calculus\</td>
<td>AMA</td>
<td>28</td>
<td>2</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AMA1101</td>
<td>Calculus I\</td>
<td>AMA</td>
<td>56</td>
<td>4</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AMA1102</td>
<td>Calculus IA\</td>
<td>AMA</td>
<td>56</td>
<td>4</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AMA1103</td>
<td>Introductory Linear Algebra^</td>
<td>AMA</td>
<td>28</td>
<td>2</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AMA1104</td>
<td>Introductory Probability ^</td>
<td>AMA</td>
<td>28</td>
<td>2</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AP00002</td>
<td>Foundation Physics I\</td>
<td>AP</td>
<td>42</td>
<td>3</td>
<td>-</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AP00003</td>
<td>Foundation Physics II\</td>
<td>AP</td>
<td>42</td>
<td>3</td>
<td>-</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AP10004</td>
<td>Physics Experiments</td>
<td>AP</td>
<td>-</td>
<td>36</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>AP10005</td>
<td>Physics I</td>
<td>AP</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>AP10006</td>
<td>Physics II</td>
<td>AP</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>40% 60%</td>
</tr>
<tr>
<td>APSS1L01</td>
<td>Tomorrow's Leaders</td>
<td>APSS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>CBS1101P</td>
<td>Fundamentals of Chinese Communication*</td>
<td>CBS</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>60% 40%</td>
</tr>
<tr>
<td>CBS1102P</td>
<td>Advanced Communication Skills in Chinese*</td>
<td>CBS</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>70% 30%</td>
</tr>
<tr>
<td>ELC1011</td>
<td>Practical English for University Studies*</td>
<td>ELC</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
<tr>
<td>ELC1012/1013</td>
<td>English for University Studies *</td>
<td>ELC</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
<tr>
<td>ELC1014</td>
<td>Advanced English for University Studies*</td>
<td>ELC</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
<tr>
<td>ELC2011</td>
<td>Advanced English Reading and Writing Skills*</td>
<td>ELC</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
<tr>
<td>ELC2012</td>
<td>Persuasive Communication*</td>
<td>ELC</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
<tr>
<td>ELC2013</td>
<td>English in Literature and Film*</td>
<td>ELC</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
<tr>
<td>ENG1003</td>
<td>Freshman Seminar for Engineering</td>
<td>ENG</td>
<td>43</td>
<td>3</td>
<td>0.2</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Students who have attained Level 2 in any one of the HKDSE extended modules in Mathematics are required to take “Calculus I” only. Students who have not attained Level 2 in any one of the HKDSE extended modules in Mathematics are required to take both “Basic Mathematics - an introduction to Algebra and Differential Calculus” and “Calculus IA”.

^ Students who have not attained Level 2 in any one of the HKDSE extended modules in Mathematics must take BOTH these subjects. Students who have attained Level 2 in HKDSE Extended Module I in Mathematics need only take “Introductory Linear Algebra”. Students who have attained Level 2 in HKDSE Extended Module II in Mathematics need only take “Introductory Probability”.

\ Students will take these subjects based on their HKDSE results (see Section 4.2 (i))
### The Hong Kong Polytechnic University
**BEng (Hons) in Electrical Engineering**

#### Level 2

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Department</th>
<th>Contact Hours</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Assessment Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMA2111</td>
<td>Mathematics I</td>
<td>AMA</td>
<td>42 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>AMA2112</td>
<td>Mathematics II</td>
<td>AMA</td>
<td>42 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>EE2001A</td>
<td>Applied Electromagnetics</td>
<td>EE</td>
<td>36 - 12 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>EE2002A</td>
<td>Circuit Analysis</td>
<td>EE</td>
<td>42 - 9 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>EE2003A</td>
<td>Electronics</td>
<td>EE</td>
<td>42 - 12 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>EE2004A</td>
<td>Electrical Energy Systems Fundamentals</td>
<td>EE</td>
<td>36 - 12 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>ENG2001</td>
<td>Fundamentals of Materials Science and Engineering#</td>
<td>ENG</td>
<td>42 - 3</td>
<td>0.2</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>ENG2002</td>
<td>Computer Programming</td>
<td>ENG</td>
<td>64 - 3</td>
<td>0.2</td>
<td>100%</td>
<td>-</td>
</tr>
<tr>
<td>ENG2003</td>
<td>Information Technology</td>
<td>ENG</td>
<td>34 - 24 - 3</td>
<td>0.2</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

#### Def Subjects

|              |                                                        |            |               |         |                 |        |
|              | Cluster Areas Requirement (CAR) subjects               | Various    | 3 - 0.2      |         | depending on the subjects taken | depending on the subjects taken |
|              | (subjects taken must conform to the University’s      | Departments|              |         |                 |        |
|              | Cluster Area Requirements specified in Section 4.2 (v) |            |              |         |                 |        |

#### IC Training

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Duration</th>
<th>Contact Hours</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Assessment Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC2105</td>
<td>Engineering Communication and Fundamentals</td>
<td>120 hours throughout the year</td>
<td>4 training credits</td>
<td></td>
<td>100% assessed and graded</td>
<td>-</td>
</tr>
<tr>
<td>IC2112</td>
<td>IC Training I (EE)</td>
<td>120 hours in Summer</td>
<td>4 training credits</td>
<td></td>
<td>100% assessed and graded</td>
<td>-</td>
</tr>
</tbody>
</table>

* Students may select a Level 2 Chemistry or Biology subject instead of “Fundamentals of Materials Science and Engineering”.

---

**Table 4.4.2**
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Department</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Continuous Assessment</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE3001A</td>
<td>Analogue and Digital Circuits</td>
<td>EE</td>
<td>36</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3002A</td>
<td>Electromechanical Energy Conversion</td>
<td>EE</td>
<td>36</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3003A</td>
<td>Power Electronics and Drives</td>
<td>EE</td>
<td>36</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3004A</td>
<td>Power Transmission and Distribution</td>
<td>EE</td>
<td>36</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3005A</td>
<td>Systems and Control</td>
<td>EE</td>
<td>38</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3006A</td>
<td>Analysis Methods for Engineers</td>
<td>EE</td>
<td>38</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>AF3625</td>
<td>Engineering Economics</td>
<td>AF</td>
<td>42</td>
<td>-</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>ENG3002</td>
<td>Multidisciplinary Project</td>
<td>ENG</td>
<td>42</td>
<td>-</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>ENG3003</td>
<td>Engineering Management</td>
<td>ENG</td>
<td>42</td>
<td>-</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>ENG3004</td>
<td>Society and the Engineer</td>
<td>ENG</td>
<td>42</td>
<td>-</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>CBS324JP</td>
<td>Professional Communication in Chinese</td>
<td>CBS</td>
<td>28</td>
<td>-</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>ELC352I</td>
<td>Professional Communication in English</td>
<td>ELC</td>
<td>28</td>
<td>-</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>EE3007A</td>
<td>Computer System Principles</td>
<td>EE</td>
<td>36</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3008A</td>
<td>Linear Systems and Signal Processing</td>
<td>EE</td>
<td>39</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3009A</td>
<td>Electrical Services in Buildings</td>
<td>EE</td>
<td>42</td>
<td>-</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>EE3010A</td>
<td>Summer Practical Training</td>
<td>Industry</td>
<td>-</td>
<td>6</td>
<td>3 training credits</td>
<td>-</td>
</tr>
</tbody>
</table>

**Non-Def Subjects**

**Def Subjects**

**Level 3 Electives (Def Subjects)**

For students who do not take Multidisciplinary Project, they should choose any two electives.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Department</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Continuous Assessment</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE3007A</td>
<td>Computer System Principles</td>
<td>EE</td>
<td>36</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3008A</td>
<td>Linear Systems and Signal Processing</td>
<td>EE</td>
<td>39</td>
<td>3</td>
<td>0.3</td>
<td>40%</td>
</tr>
<tr>
<td>EE3009A</td>
<td>Electrical Services in Buildings</td>
<td>EE</td>
<td>42</td>
<td>-</td>
<td>3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

The Department reserves the right of NOT offering all electives in each year.

**EE3010A Summer Practical Training**

Industry

A minimum of 6 weeks (Compulsory for Full-time students. Optional for Sandwich students)

<table>
<thead>
<tr>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Continuous Assessment</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.3</td>
<td>100%</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4.4.3
### The Hong Kong Polytechnic University
#### BEng (Hons) in Electrical Engineering

#### Levels 4 and 5

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Department</th>
<th>Contact Hours</th>
<th>Credits</th>
<th>GPA Weight (Wt)</th>
<th>Continuous Assessment</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Le/ Tu/ Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4003A</td>
<td>Electrical Machines</td>
<td>EE</td>
<td>36 12 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4004A</td>
<td>Power Systems</td>
<td>EE</td>
<td>38 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4006A</td>
<td>Individual Project</td>
<td>EE</td>
<td>- - 6</td>
<td>0.3</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSE463</td>
<td>Design of Mechanical Systems in Buildings</td>
<td>BSE</td>
<td>42 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4002A</td>
<td>Digital Control and Signal Processing</td>
<td>EE</td>
<td>38 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4007A</td>
<td>Advanced Power Electronics</td>
<td>EE</td>
<td>38 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4008A</td>
<td>Applied Digital Control</td>
<td>EE</td>
<td>38 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4009A</td>
<td>Electric Traction and Drives</td>
<td>EE</td>
<td>45+ - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4010A</td>
<td>Fibre Optics</td>
<td>EE</td>
<td>36 12 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4011A</td>
<td>Industrial Computer Applications</td>
<td>EE</td>
<td>36 12 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4012A</td>
<td>Intelligent Buildings</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4013A</td>
<td>Power System Protection</td>
<td>EE</td>
<td>38 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4014A</td>
<td>Intelligent Systems Applications in Electrical</td>
<td>EE</td>
<td>36 12+ 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE4015A</td>
<td>Electrical Engineering Materials</td>
<td>EE</td>
<td>42 12 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG4001</td>
<td>Project Management</td>
<td>ENG</td>
<td>39 3 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AF5107</td>
<td>Accounting for Engineers</td>
<td>AF</td>
<td>42 - 3</td>
<td>0.3</td>
<td>50% 50%</td>
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<td></td>
</tr>
<tr>
<td>CSE4062</td>
<td>Environmental Impact Assessment-Theory and Practice</td>
<td>CEE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>50% 50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE516</td>
<td>Urban Transport Planning – Theory and Practice</td>
<td>CEE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
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<tr>
<td>ISE404</td>
<td>Total Quality Management</td>
<td>ISE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>55% 45%</td>
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<tr>
<td>MM4522</td>
<td>China Business Management</td>
<td>MM</td>
<td>42 - 3</td>
<td>0.3</td>
<td>50% 50%</td>
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<td></td>
</tr>
<tr>
<td>EE501A</td>
<td>Alternative Energy Technologies</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE502A</td>
<td>Modern Protection Methods</td>
<td>EE</td>
<td>36 12 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE505A</td>
<td>Power System Control &amp; Operation</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE509A</td>
<td>High Voltage Engineering</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE510A</td>
<td>Electrical Tracation Engineering</td>
<td>EE</td>
<td>36 6 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE512A</td>
<td>Electric Vehicles</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE514A</td>
<td>Real Time Computing</td>
<td>EE</td>
<td>36 6 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE517A</td>
<td>Fibre Optic Components</td>
<td>EE</td>
<td>39 3 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE520A</td>
<td>Intelligent Motion Systems</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE521A</td>
<td>Industrial Power Electronics</td>
<td>EE</td>
<td>30 12 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE522A</td>
<td>Optical Fibre Systems</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE524A</td>
<td>Open Electricity Market Operation</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE525A</td>
<td>Energy Policy and Restructuring of Electricity</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE526A</td>
<td>Power System Analysis and Dynamics</td>
<td>EE</td>
<td>38 8 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE527A</td>
<td>Auto-tuning for Industrial Processes</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE528A</td>
<td>System Modelling and Optimal Control</td>
<td>EE</td>
<td>33 9 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE529A</td>
<td>Power Electronics for Utility Applications</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE530A</td>
<td>Electrical Energy-saving Systems</td>
<td>EE</td>
<td>42 - 3</td>
<td>0.3</td>
<td>40% 60%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.4.4**

* Lecture: 39 hours; plus Seminar: 6 hours

* Mini-project: 12 hours

* The Department reserves the right of NOT offering all electives in each year.
4.5 Indicative Progression Pattern

The progression pattern in Table 4.5.1 to Table 4.5.5 is recommended for HKDSE admittees who have attained Level 4 (Basic) in both English language and Chinese language, and who have attained Level 2 in Mathematics, plus any one of the Extended Modules in Mathematics and Physics (or Combined Science with a component in Physics).

A student in the First Year is advised to take the following curriculum as indicated in Table 4.5.1 below and obtain a total of 31 credits.

<table>
<thead>
<tr>
<th>Semester One</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA1101 Calculus I* (4)</td>
</tr>
<tr>
<td>AP10004 Physics Experiments (0.5 continues in Semester 2)</td>
</tr>
<tr>
<td>AP10005 Physics I (3)</td>
</tr>
<tr>
<td>APSS1L01 Tomorrow’s Leaders (3)</td>
</tr>
<tr>
<td>ELCXXXX English LCR Subject* (3)</td>
</tr>
<tr>
<td>ENG1003 Freshman Seminars for Engineering (1.5 continues in Semester 2)</td>
</tr>
<tr>
<td>15 credits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA1103 Introductory Linear Algebra^ (2)</td>
</tr>
<tr>
<td>AMA1104 Introductory Probability ^ (2)</td>
</tr>
<tr>
<td>AP10004 Physics Experiments (0.5 continues from Semester 1)</td>
</tr>
<tr>
<td>AP10006 Physics II (3)</td>
</tr>
<tr>
<td>ELCXXXX English LCR Subject* (3)</td>
</tr>
<tr>
<td>ENG1003 Freshman Seminar for Engineering (1.5 continues from Semester 1)</td>
</tr>
<tr>
<td>ENG2003 Information Technology (3)</td>
</tr>
<tr>
<td>CAR requirement one Cluster Area Requirement Subject (3)</td>
</tr>
<tr>
<td>16 credits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GUR requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Lifestyle (0)</td>
</tr>
</tbody>
</table>

| IC2105 Engineering Communication and Fundamentals (120 hours throughout the year) |
| 4 training credits |

* Students who have attained Level 2 in any one of the HKDSE extended modules in Mathematics are required to take “Calculus I” only. Students who have not attained Level 2 in any one of the HKDSE extended modules in Mathematics are required to take both “Calculus IA” and “Basic Mathematics - an introduction to Algebra and Differential Calculus”.

^ Students who have not attained Level 2 in any one of the HKDSE Extended Modules in Mathematics must take BOTH these subjects. Students who have attained Level 2 in HKDSE Extended Module I in Mathematics need only take “Introductory Linear Algebra”. Students who have attained Level 2 in HKDSE Extended Module II in Mathematics need only take “Introductory Probability”.

* Students will take these subjects based on their HKDSE results (see Section 4.2 (i))
A student in the Second Year is advised to take the following curriculum as indicated in Table 4.5.2 below and obtain 30 credits.

<table>
<thead>
<tr>
<th></th>
<th>Semester One</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA2111</td>
<td>Mathematics I (3)</td>
</tr>
<tr>
<td>CBSXXXX</td>
<td>Chinese LCR Subject* (3)</td>
</tr>
<tr>
<td>EE2002A</td>
<td>Circuit Analysis (3)</td>
</tr>
<tr>
<td>ENG2001</td>
<td>Fundamentals of Materials Science and Engineering* (3)</td>
</tr>
<tr>
<td>ENG2002</td>
<td>Computer Programming (1.5 continues in Semester 2)</td>
</tr>
<tr>
<td></td>
<td><strong>13.5 credits</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Semester Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF3625</td>
<td>Engineering Economics (3)</td>
</tr>
<tr>
<td>AMA2112</td>
<td>Mathematics II (3)</td>
</tr>
<tr>
<td>EE2003A</td>
<td>Electronics (3)</td>
</tr>
<tr>
<td>EE2004A</td>
<td>Electrical Energy Systems Fundamentals (3)</td>
</tr>
<tr>
<td>ENG2002</td>
<td>Computer Programming (1.5 continues from Semester 1)</td>
</tr>
<tr>
<td>CAR requirement</td>
<td>one Cluster Area Requirement Subject (3)</td>
</tr>
<tr>
<td></td>
<td><strong>16.5 credits</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Semester Three (Summer Period at the end of Year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC2112</td>
<td>IC Training I (EE) (120 hours in summer)</td>
</tr>
<tr>
<td></td>
<td><strong>4 training credits</strong></td>
</tr>
</tbody>
</table>

* Table 4.5.2

* Students may select a Level 2 Chemistry or Biology subject instead of “Fundamentals of Materials Science and Engineering”.

* Students will take these subjects based on their HKDSE results (see Section 4.2 (i))
A student in the Third Year is advised to take the following curriculum as indicated in Table 4.5.3 below and obtain 34 credits.

<table>
<thead>
<tr>
<th>Semester One</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE2001A</td>
</tr>
<tr>
<td>EE3001A</td>
</tr>
<tr>
<td>EE3004A</td>
</tr>
<tr>
<td>EE3006A</td>
</tr>
<tr>
<td>CAR requirement</td>
</tr>
<tr>
<td>ENG3002</td>
</tr>
<tr>
<td>EE3007A</td>
</tr>
<tr>
<td>EE3008A</td>
</tr>
</tbody>
</table>

18 ~ 21 credits

<table>
<thead>
<tr>
<th>Semester Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBS3241P</td>
</tr>
<tr>
<td>EE3002A</td>
</tr>
<tr>
<td>EE3003A</td>
</tr>
<tr>
<td>EE3005A</td>
</tr>
<tr>
<td>ELC3521</td>
</tr>
<tr>
<td>ENG3002</td>
</tr>
<tr>
<td>EE3009A</td>
</tr>
</tbody>
</table>

13 ~ 16 credits

<table>
<thead>
<tr>
<th>Semester Three (Summer Period at the end of Year 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE3010A</td>
</tr>
</tbody>
</table>

3 training credits

Table 4.5.3

* Students who do not take Multidisciplinary Project should choose any two EE Level 3 electives instead.
A student may opt for sandwich training after the third year of study and he or she is required to take the following training subject in Table 4.5.4 during the sandwich year.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE4001A</td>
<td>External Industrial Training (Students are required to take a minimum of 44 weeks of training in industry)</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 4.5.4

A student is advised to take the following curriculum in the final year as indicated in Table 4.5.5 and obtain 30 credits. He/she must accumulate a total of 125 academic credits to qualify for graduation.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE4003A</td>
<td>Electrical Machines (3)</td>
<td></td>
</tr>
<tr>
<td>EE4004A</td>
<td>Power Systems (3)</td>
<td></td>
</tr>
<tr>
<td>EE4006A</td>
<td>Individual Project (3 continues in Semester 2)</td>
<td></td>
</tr>
<tr>
<td>ENG3003</td>
<td>Engineering Management (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>one Cluster Area Requirement Subject (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service-Learning Subject‡ (1.5 continues in Semester 2)</td>
<td></td>
</tr>
</tbody>
</table>

Semester One  
16.5 credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE4006A</td>
<td>Individual Project (3 continues from Semester 1)</td>
<td></td>
</tr>
<tr>
<td>ENG3004</td>
<td>Society and the Engineer (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Service-Learning Subject‡ (1.5 continues from Semester 2)</td>
<td></td>
</tr>
</tbody>
</table>

Semester Two  
13.5 credits

Electives  
Out of the two electives taken in Year 4, no more than one should be a Non-technical Broadening Elective.  
The Department reserves the right of NOT offering all the electives in each year.  
Two advanced elective should be taken.  
A number of electives from Table 4.4.4 will be offered in each semester of Year 4.  
(6)

‡ Students are encouraged to take this subject at an earlier stage of study.
### 4.6 Subject Support to Programme Outcomes

Table 4.6 illustrates how the subjects support the Programme Outcomes through teaching activities, practice on the part of students, and measurements.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Programme Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>AF3625</td>
<td>√</td>
</tr>
<tr>
<td>AF5107</td>
<td>√</td>
</tr>
<tr>
<td>AMA1101</td>
<td>√</td>
</tr>
<tr>
<td>AMA1102</td>
<td>√</td>
</tr>
<tr>
<td>AMA1103</td>
<td>√</td>
</tr>
<tr>
<td>AMA1104</td>
<td>√</td>
</tr>
<tr>
<td>AMA2111</td>
<td>√</td>
</tr>
<tr>
<td>AMA2112</td>
<td>√</td>
</tr>
<tr>
<td>AP10004</td>
<td></td>
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<tr>
<td>AP10005</td>
<td></td>
</tr>
<tr>
<td>AP10006</td>
<td></td>
</tr>
<tr>
<td>APSS1L01</td>
<td></td>
</tr>
<tr>
<td>BSE463</td>
<td>√</td>
</tr>
<tr>
<td>CBS1101P</td>
<td></td>
</tr>
<tr>
<td>CBS3241P</td>
<td></td>
</tr>
<tr>
<td>CSE40462</td>
<td>√</td>
</tr>
<tr>
<td>CSE516</td>
<td>√</td>
</tr>
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<td>EE2001A</td>
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<td>EE2002A</td>
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<td>EE2004A</td>
<td></td>
</tr>
<tr>
<td>EE3001A</td>
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*Table 4.6 Support of programme outcomes by individual subjects*
4.7 Work-Integrated Education and Summer Practical Training

Work-Integrated Education (WIE) is introduced as a University exercise. It aims to prepare students for the realities of workplaces, develop students’ ability to learn in non-academic surroundings, allow students to assess their own strengths and weaknesses in a real working settings and develop students’ critical thinking and problem solving capabilities.

Summer Practical Training (EE3010A) normally takes place during the summer at the end of Year Three. Students are required to undertake a minimum of 6 weeks (3 training credits) of summer training, of which at least 2 weeks (1 credit) are of valid WIE activities as recognised by the University.

WIE activities may include placement, employment or attachment relevant to the context, knowledge and skills of the Programme. The Preferred Graduate Development Programme (PGDP) organised by the Student Affairs Office (SAO) of the University is one of the main sources of placement opportunities for local students and students from Mainland China and overseas. There is no requirement on the WIE activities being paid jobs. Any payment by employers is completely at the employers’ discretion. Typical examples of WIE activities are as follows:

- Full-time placement in a suitable organisation as part of a sandwich programme.
- Summer placement in a suitable organisation participating in the Preferred Graduate Development Programme.
- Relevant placement as student helpers in University’s administrative departments and the Industrial Centre.
- Assisting in the University-wide activities that have an external collaboration or service component such as, Innovation and Technology Fund projects, RAPRODS projects, IGARD projects, high-level consultancy projects, collaborative research projects that were undertaken with external organizations, jobs undertaken by the Industrial Centre as a service for an external organization.
- Placement within the International Association for the Exchange of Students for Technical Experience (IAESTE) Programme in which the student is attached to a workplace abroad during the training.
- The student works on his final-year degree project which involves an industrial partner or external client. The student need not be placed in the company but make frequent visits to ensure that the project will meet the specifications required by the company/client.

In order to ensure that students have useful experience, the summer practical training must be suitably chosen and properly organised. Students are required to initiate and formulate a training proposal or learning contract to indicate the expected work-based learning experiences, as well as a learning portfolio to review their achievements and intended learning outcomes.

Accordingly, the WIE officer will coordinate the following learning support activities:

(i) Orientation

To allow sufficient time for the formulation of training proposals and/or learning contracts, students should start their preparatory work by the commencement of the second semester of their second year study. In the orientation meeting, students will first learn the basic requirements of a good proposal in terms of learning outcomes and then, the basic skills in undertaking practical training.
• Information on search techniques to find national/international work-base employment, attachments etc.
• Life skills to be successful in the workplace
• Develop a positive attitude to work-based learning
• Planning and scheduling for successful completion of assessment instruments
• Consolidation of Training Proposal and/or Learning Contract
• Consideration of taking this chance for the preparation of Final Year Project

Students are required to submit their practical training proposals and learning contracts by end of June.

(ii) Progress Monitoring

During the practical training, students are required to maintain a weekly training journal to identify their progress of their training. If applicable, site visits will be arranged by the supervisor during the practical training.

(iii) Learning Evaluation

After returning from the practical training, students are required to submit a learning portfolio which should cover all periods of practical training. The learning portfolio is expected to demonstrate development of practical and professional skills through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject learning outcomes. The student should be able to present the learning portfolio to prospective employers, as a complement to their degree.

_Learning Portfolio_

In writing the portfolio, the following should be observed:

• Preliminary Information: A contents list, abstract and employment details should precede the main learning portfolio. The abstract should be a summary of the portfolio and comprise about 300 words on one page. The employment details should set out names of employing organisations, method of obtaining employment, specific periods of employment, and nature of appointments (e.g. trainee engineer etc.). Also required are details of job locations, name, phone number and designation of immediate superior (for possible contact by the course coordinator), projects in which the student was directly involved, and their degree of responsibility.

• Content: The major portion of the portfolio should be set out as a technical report, divided into suitable sections, and with an introduction to each major or different aspect of work. Students need to report on all projects listed in the employment details. Noteworthy technical details of projects in which the student was directly involved, or of projects which the student observed, should also be included. These may include investigation, feasibility, design, management, commissioning or operational aspects etc. Students should openly discuss aspects of the work they have performed or observed and indicate their involvement in their work throughout the text. To be able to produce an accurate and comprehensive portfolio it is recommended that students keep a diary, along with photographs and any other information regarding their work. This diary will not be assessed; it will however be helpful in writing the final portfolio. All project data and information must be cleared by the employers for confidentiality.
prior to its incorporation in the portfolio. It is generally advisable to avoid all sensitive information related to the employment by limiting the contents to the general or public aspects of each specific project. References should be made in the text to books, technical papers, standards etc., used during the training period and should be listed. Finally, a conclusion should include comprehensive comments on the type and value of experience gained, and how this relates to the student’s future professional career.

A student will be given a **PASS** grade only if he/she meets the following requirements with satisfactory performance:

1. Fulfilment of at least 6 weeks of summer practical training for full time students or 44 weeks for students taking the sandwich mode option, with at least 2 weeks of valid WIE activities as recognised by the University.
2. Punctual submission of training proposals and/or learning contracts, training journal and learning portfolio.

An academic staff will be allocated to each student as his or her training tutor to certify that all of the above requirements have been satisfactorily met. The training tutor has the right to ask the student to re-submit the training proposal and/or learning portfolio after giving the student the necessary feedback.

While the Department will be the responsible party to pursue WIE opportunities as vigorously as possible for the students so that they meet the graduation requirements, the students are expected to play their part in ensuring that they meet the WIE requirements for graduation.

### 4.8 Industrial Centre (IC) Training

Besides the WIE training components, students are required to undertake training at the Industrial Centre (IC), which is equivalent to 8 training credits. The training is scheduled within Year One and at the end of Year Two. The students will not pay any training fee, nor receive any stipend. IC training is however not part of WIE activities.

### 4.9 Language Enhancement Subjects

All students are strongly encouraged to make full use of the facilities and services provided in the ELC and CLC to improve their language proficiency throughout the programme.

### 4.10 Physics and Mathematics Enhancement Subjects

Students who do not possess the requisite background knowledge in Physics (i.e. attained Level 2 in HKDSE Physics or Combined Science with a component in Physics) are required to take and pass two Physics enhancement subjects (Foundation Physics I and Foundation Physics II) before they can take Physics I and Physics II.

Students who have attained Level 2 in any one of the HKDSE extended modules in Mathematics are required to take “Calculus I” only. Students who have not attained Level 2 in any one of the HKDSE extended modules in Mathematics are required to take both “Calculus IA” and “Basic Mathematics - an introduction to Algebra and Differential Calculus”.


5. **Management and Operation**

5.1 **Administration**

The daily operation of the programme, such as general administration of admission, registrations, student records, preparation for Board-of-Examiners meetings and documentations, is overseen by the Programme Leader and the administrative team of the Department. All enquiries regarding registration and general administration from students on the programme should be made to the General Office as the first contact point.

The Departmental Undergraduate Programmes Committee, in which the Head of Department and the Programme Leaders of all programmes offered by the Department are members, discusses and reviews the programme structure, syllabi content, high-level integration and future directions of the programme. The Departmental Learning and Teaching Committee advises on matters related to teaching methods and learning quality and cultivates the positive mentality toward teaching and learning among teaching staff and students. WIE/Career Liaison Officer and Student-Exchange Coordinator are appointed by the Department to provide students with advice and assistance.

5.2 **Academic Advisors**

While the Programme Leader is available for the operation of the programme, general enquiry and counselling, Academic Advisors are in place to offer more personal contacts and to look after students’ need.

The Academic Advisors, usually an academic staff member, is assigned to each newly admitted student and he/she will be with the student till graduation. Academic Advisors provide continuous and individual counselling and help guide the students through various difficulties, if any, which might affect their studies. A specific staff member from the General Office will work closely with the Programme Leaders and the Academic Advisors. All academic requirements and regulations related to academic programmes offered by the department as well as the GUR requirements will be provided to the students.
6 Academic Regulations on Admission, Registrations and Assessment

The admission, registration and assessment arrangements described below are in accordance with the University policies and regulations for all 4-year full-time undergraduate degree programmes, including programmes of 5-year duration due to the provision for a sandwich year. Under the framework of the 4-year undergraduate degree programmes, students can work for either a single discipline Major, or a Major plus a Minor. These regulations shall apply to both circumstances, unless otherwise specified.

6.1 Admission

Students are admitted into the programme via the Joint University Programmes Admissions System (JUPAS). Non-JUPAS applicants are also considered on their academic merits, as well as non-academic achievements.

6.2 Re-admission

Students who have been required to withdraw on the grounds of academic failure or have been de-registered, and those who have discontinued their studies without completing the proper procedures for official withdrawal, shall not be considered for re-admission to the same programme/stream in the following academic year. However, for students de-registered/withdrawn from a 3-year full-time Bachelor’s degree programme, they will be allowed to apply to the 4-year degree programme leading to the same award. Those de-registered/withdrawn from a Broad Discipline will also be allowed to apply to the constituent single discipline programmes, and vice versa, in the following academic year.

6.3 Transfer of study within the University

A student who has not completed his programme of study may apply to transfer to another programme, and may be admitted, provided that the total period of registration does not exceed the maximum period of registration of the programme with the longer duration. However, year one new students will only be considered for transfer to another programme offered in the same mode of study, starting from their second semester of registration.

Students who wish to transfer to another full-time UGC-funded programme of the same level within the University should submit an application for transfer of study, instead of a new application in the non-JUPAS application period.

All applications for transfer of study will be considered in competition with other new applications.

6.4 Concurrent enrolment

Students are not permitted to enrol concurrently on two full-time/sandwich programmes, whether or not one of the programmes is offered by another institution.

Except for programmes which do not lead to any formal award, students are not allowed to enrol concurrently on a full-time/sandwich programme and a part-time programme, or on more than one part-time programmes, including those offered by another institution, without permission from the Head(s) of Department concerned.
6.5 **Maximum duration for completion of a programme and the validity period of subject credits**

The maximum period of registration on, and for completion of, a programme is normally twice the duration of the programme, and must not exceed 8 years. This 8 year maximum period shall apply to programmes whose specified duration is more than 4 years. This period shall exclude deferment granted for justifiable reasons such as illness or posting to work outside Hong Kong, but any semester in which the students are allowed to take zero subject will be counted towards the maximum period of registration.

A student's registration shall lapse if it is no longer possible for him to obtain an award within the maximum period of registration.

The validity period of subject credits earned is 8 years from the year of attainment, i.e. the year in which the subject is completed. Credits earned from previous study should remain valid at the time when the student applies for credit transfer.

6.6 **Residential requirement**

In order to be considered for an award granted by the University, a student must complete at least 1/3 of the normal credit requirement for the award he is currently enrolled, unless the professional bodies concerned stipulate otherwise.

6.7 **Subject registration and withdrawal**

In addition to programme registration, students need to register for the subjects at specified periods prior to the commencement of the semester. An add/drop period will also be scheduled for each semester/term. Students may apply for withdrawal of their registration on a subject after the add/drop period, if they have a genuine need to do so. The application should be made to the relevant programme offering Department and will require the approval of both the subject lecturer and the host Department Programme Leader concerned. Applications must be submitted one month before the commencement of the examination period. For approved applications of subject withdrawal, the tuition fee paid for the subject will be forfeited and the withdrawal status of the subject will be shown in the examination result notification and transcript of studies, but will not be counted in the calculation of the GPA.

The pre-requisite requirements of a subject must have been fulfilled before a student registers for that subject. However, the subject offering Department has the discretion to waive the pre-requisite requirements of a subject, if deemed appropriate. If the pre-requisite subject concerned forms part of the requirements for award, the subject has to be passed in order to satisfy the graduation requirements for the programme concerned, despite the waiving of the pre-requisite.

Students will be allowed to take additional subjects for broadening purpose, after they fulfil the graduation requirements and for the following semester. However, they will still be subject to the maximum study load of 21 credits per semester and the availability of places in the subjects concerned, and their enrolment will be as subject-based students only.
6.8 Study Load

For students following the progression pattern specified for their programme, they have to take the number of credits and subjects, as specified in this Definitive Programme Document, for each semester. Students cannot drop those subjects assigned by the department unless prior approval has been given by the department.

The normal study load is 15 credits in a semester. The maximum study load to be taken by a student in a semester is 21 credits, unless exceptional approval is given by the Head of the programme offering department. For such cases, students should be reminded that the study load approved should not be taken as the grounds for academic appeal.

Students are not allowed to take zero subject in any semester, including the mandatory summer term as required by some programmes, unless they have obtained prior approval from the programme offering department; otherwise they will be classified as having unofficially withdrawn from their programme. Students who have been approved for zero subject enrolment (i.e. taking zero subject in a semester) are allowed to retain their student status and continue using campus facilities and library facilities. Any semester in which the students are allowed to take zero subject will nevertheless be counted towards the maximum period of registration.

6.9 Subject exemption

Students may be exempted from taking any specified subjects, including mandatory General University Requirements (GUR) subjects, if they have successfully completed similar subjects previously in another programme or have demonstrated the level of proficiency/ability to the satisfaction of the subject offering department. Subject exemption is normally decided by the subject offering department. However, for applications which are submitted by students who have completed an approved student exchange programme, the subject exemption is to be decided by the programme offering department in consultation with the subject offering departments. In case of disagreement between the programme offering department and the subject offering department, the two Faculty Deans/School Board Chairmen concerned will make a final decision jointly on the application. If students are exempted from taking a specified subject, the credits associated with the exempted subject will not be counted towards meeting the award requirements. It will therefore be necessary for the students to consult the programme offering department and take another subject in order to satisfy the credit requirement for the award.

6.10 Credit transfer

Students may be given credits for recognised previous studies (including mandatory General University Requirements (GUR) subjects, and the credits will be counted towards meeting the requirements for award. Credit transfer normally will be done without the grade being carried over. Subject credit transfer is normally decided by the subject offering department. However, for applications which are submitted by students who have completed an approved student exchange programme, the decision will be made by the programme offering department in consultation with the subject offering departments.

In case of disagreement between the programme offering department and the subject offering department, the two Faculty Deans/School Board Chairmen concerned will make a final decision jointly on the application. The validity period of credits previously earned, is 8 years after the year of attainment.
Normally, not more than 50% of the credit requirement for award may be transferable from
approved institutions outside the University. For transfer of credits from programmes
offered by the University, normally not more than 67% of the credit requirement for award
can be transferred. In cases where both types of credits are being transferred (i.e. from
programmes offered by the University and from approved institutions outside the
University), not more than 50% of the credit requirement for award may be transferred.

Credit transfer can be applicable to credits earned by students through study at an overseas
institution under an approved exchange programme. Students should, before they go abroad
for the exchange programme, seek prior approval from the programme offering department
on their study plan and credit transferability. In order to overcome the problems associated
with subject-to-subject mappings, block credit transfer rather than subject-by-subject credit
transfer can be given.

All credit transfers approved will take effect only in the semester for which they are
approved. A student who applies for transfer of credits during the re-enrolment or the
add/drop period of a particular semester will only be eligible for graduation at the end of that
semester, even if the granting of credit transfer will immediately enable the student to satisfy
the credit requirement for the award.

6.11 Deferment of study

Students may apply for deferment of study if they have a genuine need to do so such as
illness. Approval from the department offering the programme is required. The deferment
period will not be counted towards the maximum period of registration.

Application for deferment of study will be entertained only in exceptional circumstances
from students who have not yet completed the first year of a full-time or sandwich
programme. Where the period of deferment of study begins during a stage for which fees
have been paid, no refund of such fees will be made. Students who have been approved for
deferment are not entitled to enjoy any campus facilities during the deferment period.

6.12 General Assessment Regulations

These General Assessment Regulations shall govern all full-time 4-year undergraduate
degree programmes and articulation degree programmes, except where the Senate decides
otherwise. Unless otherwise specified, students who have opted for the Major/Minor route
should abide by the academic regulations, including assessment regulations, stipulated in the
definitive programme document applicable to students of the single-discipline Major
programme.

For all programmes, students progress by credit accumulation, i.e. credits earned by passing
individual subjects can be accumulated and counted towards the final award.

(i) Subject Level

A 'level' in a programme indicates the intellectual demand placed upon students and may
characterise each subject with respect to its recommended sequencing within that
programme. Upper level subjects should normally build on lower level subjects. Pre-
requisite requirements, if any, must therefore be spelt out on a subject basis.
A 'subject' is defined as a discrete section of the programme which is assigned a separate assessment. A list of subjects, together with their level and weightings, shall be published in the definitive programme document.

The following is the Subject Level code adopted by the University:

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<th>Explanation</th>
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<td>Pre-university level standard (and remedial subjects taken by new admittees to a 4-year degree programme, or some subjects offered to Higher Diploma students only)</td>
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<tr>
<td>1</td>
<td>Standard comparable to year 1 of a 4-year degree programme</td>
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<tr>
<td>2</td>
<td>Standard comparable to year 2 of a 4-year degree programme</td>
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<td>Standard comparable to year 3 of a 4-year degree programme</td>
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<td>Standard comparable to the final year of a 4-year degree programme</td>
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<td>Master's degree level</td>
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<tr>
<td>6</td>
<td>Doctoral degree level</td>
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</table>

(ii) Language of assessment

The language of assessment for all programmes/subjects shall be English, unless approval is given for it to be otherwise.

6.13 Principles of assessment

Assessment of learning and assessment for learning are both important for assuring the quality of student learning. Assessment of learning is to evaluate whether students have achieved the intended learning outcomes of the subjects that they have taken and have attained the overall learning outcomes of the academic programme at the end of their study at a standard appropriate to the award. Appropriate methods of assessment that align with the intended learning outcomes should be designed for this purpose. The assessment methods will also enable the teacher to differentiate students’ different levels of performance within the subject. Assessment for learning is to engage students in productive learning activities through purposefully designed assessment tasks.

Assessment will also serve as feedback to students. The assessment criteria and standards should be made explicit to students before the start of the assessment to facilitate student learning, and feedback provided should link to the criteria and standards. Timely feedback should be provided to students so that they are aware of their progress and attainment for the purpose of improvement.

The ultimate authority in the University for the confirmation of academic decisions is the Senate, but for practical reasons, the Senate has delegated to the Faculty/School Boards the authority to confirm the decisions of Boards of Examiners provided these are made within the framework of the General Assessment Regulations. Recommendations from Board of Examiners which fall outside these Regulations shall be ratified by the Academic Regulations Committee (ARC) and reported to the Senate.
6.14 Assessment methods

Students' performance in a subject can be assessed by continuous assessment and/or examinations, at the discretion of the individual subject offering department. Where both continuous assessment and examinations are used, the weighting of each in the overall subject grade shall be clearly stated in the definitive programme document. The subject offering department can decide whether students are required to pass both the continuous assessment and examination components, or either component only, in order to obtain a subject pass, but this requirement (to pass both, or either, components) shall be specified in the Definite Programme Document. Learning outcome should be assessed by continuous assessment and/or examination appropriately, in line with the outcome-based approach.

Continuous assessment may include tests, assignments, projects, laboratory work, field exercises, presentations and other forms of classroom participation. Continuous Assessment assignments which involve group work should nevertheless include some individual components therein. The contribution made by each student in continuous assessment involving a group effort shall be determined and assessed separately, and this can result in different grades being awarded to students in the same group.

Assessment methods and parameters of subjects shall be determined by the subject offering department.

At the beginning of each semester, the subject teacher should inform students of the details of the methods of assessments to be used, within the assessment framework as specified in the definitive programme document.

6.15 Progression/Academic Probation/Deregistration

(i) The Board of Examiners shall, at the end of each semester (except for Summer Term unless there are students who are eligible to graduate after completion of Summer Term subjects), determine whether each student is

(a) eligible for progression towards an award; or

(b) eligible for an award; or

(c) required to be deregistered from the programme.

When a student has a Grade Point Average (GPA) lower than 2.0, he will be put on academic probation in the following semester. If a student is able to pull his GPA up to 2.0 or above at the end of the semester, the status of "academic probation" will be lifted. The status of "academic probation" will be reflected in the examination result notification but not in the transcript of studies.
(ii) A student will have ‘progressing’ status unless he falls within anyone of the following categories, which may be regarded as grounds for deregistration from the programme:

(a) the student has exceeded the maximum period of registration for that programme, as specified in the Definitive Programme Document; or

(b) the student's GPA is lower than 2.0 for two consecutive semesters and his Semester GPA in the second semester is also lower than 2.0; or

(c) the student's GPA is lower than 2.0 for three consecutive semesters.

The progression of students to the following academic year will not be affected by the GPA obtained in the Summer Term, unless Summer Term study is mandatory for all students of the programme and constitutes a requirement for graduation.

A student may be de-registered from the programme enrolled before the time frame specified at (ii) or (iii) of (b) above if his academic performance is poor to the extent that the Board of Examiners deems that his chance of attaining a GPA of 2.0 at the end of the programme is slim or impossible.

Where there are good reasons, the Board of Examiners has the discretion to recommend allowing students who fall into categories as stated at (ii) or (iii) of (b) above to stay on the programme, and these recommendations should be presented to the relevant Faculty/School Board for final decision.

Under the current procedures, a student can appeal against the decision of the Board of Examiners to de-register him. If such an appeal was upheld by the Department/School concerned, the recommendation (to reverse the previous decision to de-register the student) should also be presented to the relevant Faculty/School Board for final decision.

6.16 Retaking of subjects

Students may retake any subject for the purpose of improving their grade without having to seek approval, but they must retake a compulsory subject which they have failed, i.e. obtained an F grade. Retaking of subjects is with the condition that the maximum study load of 21 credits per semester is not exceeded. Students wishing to retake passed subjects will be accorded a lower priority than those who are required to retake (due to failure in a compulsory subject) and can only do so if places are available.

The number of retakes of a subject is not restricted. Only the grade obtained in the final attempt of retaking (even if the retake grade is lower than the original grade for originally passed subject) will be included in the calculation of the Grade Point Average (GPA). If students have passed a subject but failed after retake, credits accumulated for passing the subject in a previous attempt will remain valid for satisfying the credit requirement for award. (The grades obtained in previous attempts will only be reflected in transcript of studies.)

In cases where a student takes another subject to replace a failed elective subject, the fail grade will be taken into account in the calculation of the GPA, despite the passing of the replacement subject.
6.17 Absence from an assessment component

If a student is unable to complete all the assessment components of a subject, due to illness or other circumstances which are beyond his control and considered by the subject offering Department as legitimate, the Department will determine whether the student will have to complete a late assessment and, if so, by what means. This late assessment shall take place at the earliest opportunity, and before the commencement of the following academic year (except that for Summer Term, which may take place within 3 weeks after the finalisation of Summer Term results). If the late assessment cannot be completed before the commencement of the following academic year, the Faculty/School Board Chairman shall decide on an appropriate time for completion of the late assessment.

The student concerned is required to submit his/her application for late assessment in writing to the Head of Department offering the subject, within 5 working days from the date of the examination, together with any supporting documents. Approval of applications for late assessment and the means for such late assessments shall be given by the Head of Department offering the subject or the Subject Lecturer concerned, in consultation with the Programme Leader.

6.18 Aegrotat award

If a student is unable to complete the requirements of the programme in question for the award due to very serious illness, or other very special circumstances which are beyond his control, and considered by the Board of Examiners as legitimate, the Faculty/School Board will determine whether the student will be granted an aegrotat award. Aegrotat award will be granted under very exceptional circumstances.

A student who has been offered an aegrotat award shall have the right to opt either to accept such an award, or request to be assessed on another occasion to be stipulated by the Board of Examiners; the student's exercise of this option shall be irrevocable.

The acceptance of an aegrotat award by a student shall disqualify him from any subsequent assessment for the same award.

An aegrotat award shall normally not be classified, and the award parchment shall not state that it is an aegrotat award. However, the Board of Examiners may determine whether the award should be classified, provided that they have adequate information on the students' academic performance.
### 6.19 Grading

Assessment grades shall be awarded on a criterion-referenced basis. A student's overall performance in a subject (including GUR subjects) shall be graded as follows:

<table>
<thead>
<tr>
<th>Subject grade</th>
<th>Short description</th>
<th>Elaboration on subject grading description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Exceptionally Outstanding</td>
<td>The student's work is exceptionally outstanding. It exceeds the intended subject learning outcomes in all regards.</td>
</tr>
<tr>
<td>A</td>
<td>Outstanding</td>
<td>The student's work is outstanding. It exceeds the intended subject learning outcomes in nearly all regards.</td>
</tr>
<tr>
<td>B+</td>
<td>Very Good</td>
<td>The student's work is very good. It exceeds the intended subject learning outcomes in most regards.</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>The student's work is good. It exceeds the intended subject learning outcomes in some regards.</td>
</tr>
<tr>
<td>C+</td>
<td>Wholly Satisfactory</td>
<td>The student's work is wholly satisfactory. It fully meets the intended subject learning outcomes.</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>The student's work is satisfactory. It largely meets the intended subject learning outcomes.</td>
</tr>
<tr>
<td>D+</td>
<td>Barely Satisfactory</td>
<td>The student's work is barely satisfactory. It marginally meets the intended subject learning outcomes.</td>
</tr>
<tr>
<td>D</td>
<td>Barely Adequate</td>
<td>The student's work is barely adequate. It meets the intended subject learning outcomes only in some regards.</td>
</tr>
<tr>
<td>F</td>
<td>Inadequate</td>
<td>The student's work is inadequate. It fails to meet many of the intended subject learning outcomes.</td>
</tr>
</tbody>
</table>

'F' is a subject failure grade, whilst all others ('D' to 'A+') are subject passing grades. No credit will be earned if a subject is failed.
<table>
<thead>
<tr>
<th>Codes</th>
<th>Interpretation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I #</td>
<td>Assessment to be completed</td>
<td>An incomplete grade must be converted to a regular grade normally in the following academic year at the latest.</td>
</tr>
<tr>
<td>N</td>
<td>Assessment is not required</td>
<td>—</td>
</tr>
<tr>
<td>P</td>
<td>Pass an ungraded subject</td>
<td>This code applies to an ungraded subject, such as industrial training.</td>
</tr>
<tr>
<td>U</td>
<td>Fail an ungraded subject</td>
<td>This code applies to an ungraded subject, such as industrial training.</td>
</tr>
<tr>
<td>M</td>
<td>Pass with Merit</td>
<td>This code applies to all General Education subjects for intake cohorts before 2010/11. The adoption or otherwise of this code to other subjects adopting a &quot;Pass/Fail&quot; grading system would be subject to the decision of individual Departments. The grade &quot;Pass with Merit&quot; can be awarded when the student's work exceeds the subject learning outcomes in the majority of regards.</td>
</tr>
<tr>
<td>L</td>
<td>Subject to be continued in the following semester</td>
<td>This code applies to subjects like &quot;Project&quot; which may consist of more than 1 part (denoted by the same subject code) and for which continuous assessment is deemed appropriate.</td>
</tr>
<tr>
<td>S</td>
<td>Absent from assessment</td>
<td>—</td>
</tr>
<tr>
<td>W</td>
<td>Withdrawn from subject</td>
<td>Dropping of subjects after the add/drop period is normally not allowed. Requests for withdrawal from subjects after the add/drop period and prior to examination will only be considered under exceptional circumstances. This code is given when a student has obtained exceptional approval from Department to withdraw from a subject after the &quot;add/drop&quot; period and prior to examination; otherwise, a failure grade (grade F) should be awarded.</td>
</tr>
<tr>
<td>Z</td>
<td>Exempted</td>
<td>—</td>
</tr>
<tr>
<td>T</td>
<td>Transfer of credit</td>
<td>—</td>
</tr>
</tbody>
</table>

* Entry of grades/codes for subject components is optional.

# For cases where students fail marginally in one of the components within a subject, the BoE can defer making a final decision until the students concerned have completed the necessary remedial work to the satisfaction of the subject examiner(s). The students can be assigned an 'I' code in this circumstance.

Note: Subjects with the assigned codes I, N, P, U, M, L, W, Z and T (if the subject is without grade transferred) will be omitted in the calculation of the GPA. A subject assigned code S will be taken as zero in the calculation.
A numeral grade point is assigned to each subject grade, as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.5</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>B+</td>
<td>3.5</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>C+</td>
<td>2.5</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>D+</td>
<td>1.5</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

At the end of each semester/term, a Grade Point Average (GPA) will be computed as follows, and based on the grade point of all the subjects:

\[
GPA = \frac{\sum \text{Subject Grade Point} \times \text{Subject Credit Value}}{\sum \text{Subject Credit Value}}
\]

where \( n \) = number of all subjects (inclusive of failed subjects) taken by the student up to and including the latest semester/term. For subjects which have been retaken, only the grade point obtained in the final attempt will be included in the GPA calculation.

In addition, the following subjects will be excluded from the GPA calculation:

(i) Exempted subjects
(ii) Ungraded subjects
(iii) Incomplete subjects
(iv) Subjects for which credit transfer has been approved, but without any grade assigned
(v) Subjects from which a student has been allowed to withdraw (i.e. those with the code 'W')

Subject which has been given an "S" code, i.e. absent from assessment, will be included in the GPA calculation and will be counted as "zero" grade point. GPA is thus the unweighted cumulative average calculated for a student, for all relevant subjects taken from the start of the programme to a particular point of time. GPA is an indicator of overall performance, and is capped at 4.0.

All training credits will be counted in the GPA calculation but not in the WGPA calculation.

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1 Subjects taken in the University or elsewhere and with grades assigned, and for which credit transfer has been approved, will be included in the GPA calculation.

2 "Training credits" is used as a generic term only, and also includes clinical/field credits for programmes in different study disciplines. Laboratory experiments done as a subject/an integral part of a subject to satisfy the academic requirements is not considered to be practical training.
In the event that grade is awarded to subject components, a grade point with the decimal value may be generated for the overall result of the subject. This grade point with decimal value will be converted to grade according to the conversion methodology for deriving the subject overall grades. The corresponding grade point for the subject overall grade, instead of the actual grade points obtained by students, will be used for GPA calculation. This methodology for deriving subject overall grades only serves as an aid to subject assessors. As assessment should be a matter of judgement, not merely a result of computation, the subject lecturer will have the discretion to assign a grade which is considered to reflect more appropriately the overall performance of the student in a subject to override the grade derived by the computer.

6.20 Different types of GPA's

GPA's will be calculated for each Semester including the Summer Term. This Semester GPA will be used to determine students' eligibility to progress to the next Semester alongside with the 'cumulative GPA'. However, the Semester GPA calculated for the Summer Term will not be used for this purpose, unless the Summer Term study is mandatory for all students of the programme concerned and constitutes part of the graduation requirements.

The GPA calculated after the second Semester of the students' study is therefore a 'cumulative' GPA of all the subjects taken so far by students, and without applying any level weighting.

Along with the 'cumulative' GPA, a weighted GPA will also be calculated, to give an indication to the Board of Examiners on the award classification which a student will likely get if he makes steady progress on his academic studies. GUR subjects will be included in the calculation of weighted GPA for all programmes.

When a student has satisfied the requirements for award, an award GPA will be calculated to determine his award classification. GUR subjects will be included in the calculation of award GPA for all programmes.

For students taking the Major/Minor study route, a separate GPA will be calculated for their Major and Minor programmes. The Major GPA will be used to determine his award classification, which will be so reflected on the award parchment. The Minor GPA can be used as a reference for Board of Examiners to moderate the award classification for the Major.
<table>
<thead>
<tr>
<th>Types of GPA</th>
<th>Purpose</th>
<th>Rules for GPA calculation</th>
</tr>
</thead>
</table>
| GPA         | Determine Progression/ Graduation | (1) All academic subjects taken by the student throughout his study, both inside and outside the programme curriculum, are included in the GPA calculation.  
(2) For training subjects, including WIE and Clinical/Field subjects, departments can decide whether to include them in the GPA calculation.  
(3) For retake subjects, only the last attempt will be taken in the GPA calculation.  
(4) Level weighting, if any, will be ignored. |
| Semester GPA | Determine Progression | Similar to the rules for GPA as described above, except that only subjects taken in that Semester, including retaken subjects, will be included in the calculation. |
| Weighted GPA* | To give an interim indication on the likely Award GPA | (1) Similar to the rules for GPA, except that only subjects inside the programme curriculum concerned will be included in the calculation. Subjects outside the programme curriculum will be excluded.  
(2) Departments can decide whether the training subjects are to be counted towards the Weighted GPA.  
(3) For retake subjects, only the last attempt will be taken in the Weighted GPA calculation.  
(4) The weighted GPA will be the same as the Award GPA unless a student has taken more subjects than required. |
<table>
<thead>
<tr>
<th>Types of GPA</th>
<th>Purpose</th>
<th>Rules for GPA calculation</th>
</tr>
</thead>
</table>
| Major/Minor GPA      | For reference and determination of award classification | *Major/Minor GPA*<br>(1) Only subjects inside the curriculum of the Major/Minor Programmes will be taken in the Major/Minor GPA calculation.  
(2) Departments can decide whether the training subjects, are to be counted towards the Major/Minor GPA.  
(3) For retake subjects, only the last attempt will be taken in the Major/Minor GPA calculation.  |
|                      |                                                   | *Major GPA*<br>Level weighting will be included in the calculation of Major GPA.  |
|                      |                                                   | *Minor GPA*<br>Level weighting will not be included in the calculation of Minor GPA.  |
| Award GPA            | For determination of award classification          | If the student has not taken more subjects than required, the Award GPA will be as follows:  
(1) For single Major:  
Award GPA = Weighted GPA  
(2) For Major/Minor programmes:  
Award GPA = Major GPA  |

Bachelor of Engineering (Honours) in Electrical Engineering (4-year) 2013/14

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6.21 University Graduation Requirements

To be eligible for a Bachelor’s Degree award under the 4-year full-time undergraduate curriculum, a student must:

(i) Complete successfully a minimum of 120 credits.3

(ii) Earn a cumulative GPA (or both a Major GPA and Minor GPA if applicable)4 of 2.00 or above at graduation.

(iii) Complete successfully the mandatory Work-Integrated Education (WIE) component as specified by their programme/Major.

(iv) Satisfy the following GUR requirements:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Language and Communication Requirements5</td>
<td>9</td>
</tr>
<tr>
<td>(b) Freshman Seminar</td>
<td>3</td>
</tr>
<tr>
<td>(c) Leadership and Intra-Personal Development</td>
<td>3</td>
</tr>
<tr>
<td>(d) Service-Learning</td>
<td>3</td>
</tr>
<tr>
<td>(e) Cluster Areas Requirement (CAR)</td>
<td>12</td>
</tr>
<tr>
<td>(f) China Studies Requirement</td>
<td>(3 of the 12 CAR credits)</td>
</tr>
<tr>
<td>(g) Healthy Lifestyle</td>
<td>Non-credit bearing</td>
</tr>
</tbody>
</table>

Total = 30 credits

(v) Satisfy the residential requirement.

(vi) Satisfy any other requirements as specified in the Definite Programme Document.

A student is required to graduate as soon as he/she satisfies the graduation requirements. The student concerned is required to apply for graduation, in the semester in which he is able to fulfil all his graduation requirements, and after the add/drop period for that semester has ended.

Students taking the Major/Minor option will be considered for an award when they have satisfied the requirements for both the Major and Minor studies (i.e. having a GPA of 2.0 or above for the Major programme, Minor programme and overall) and have also submitted an application for graduation. If the 18 credits taken for the approved Minor study can meet the requirements for that Minor, the Major students may apply to graduate with a specific Minor, in addition to their Major. Otherwise, students will graduate with a Major only.

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3 This minimum only applies to students who are admitted through the normal route. Also, for passing a subject which is designed to fulfil the credit requirement of different types of subject, students will be regarded as having fulfilled the credit requirements of the particular types of subject concerned. Nevertheless, the subject itself will only be counted once in the student's total credit requirements, and the students will be required to make up the total credit requirement by taking another subject.

4 These requirements are applicable with effect from the 2012/13 cohorts of intakes, including students on Foundation Year programmes in 2011/12 who progress to stage 1 of FT undergraduate degree programmes in 2012/13. However, these are not applicable to students admitted to Senior Years in 2012/13 either on advanced standing or under the Senior Year quota.

5 Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from the DSR - Chinese and CAR - Chinese Reading and Writing requirements. However, this group of students would still be required to take one Chinese LCR subject to fulfil their Chinese LCR.
Subject to approval by the Minor-offering Department, students may count up to 6 credits from their Major/GUR [including Language Communication Requirements (LCR) subjects at proficiency level] towards their chosen Minor.

6.22 Guidelines for award classification

The Weighted GPA will be used as a guide to help determine award classifications, and the level weighting to different subjects of all disciplines and programmes will need to be specified in the Definitive Programme Document.

Weighted GPA will be computed as follows:

\[
\text{Weighted GPA} = \frac{\sum \text{Subject Grade Point} \times \text{Subject Credit Value} \times W_i}{\sum \text{Subject Credit Value} \times W_i}
\]

where \( W_i \) = weighting to be assigned according to the level of the subject (see note below)

\( n \) = number of all subjects counted in GPA calculation

Same as for GPA, Weighted GPA is capped at 4.0.

Any subjects passed after the graduation requirement has been met will not be taken into account in the grade point calculation for award classification.

For students who have completed a Major/Minor programme, a single classification will be awarded and their award classification will mainly be based on the "Major GPA", but it can be moderated by the Board of Examiners with reference to the "Minor GPA". For students who have completed a Major programme combined with free electives, their award classification will be determined by their "Major GPA" and the grades obtained for the free electives.

"Major GPA" is derived based on all subjects of the Major programme, including those meeting the mandatory General University Requirements (GUR) and programme-specific language requirement, but not necessarily including the training credits.

"Minor GPA" is derived based on the 18 credits of specific Minor programme. "Minor GPA" is unweighted.

The "Major GPA" and the "Minor GPA" will be presented separately to the Board of Examiners for consideration. The guidelines for determining award classification are applicable to programmes with Major/Minor studies.

Where a student has a high GPA for his Major but a lower GPA for his Minor, he will not be 'penalised' in respect of his award classification, which is attached to the Major. On the other hand, if a student has a lower GPA for his Major than his GPA for the Minor, the Board of Examiners may consider giving the student a higher award classification than with reference to his Major GPA.
6.23 Classification of awards

For Honours degree programmes, the awards will be classified as follows:

- First Class Honours
- Second Class Honours (Division 1)
- Second Class Honours (Division 2)
- Third Class Honours

The following are guidelines for Boards of Examiners' reference in determining award classifications:

<table>
<thead>
<tr>
<th>Honours degrees</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>The student's performance/attainment is outstanding, and identifies him as exceptionally able in the field covered by the programme in question.</td>
</tr>
<tr>
<td>2:i</td>
<td>The student has reached a standard of performance/attainment which is more than satisfactory but less than outstanding.</td>
</tr>
<tr>
<td>2:ii</td>
<td>The student has reached a standard of performance/attainment judged to be satisfactory, and clearly higher than the 'essential minimum' required for graduation.</td>
</tr>
<tr>
<td>3rd</td>
<td>The student has attained the 'essential minimum' required for graduation at a standard ranging from just adequate to just satisfactory.</td>
</tr>
</tbody>
</table>

Under exceptional circumstances, a student who has completed an Honours degree programme, but has not attained Honours standard, may be awarded a Pass-without-Honours degree. A Pass-without-Honours degree award will be recommended, when the student has demonstrated a level of final attainment which is below the 'essential minimum' required for graduation with Honours from the programme in question, but when he has nonetheless covered the prescribed work of the programme in an adequate fashion, while failing to show sufficient evidence of the intellectual calibre expected of Honours degree graduates. For example, if a student in an Honours degree programme has a Grade Point Average (GPA) of 2.0 or more, but his Weighted GPA is less than 2.0, he may be considered for a Pass-without-Honours classification. A Pass-without-Honours is an unclassified award, but the award parchment will not include this specification.
The following is a set of indicators, for Boards of Examiners' reference, which can be used in helping to determine award classification:

<table>
<thead>
<tr>
<th>Honours classification</th>
<th>Weighted GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>3.7+ - 4</td>
</tr>
<tr>
<td>2:i</td>
<td>3.2+ - 3.7-</td>
</tr>
<tr>
<td>2:ii</td>
<td>2.3+ - 3.2-</td>
</tr>
<tr>
<td>3rd</td>
<td>2.0 - 2.3-</td>
</tr>
</tbody>
</table>

Note: "+" sign denotes 'equal to and more than'; "−" sign denotes 'less than'.

There is no requirement for Boards of Examiners to produce award lists which conform to the guidelines of the above table.

6.24 Examination result announcements, transcripts, testimonials and references

At the end of each semester, where appropriate, examination results are announced online for individual students' checking. It provides information on subjects taken and grades attained, the Grade Point Average (GPA) for all subjects, and the overall result for that semester. The announcement serves as an official notification of the student's academic performance.

A formal transcript of studies will be issued by the University, upon request, to any student registered on a programme offered by the University, and it will include the following information:

(i) name and student number;

(ii) title of the programme(s) on which enrolled, or from which graduated;

(iii) medium of instruction for the programme (applicable only to programmes which are delivered in Chinese and for which both Chinese and English versions are offered);

(iv) a full academic record, giving subjects taken and grades attained, and the Grade Point Average (GPA) for all subjects;

(v) credit requirement of the student if different from the normal credit requirement of the programme;

(vi) where relevant, the final award(s) granted, with classification and year of award; and

(vii) a statement indicating that the student has completed the Work-integrated Education (WIE) activities, and the Healthy Lifestyle subject which is non-credit bearing.

Students may request for a testimonial which is a certification of their studies at the University, but without details on subjects and subject results. Students may also request for references direct from academic staff/members concerned.
Appendix I

Subject Description Forms
## Content

<table>
<thead>
<tr>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF3625</td>
</tr>
<tr>
<td>AF5107</td>
</tr>
<tr>
<td>AMA1100</td>
</tr>
<tr>
<td>AMA1101</td>
</tr>
<tr>
<td>AMA1102</td>
</tr>
<tr>
<td>AMA1103</td>
</tr>
<tr>
<td>AMA1104</td>
</tr>
<tr>
<td>AMA2111</td>
</tr>
<tr>
<td>AMA2112</td>
</tr>
<tr>
<td>AP00002</td>
</tr>
<tr>
<td>AP00003</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>APSS1L01</td>
</tr>
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<td>BSE463</td>
</tr>
<tr>
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</tr>
<tr>
<td>CBS1102P</td>
</tr>
<tr>
<td>CBS3241P</td>
</tr>
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<td>EE521A</td>
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<td>EE522A</td>
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<td>Course Code</td>
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<td>EE524A</td>
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<td>EE528A</td>
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<td>ELC1012/1013</td>
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<td>ELC2011</td>
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<td>ELC2012</td>
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<td>ELC2013</td>
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<td>ENG3002</td>
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<td>ENG3003</td>
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<td>ENG3004</td>
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<td>IC2105</td>
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<td>IC2112</td>
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<tr>
<td>ISE404</td>
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<tr>
<td>MM4522</td>
</tr>
</tbody>
</table>
**Subject Title**: Engineering Economics  
**Subject Code**: AF3625  
**Credit Value**: 3  
**Level**: 3  
**Pre-requisite / Co-requisite/Exclusion**: Exclusion: AF2618

### Objectives
1. Understand how the relevant economic factors shape the environment within which an engineering company operates.
2. Evaluate the financial condition of a company based on the financial statements.
3. Apply the basic cost accounting techniques in the planning and control of engineering and production activities.

### Subject Synopsis/Indicative Syllabus
**Economic Environment of a Firm**
- Microeconomic Factors: Supply, demand, price, profit, competition, monopoly and oligopoly.
- Macroeconomic Factors: Government interventions, fiscal policy, monetary policy, international trade and globalization.

**Accounting and Engineering Economics**
- Financial statements analysis: Return on investment, cost-volume-profit analysis, budgeting.
- Composition of cost: Direct costs, fixed costs, variable costs, marginal costs.
- Evaluation of investment alternatives: Capital Evaluation, net present value, internal rate of return.

### Teaching/Learning Methodology
The two-hour lecture each week focuses on the introduction and explanation of key concepts of engineering economics. The one-hour tutorial provides students with activities, including discussions and presentations, to facilitate student understanding and application of the concepts. They have learned to tackle real-life problems in Engineering Economics.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Intended Subject Learning Outcomes to Be Assessed</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>a, b, c</td>
<td>50%</td>
</tr>
<tr>
<td>Examination</td>
<td></td>
<td>50%</td>
</tr>
</tbody>
</table>

**Total**: 100%

To pass this subject, students are required to obtain Grade D or above in both the Continuous Assessment and Examination components.

### Reading List and References
**Recommended Textbooks**

**References**

**Student Study Effort Required**
- Class contact: Lecture 28 Hrs., Tutorial 14 Hrs.
- Other student study effort: Study and self-learning 45 Hrs., Written assignments 18 Hrs.
- Total student study effort: 105 Hrs.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Specific Assessment Methods/Details</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>1. In-class activities</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>2. Written assignments</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>3. Test</td>
<td>20%</td>
</tr>
<tr>
<td>Examination</td>
<td></td>
<td>50%</td>
</tr>
</tbody>
</table>

**Total**: 100%

**Intended Subject Learning Outcomes to Be Assessed**

<table>
<thead>
<tr>
<th>Intended Subject Learning Outcomes</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Understand how the relevant economic factors shape the environment within which an engineering company operates.</td>
<td>15%</td>
</tr>
<tr>
<td>b. Apply the basic cost accounting techniques in the planning and control of engineering and production activities.</td>
<td>15%</td>
</tr>
<tr>
<td>c. Evaluate the financial condition of a company based on the financial statements.</td>
<td>18%</td>
</tr>
</tbody>
</table>

**Total student study effort**

<table>
<thead>
<tr>
<th>Assessment Methods in Alignment with Intended Learning Outcomes</th>
<th>Other student study effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>29 Hrs.</td>
</tr>
<tr>
<td>Examination</td>
<td>14 Hrs.</td>
</tr>
<tr>
<td>Other student study effort</td>
<td></td>
</tr>
<tr>
<td>Continuous Assessment</td>
<td>29 Hrs.</td>
</tr>
<tr>
<td>Examination</td>
<td>14 Hrs.</td>
</tr>
<tr>
<td>Other student study effort</td>
<td></td>
</tr>
</tbody>
</table>

**Total student study effort**: 105 Hrs.
Subject Description Form

Subject Code: AF5107
Subject Title: Accounting for Engineers
Credit Value: 3
Level: 5
Normal Duration: One Semester
Pre-requisite/Co-requisite/Exclusion: None

Objectives:
To orient students to the purpose and the subject matter of accounting.
To provide students with the techniques and tools to understand and interpret accounting information.
To stimulate students’ interests in accounting.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:

a. Employ the accounting building blocks from the preparers’ perspective.
b. Understand accounting information from the users’ perspective and be able to interpret them.
c. Appreciate the role of quality accounting information in the decision making process.

Subject Synopsis/Indicative Syllabus:
Understanding Accounting
Why accounting matters. Accounting and its building blocks. The recording process. The accounting information system. The financial statements. Corporate governance, internal control and cash. The application of accounting rules (GAAPs) in general and in particular to receivables and long-lived assets.

Interpretation of Accounts
The need for comparative analysis. Tools of financial statement analysis. Understanding the uses and limitations of the tools. Gaining meaningful insights from the numbers.

Managerial Accounting Concepts & Techniques

Financial Management
Basic concepts and funding needs. Capital Budgeting. Cashflow statement, budgeted income statement, budgeted balance sheet and cash budget

Accounting is Interesting
A case study of financial statements of a listed company.

Teaching/Learning Methodology:
A three-hour seminar will be conducted each week to initiate students to ideas, concepts and techniques of the topics, which is then reinforced by their participation in class discussion, quiz and presentation. These are designed to consolidate and develop students’ understanding and analytical ability through problem solving and working on relevant cases.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>50%</td>
<td>a. Class Participation (assignments)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Group project</td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: In addition to the classroom activities (1 & 2), students are required to do some research and learning appraisals in assessment components 3 & 4.

Note: To pass this subject, students are required to obtain Grade D or above in BOTH the Continuous Assessment and Examination components. In addition, the specific requirements on individual assessment components discussed above could be adjusted based on the pedagogical needs of subject lecturers.

Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th>42 Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other student study effort:</td>
<td></td>
</tr>
<tr>
<td>▪ Reading books and working through assigned problems</td>
<td>45 Hrs.</td>
</tr>
<tr>
<td>▪ Research, discussion &amp; write-up</td>
<td>15 Hrs.</td>
</tr>
<tr>
<td>Total student study effort</td>
<td>102 Hrs.</td>
</tr>
</tbody>
</table>

Reading List and References


May 2013
**Subject Description Form**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AMA1100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Basic Mathematics - an Introduction to Algebra and Differential Calculus</td>
</tr>
<tr>
<td>Credit Value</td>
<td>2</td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Pre-requisite / Co-requisite / Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**Objectives**

This subject aims to introduce students to the basic concepts and principles of algebra, limit and differentiation. It is designed for those students with only the compulsory mathematics component in the NSS curriculum. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical techniques in solving practical problems in science and engineering.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able to:

(a) apply mathematical reasoning to solve problems in science and engineering;  
(b) make use of the knowledge of mathematical techniques and adapt known solutions to various situations;  
(c) apply mathematical modeling in problem solving;  
(d) demonstrate abilities of logical and analytical thinking.

**Subject Synopsis / Indicative Syllabus**

Mathematical Induction; Binomial Theorem; Functions and inverse functions; Trigonometric functions and their inverses. Limit concepts, derivatives and their physical & geometric meanings, rules of differentiation, implicit differentiation, L'Hopital's rule, maxima and minima of a function.

**Teaching / Learning Methodology**

Basic concepts and techniques of topics in algebra and in elementary differential calculus will be discussed in lectures. These will be further enhanced in tutorials through practical problem solving.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighing</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
</tr>
<tr>
<td>1. Homework, quizzes and mid-term test</td>
<td>40%</td>
<td>Y</td>
</tr>
<tr>
<td>2. Examination</td>
<td>60%</td>
<td>Y</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess students’ level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject focuses on understanding of basic concepts and application of techniques in algebra, limit and differentiation. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students’ progress in the course.

**Student Study Effort Expected**

- Lecture: 21 Hours
- Tutorial: 7 Hours
- Self-study: 42 Hours
- Total student study effort: 70 Hours

**Reading List and References**


Lang, S.  Short Calculus, Springer 2002
Subject Code: AMA1101

Subject Title: Calculus I

Credit Value: 4

Level: 1

Pre-requisite / Co-requisite / Exclusion:
Pre-requisite: NSS Mathematics plus Module I or Module II

Objectives:
This subject aims to introduce students to the theory and applications of differential and integral calculus. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical techniques in solving practical problems in science and engineering.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:
(a) apply mathematical reasoning to solve problems in science and engineering;
(b) make use of the knowledge of mathematical techniques and adapt known solutions to various situations;
(c) apply mathematical modeling in problem solving;
(d) demonstrate abilities of logical and analytical thinking.

Subject Synopsis/ Indicative Syllabus:
Review of limit and continuity; derivative and rules of differentiation; relative and absolute extremum; Rolle's theorem and the mean value theorem with applications; logarithmic, exponential, trigonometric and hyperbolic functions; applications of differential calculus including curve sketching. Indefinite and definite integrals; fundamental theorem of calculus; techniques of integration; Taylor's theorem with remainders; series expansion for elementary functions; improper integrals; some simple applications of integral calculus.

Teaching/Learning Methodology:
Basic concepts and techniques of calculus will be taught in lectures. These will be further enhanced in tutorials through practical problem solving.

Assessment Methods:
Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and mid-term test. An examination is held at the end of the semester.

Specific methods and assessment methods used to assess the following outcome:

<table>
<thead>
<tr>
<th>Intended Subject Learning Outcomes to be assessed</th>
<th>Percentage weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Homework, quizzes and mid-term test</td>
<td>40%</td>
</tr>
<tr>
<td>b. Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Specific assessment of assignments, quizzes and examinations are used to assess outcomes. Students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.
Subject Description Form

Subject Code: AMA1102
Subject Title: Calculus IA
Credit Value: 4
Level: 1

Pre-requisite / Co-requisite / Exclusion
Pre-requisite:
AMA1100 Foundation Mathematics

Objectives
This subject aims to introduce students to the theory and applications of differential and integral calculus. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical techniques in solving practical problems in science and engineering.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:
(a) apply mathematical reasoning to solve problems in science and engineering;
(b) make use of the knowledge of mathematical techniques and adapt known solutions to various situations;
(c) apply mathematical modeling in problem solving;
(d) demonstrate abilities of logical and analytical thinking.

Subject Synopsis/Indicative Syllabus
Review of limit, continuity and derivative; rules of differentiation; relative and absolute extremum; Rolle's theorem and the mean value theorem with applications; logarithmic, exponential and hyperbolic functions; simple applications of differential calculus; asymptotes of the graph of a function; curve sketching. Indefinite and definite integrals and their properties; fundamental theorem of calculus; techniques of integration; improper integrals; Taylor's theorem with remainders; series expansion for elementary functions; simple applications of calculus to geometry.

Teaching/Learning Methodology
Basic concepts and techniques of calculus will be taught in lectures. These will be further enhanced in tutorials through practical problem solving.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework, quizzes</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>

Total 100%

Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester. Questions used in assignments, quizzes, tests and examinations are used to assess students' level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in calculus. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Students are required to attend the tutorials regularly in order to allow subject lecturers to keep track of students' progress in the course.

Student Study Effort Expected
Class contact:
- Lecture: 42 Hrs.
- Tutorial: 14 Hrs.

Other student study effort:
- Homework and self-study: 84 Hrs.

Total student study effort: 140 Hrs.

Reading List and References
**Subject Description Form**

**Subject Code** AMA1103

**Subject Title** Introductory Linear Algebra

**Credit Value** 2

**Level** 1

**Pre-requisite / Co-requisite / Exclusion**
- Pre-requisite: NSS Mathematics
- Exclusion: NSS Mathematics Module II

**Objectives**
This subject aims to introduce students to some basic principles and knowledge of elementary linear algebra. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical techniques in solving practical problems in science and engineering.

**Intended Learning Outcomes**
Upon completion of the subject, students will be able to:
(a) apply mathematical reasoning to solve problems in science and engineering;
(b) make use of the knowledge and techniques in linear algebra and adapt known results to various situations;
(c) apply mathematical modeling in problem solving;
(d) demonstrate abilities of logical and analytical thinking.

**Subject Synopsis / Indicative Syllabus**
Matrices; systems of linear equations and Gaussian elimination; non-singular matrices; determinant; vectors in 2 or 3 dimensions and their inner product; simple applications of vectors in geometry.

**Teaching / Learning Methodology**
Basic concepts and techniques of matrices, linear systems and vector spaces will be taught in lectures. These will be further enhanced in tutorials through practical problem solving.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Homework, quizzes and mid-term test</td>
<td>40%</td>
<td>a, b, c, d</td>
</tr>
<tr>
<td>2. Examination</td>
<td>60%</td>
<td>a, b, c, d</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester. Questions used in assignments, quizzes, tests and examinations are used to assess students' level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.

**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**
The subject focuses on understanding of basic concepts and application of techniques in matrices, determinant, linear systems and vectors. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.

**Student Study Effort Expected**

<table>
<thead>
<tr>
<th>Class contact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
</tr>
<tr>
<td>Tutorial</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other student study effort:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and self-study</td>
</tr>
</tbody>
</table>

Total student study effort 70 Hrs

**References**
- Anton, H. Elementary Linear Algebra, 10th ed, John Wiley, 2010
Subject Description Form

Subject Code: AMA1104
Subject Title: Introductory Probability
Credit Value: 2
Level: 1
Pre-requisite: NSS Mathematics
Exclusion: NSS Mathematics Module I

Objectives
This subject aims to introduce students to some basic principles and knowledge of probability. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical techniques in solving practical problems in science and engineering.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:
(a) apply probabilistic and statistical reasoning to describe and analyze essential features of data sets;
(b) make use of the knowledge and techniques in probability and adapt known results to various situations;
(c) develop and extrapolate concepts of probability and statistics in data analysis and problem solving;
(d) demonstrate abilities of logical and analytical thinking.

Subject Synopsis/Indicative Syllabus
Introduction to Probability

Discrete Random Variables
Introduction to discrete random variables such as uniform, binomial, Poisson, etc. and their probability distributions. Mathematical expectation.

Continuous random variables
Concept of continuous random variables such as uniform, exponential, normal, etc. and their probability density functions. Mathematical expectation. Normal approximation to the binomial distribution.

Sampling Distributions
Population and random samples. Sampling distributions related to sample mean, sample proportions, and sample variances.

Estimation of Parameters
Concepts of a point estimator and a confidence interval. Point and interval estimates of a mean and the difference between two means.

Teaching/Learning Methodology
Basic concepts and techniques of probability and statistics will be taught in lectures. These will be further enhanced in tutorials through practical problem solving and case study.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>%</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Homework, quizzes and mid-term test</td>
<td>40%</td>
<td>a b c d</td>
</tr>
<tr>
<td>2. Examination</td>
<td>60%</td>
<td>a b c d</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess students’ level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in probability distributions, random variables and sampling distribution. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students’ progress in the course.

Student Study Effort Expected
Class contact:
- Lecture: 21 Hrs.
- Tutorial: 7 Hr.
Other student study effort:
- Homework and self-study: 42 Hrs.
Total student study effort: 70 Hrs.

References
Subject Description Form

Subject Code: AMA2111
Subject Title: Mathematics I
Credit Value: 3
Level: 2
Pre-requisite: Calculus I (AMA1101) or Calculus IA (AMA1102)
Co-requisite/Exclusion: Nil

Objectives:
- This subject aims to introduce students to the basic principles and techniques of engineering mathematics. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical methods in solving practical problems in science and engineering.

Intended Learning Outcomes:
1. apply mathematical reasoning to analyze essential features of different problems in science and engineering;
2. extend their knowledge of mathematical and numerical techniques and adapt known solutions in various situations;
3. develop and extrapolate the mathematical concepts in synthesizing and solving new problems;
4. demonstrate abilities of logical and analytical thinking;
5. search for useful information in the process of problem solving.

Contribution of the Subject to the Attainment of the Programme Outcomes:

Programme Outcome 1, 2, 4 and 5.

Programme Synopsis/Indicative Syllabus:
1. Algebra of complex numbers
   - Complex numbers, geometric representation, complex exponential, trigonometric, and hyperbolic functions, and polar forms of complex numbers.
2. Ordinary differential equations
3. Linear algebra
   - Linear systems, determinants, matrices, vector spaces, linear transformations, eigenvalues, and eigenvectors.
4. Partial differential equations
   - Solution of partial differential equations by series methods.
5. Laplace transforms
   - Introduction to Laplace transforms and their applications in solving differential equations.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>%</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework, quizzes and mid-semester</td>
<td>40%</td>
<td>✔ ✔ ✔ ✔ ✔</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
<td>✔ ✔ ✔ ✔ ✔</td>
</tr>
</tbody>
</table>

Total 100%

Continuous assessment comprises of assignments, quizzes, tests and examinations which are used to assess students’ knowledge of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject focuses on understanding of basic concepts and application of techniques in engineering mathematics. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit self-assessment and/or subject lecturers to keep track of students’ progress in the course.

Student Study Effort Expected:

<table>
<thead>
<tr>
<th>Class contact</th>
<th>Lecture</th>
<th>Tutorial</th>
<th>Mid-term test and examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28 Hours</td>
<td>14 Hours</td>
<td>5 hours</td>
</tr>
<tr>
<td>Other student study effort</td>
<td>Assignments and Self-study</td>
<td>73 Hours</td>
<td>7 hours</td>
</tr>
</tbody>
</table>

Subject Code  AMA2111
<table>
<thead>
<tr>
<th>Reading List and References</th>
<th>Total student study effort:</th>
</tr>
</thead>
</table>
Subject Code: AMA2112
Subject Title: Mathematics II
Credit Value: 3
Level: 2
Pre-requisite: Mathematics I (AMA2111)
Co-requisite/Exclusion: Nil

Objectives:
This subject is a continuation of AMA2111. It aims to introduce students to the basic principles and techniques of engineering mathematics. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical methods in solving practical problems in science and engineering.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:
1. apply mathematical reasoning to analyze essential features of different problems in science and engineering;
2. extend their knowledge of mathematical and numerical techniques and adapt known solutions in various situations;
3. develop and extrapolate the mathematical concepts in synthesizing and solving new problems;
4. demonstrate abilities of logical and analytical thinking;
5. search for useful information in the process of problem solving.

Contribution of the Subject to the attainment of the Programme Outcomes:

<table>
<thead>
<tr>
<th>Programme Outcomes</th>
<th>Category A: Professional/academic knowledge and skills</th>
<th>Category B: Attributes for all-roundedness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Programme Outcomes 4 and 5.</td>
<td>Programme Outcomes 10 and 11.</td>
</tr>
<tr>
<td>Category C: Personal Attributes and skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Programme Outcomes 6 and 8.</td>
<td></td>
</tr>
<tr>
<td>Category D: Communication and team work skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Programme Outcomes 10 and 11.</td>
<td></td>
</tr>
</tbody>
</table>

Teaching/Learning Methodology:
The subject will be delivered mainly through lectures and tutorials. The lectures aim to provide the students with an integrated knowledge required for understanding and application of fundamental concepts and techniques. Tutorials will mainly be used to develop students’ problem solving ability.

Assessment Methods:
Subject Description Form | Assessment methods | % Intended subject learning outcomes to be assessed (Phase 1 as appropriate) | % Intended subject learning outcomes to be assessed (Phase 2 as appropriate) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Homework, quizzes and mid-term test</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Examination</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examination is an end of the semester Continuous Assessment comprising of assignments, in-class quizzes, online quizzes, and short tests. Questions used in assignments, quizzes, tests and examinations are designed to assess student’s level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering. Students are required to obtain grades D or above in both the continuous assessment and the examination to pass this subject.

Teaching/Learning Methodology:
The subject will be delivered mainly through lectures and tutorials. The lectures aim to provide the students with an integrated knowledge required for understanding and application of fundamental concepts and techniques. Tutorials will mainly be used to develop students’ problem solving ability.

Assessment Methods:
Subject Description Form | Assessment methods | % Intended subject learning outcomes to be assessed (Phase 1 as appropriate) | % Intended subject learning outcomes to be assessed (Phase 2 as appropriate) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>1. Homework, quizzes and mid-term test</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Examination</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques in engineering mathematics. As such, an assessment method based mainly on examinations is considered appropriate. Furthermore, students are required to submit homework assignments in order to allow subject lecturers to keep track of students’ progress in the course.

Reading List and References:
Hall.
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AP00002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Foundation Physics I</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>0</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

#### Objectives
To provide students with fundamental knowledge in physics focusing on the topics of mechanics and thermal physics.

#### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

(a) grasp a basic understanding in selected fundamental physical principles in mechanics and thermal physics;
(b) solve real-life problems based on the physical principles; and
(c) appreciate the importance of some physical principles as employed in various branches of engineering.

#### Subject Synopsis/Indicative Syllabus
**Mechanics:** scalars and vectors; displacement, velocity and acceleration; motion along a straight line; projectile motion; Newton’s laws of motions; addition and resolution of forces; work, energy and power; conservation of energy; momentum, impulse and collision; conservation of momentum.

**Thermal physics:** temperature and thermometer; heat and internal energy; heat capacity; change of state and latent heat; conduction, convection and radiation; evaporation; general gas law.

#### Teaching/Learning Methodology
**Lecture:** The fundamentals in mechanics and thermal physics will be explained. Examples will be used to illustrate the concepts and ideas in the lecture. The students are free to request help. Homework problem sets will be given. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance.

**Student-centered Tutorial:** Students work on a set of problems in the tutorials. Students are encouraged to try to solve problems before seeking assistance. These problem sets provide them opportunities to apply the knowledge gained from the lecture. They also help the students consolidate what they have learned. Furthermore, students can develop a deeper understanding of the subject in relation to engineering science.

#### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
</table>
| (1) Continuous assessment         | 40          | ✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✧✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✏✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✍✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✏✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✞✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✡✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠✠criptors

#### Assessment
Homework problem sets and tests (assessment method 1) and a final written examination (assessment method 2) all require demonstration of basic understanding of the relevant physics (a), good problem solving skills (b), and being able to relate the fundamental physics to engineering problems (c).

The continuous assessments aim at checking the progress of students study throughout the course, assisting them in self-monitoring of fulfilling the learning outcomes. The examination will be used to assess the knowledge acquired by the students; as well as to determine the degree of achieving the learning outcomes.

#### Student Study Effort Expected
<table>
<thead>
<tr>
<th>Class contact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lecture</td>
</tr>
<tr>
<td>• Tutorial</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other student study effort:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Self-study</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total student study effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 h</td>
</tr>
</tbody>
</table>

#### Reading List and References
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AP00003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Foundation Physics II</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>0</td>
</tr>
<tr>
<td>Pre-requisite/ Co-requisite/ Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Objectives
To provide students with fundamental knowledge in physics focusing on the topics of waves and electromagnetism.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:
(a) grasp a basic understanding in selected fundamental physical principles in waves and electromagnetism;
(b) solve real-life problems based on the physical principles; and
(c) appreciate the importance of some physical principles as employed in various branches of engineering.

Subject Synopsis/Indicative Syllabus
Waves: nature of waves; wave motion and propagation; longitudinal and transverse waves; reflection and refraction; superposition of waves; standing waves; diffraction and interference; sound waves; light in electromagnetic spectrum; reflection and refraction of light; total internal reflection; image formation by mirrors and lenses; wave nature of light.

Electromagnetism: electric charges; electric field and potential; current, potential difference and resistance; Ohm's law; series and parallel circuits; electrical power; magnetic force and magnetic field; magnetic effect of electric current; magnetic force on moving charges and current-carrying conductors; Hall effect; electromagnetic induction.

Teaching/Learning Methodology
Lecture: The fundamentals in waves and electromagnetism will be explained. Examples will be used to illustrate the concepts and ideas in the lecture. The students are free to request help. Homework problem sets will be given. The students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance.

Student-centered Tutorial: Students work on a set of problems in the tutorials. Students are encouraged to try to solve problems before seeking assistance. These problem sets provide them opportunities to apply the knowledge gained from the lecture. They also help the students consolidate what they have learned. Furthermore, students can develop a deeper understanding of the subject in relation to engineering science.

Homework problem sets and tests (assessment method 1) and a final written examination (assessment method 2) all require demonstration of basic understanding of the relevant physics (a), good problem solving skills (b), and being able to relate the fundamental physics to engineering problems (c).

The continuous assessments aim at checking the progress of students study throughout the course, assisting them in self-monitoring of fulfilling the learning outcomes. The examination will be used to assess the knowledge acquired by the students; as well as to determine the degree of achieving the learning outcomes.

Student Study Effort Required
Class contact:
- Lecture: 28 h
- Tutorial: 14 h

Other students' study effort:
- Self-study: 78 h

Total student study effort: 120 h

Reading List and References
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AP10004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Physics Experiments</td>
</tr>
<tr>
<td>Credit Value</td>
<td>1</td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Objectives
To provide the students with hands-on experience in the operation of various kinds of physical instruments and to apply their knowledge in physical principles for practical applications.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:
(a) apply the principles, methodologies and skills for experimental observation and interpretation for scientific and engineering purposes;
(b) analyze, evaluate, synthesize and propose solutions to problems of a general nature with innovative/creative ideas where appropriate; and
(c) to collaborate smoothly with others in teamwork.

Subject Synopsis/Indicative Syllabus
Suggested Experiments:
1. Linear motion and Newton’s Laws
2. Artwood’s Machine and Kinetic Friction
3. Physical Pendulum
4. Specific Heat of objects
5. Ideal Gas Law
6. Heat Engine Cycle
7. Sound Waves and Standing Waves
8. Light Intensity and Polarization
9. Interference from a Single-slit and a Double-slit
10. Electrostatic system
11. Magnetic Fields
12. Electromagnetic induction

Teaching/Learning Methodology
Laboratory: Twelve experiments will be conducted. They cover the whole range of fundamental physics, i.e. mechanics, heat, wave, light, and electromagnetism. Students will work in groups and conduct the experiments under the guidance of teaching staff. They are required to analyze their experimental results using basic physical principles. They also have to answer preset questions and complete laboratory reports before they leave the laboratory.

Assessment Method in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Reports</td>
<td>✓</td>
</tr>
<tr>
<td>Participation</td>
<td>✓</td>
</tr>
<tr>
<td>Total</td>
<td>✓</td>
</tr>
</tbody>
</table>

Total 100

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
Method 1 is designed to assess how the students can apply their knowledge and whether they can provide a solution to a practical problem, which are the learning outcomes of (a) and (b). It also encourages the students to work in groups, which is outcome (c).

Student Study Effort Required

<table>
<thead>
<tr>
<th>Class contact</th>
<th>36 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td></td>
</tr>
<tr>
<td>Total student study effort</td>
<td>36 h</td>
</tr>
</tbody>
</table>

Reading List and Reference
Subject Code: AP10005
Subject Title: Physics I
Credit Value: 3
Level: 1
Pre-requisite/Co-requisite/Exclusion: Nil

Objectives:
This course provides a broad foundation in mechanics and thermal physics to those students who are going to study science, engineering, or related programmes.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:
(a) solve simple problems in single-particle mechanics using calculus and vectors;
(b) solve problems in mechanics of many-particle systems using calculus and vectors;
(c) define simple harmonic motion and solve simple problems;
(d) explain the formation of acoustical standing waves and beats;
(e) use Doppler's effect to explain changes in frequency received.
(f) explain ideal gas laws in terms of kinetic theory;
(g) apply the first law of thermodynamics to simple processes; and
(h) solve simple problems related to the Carnot cycle.

Subject Synopsis/Indicative Syllabus:
Mechanics:
- Calculus-based mechanics, dynamics, Newton's laws, calculus-based energy, etc.;
- Conservation laws; systems of particles; collisions; rigid body rotation; angular momentum; oscillations and simple harmonic motion; pendulum;

Thermal physics:
- Conduction, convection and radiation; black body radiation and energy quantization; ideal gas and kinetic theory; work, heat and internal energy;
- First law of thermodynamics; entropy and the second law of thermodynamics; heat engine and refrigerators.

Teaching/Learning Methodology:
Lecture: Fundamentals in mechanics, waves and electromagnetism will be explained.
Examples are added to illustrate concepts and ideas in the lecture. At least one test would be administered during the course of the subject as a means of checking how effective the students' digest and consolidate the materials taught in the class.

Student-centered Tutorial: Students will work in groups to solve problems in tutorials. These problem sets are designed to consolidate the material presented in lectures, and to develop the skills necessary to tackle unseen problems.

E-learning: In order to enhance the effectiveness of teaching and learning processes, basic communication tools and relevant learning platforms are used.

Assessment Methods in Alignment with Intended Learning Outcomes:
Specific assessment methods/tasks
Continuous assessment: 40%
Examination: 60%
Total: 100%

Intended subject learning outcomes to be assessed (Please tick as appropriate)
( ) a ( ) b ( ) c ( ) d ( ) e ( ) f ( ) g ( ) h

Continuous assessment:
The continuous assessment includes assignments, quizzes and tests, which are designed to check the progress of students throughout the course, assisting them in fulfilling the learning outcomes. They include end-of-chapter problems which are used to reinforce and assess the core concepts that they are expected to reach. At least one test would be administered during the course of the subject as a means of checking how effective the students' digest and consolidate the materials taught in the class.

Exam:
This is a major assessment component of the subject. It would be a closed-book examination. Complex problems would be given to avoid rote memorisation, such that the emphasis of assessment would be put on testing the understanding, analysis, and problem solving ability of the students.

Reading List and References:

Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Physics II</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Prerequisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**Objectives**

To provide students with fundamental knowledge in physics focusing on the topics of waves and electromagnetism. This course prepares students to study science, engineering or related programmes.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able to:

(a) apply simple laws in optics to explain image formation;
(b) explain phenomena related to the wave character of light;
(c) define electrostatic field and potential;
(d) use Gauss' law in solving problems in electrostatics;
(e) solve problems on interaction between current and magnetic field;
(f) apply electromagnetic induction to various phenomena; and
(g) solve simple problems in AC circuits.

**Subject Synopsis/Indicative Syllabus**

**Waves and optics**
- nature of light, reflection and refraction; image formation by mirrors and lenses.
- interference and diffraction; Young’s double-slit experiment; interference and diffraction gratings; polarization.

**Electromagnetism**
- law of electric charges and fields; Gauss's law; magnetic force on moving charges and current; Hall effect; Biot-Savart law and Ampere’s law; Faraday’s law and Lenz’s law; self-inductance and mutual inductance; transformers; AC circuits and applications.

**Teaching/Learning Methodology**

Lecture: The fundamentals in optics and electromagnetism will be explained. Examples will be used to illustrate the concepts and ideas in the lecture. Students are free to ask questions during the lecture.

Student-centered Tutorial: Students will work on a set of problems in small groups before seeking assistance from the lecturer. These problems provide opportunities for students to apply their knowledge gained from the lecture. They also help students to develop their understanding of the subject in relation to daily life phenomena and experiences.

E-learning: In order to enhance the effectiveness of teaching and learning processes, electronic means and multimedia technologies would be adopted for presentations of lectures, communication between students and lecturer, delivery of handouts, homework and notes etc.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods</th>
<th>Method of marking and weighting</th>
<th>% weighted</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous assessment</td>
<td>Lecture</td>
<td>40</td>
<td>(a) (b) (c) (d) (e) (f) (g)</td>
</tr>
<tr>
<td>Examinations</td>
<td>Lecture</td>
<td>60</td>
<td>(a) (b) (c) (d) (e) (f) (g)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Assessment in General**

Continuous assessment includes assignments, quizzes and tests which aim at checking the concepts and skills acquired by the students, and at focusing them in mastering the learning outcomes. Assignments in general include end-of-chapter problems, which are used to reinforce and assess the understanding of the concepts and skills taught throughout the course. Assignments will be graded using the assessment rubric mentioned in the class.

At least one test would be administered during the course of the subject, and two sets of tests will be given to the students. It would be a closed-book examination. Complicated formulas would be given on the exam paper and the emphasis of the assessment would be put on testing the understanding and conceptual abilities of the students.

**Examination: This is a major assessment component of the subject. It would be a closed-book examination.**

**Reading List and References**


**Student Study Effort Expected**

Class contact:
- Lecture: 36 h
- Tutorial: 6 h
- Other student study effort:
- Self-study: 78 h
- Total student study effort: 120 h
**Subject Description Form**

**Subject Code**: APSS1L01  
**Subject Title**: Tomorrow’s Leaders  
**Credit Value**: 3  
**Level**: 1

**GUR Requirements Intended to Fulfill**
- This subject intends to fulfill the following requirement(s):
  - Healthy Lifestyle
  - Freshman Seminar
  - Languages and Communication Requirement (LCR)
  - Leadership and Intra-Personal Development
  - Service-Learning
  - Cluster-Area Requirement (CAR)
    - Human Nature, Relations and Development
    - Community, Organization and Globalization
    - History, Cultures and World Views
    - Science, Technology and Environment
  - China-Study Requirement
    - Yes or No
  - Writing and Reading Requirements
    - English or Chinese

**Pre-requisite / Co-requisite/Exclusion**: Nil

**Assessment Methods**

<table>
<thead>
<tr>
<th>100% Continuous Assessment</th>
<th>Individual Assessment</th>
<th>Group Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Class Participation / Preparation</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2. Peer Assessment</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>3. Group Project</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>4. Individual Assignment</td>
<td>45%</td>
<td></td>
</tr>
</tbody>
</table>

**Objectives**

Specific objectives of the subject:

The course is designed to enable students to learn and integrate theories, research and concepts of the basic personal qualities (particularly intrapersonal and interpersonal qualities) of effective leaders. This course also intends to help students develop and reflect on their intrapersonal qualities, interpersonal qualities and connection of learning to oneself. Finally, the course cultivates students’ appreciation of the importance of intrapersonal and interpersonal qualities in effective leadership.

**Intended Learning Outcomes**

(Note 1)

Upon completion of the subject, students will be able to:

a. Understand and integrate theories, research and concepts on the basic qualities (particularly intrapersonal and interpersonal qualities) of effective leaders;  
b. Cultivate self-awareness and self-understanding;  
c. Develop interpersonal skills;  
d. Cultivate self-reflection skills;  
e. Understand the importance of intrapersonal and interpersonal qualities in effective leadership, particularly the connection of learning in the subject to one’s personal development.

**Subject Synopsis/Indicative Syllabus**

(Note 2)

1. An overview of the personal attributes of effective leaders: roles of self-understanding and interpersonal relationship qualities in effective leadership.  
2. Self-understanding and personality: theories and concepts; personality traits that are conducive to successful leadership.  
3. Cognitive competence: different types of thinking styles; higher-order thinking; experiential learning; role of cognitive competence, critical thinking and problem solving in effective leadership; effective leaders as teachers.  
4. Emotional competence: awareness and understanding of emotions; emotional quotient (EQ); role of emotional management in effective leadership; mental health and stress management.  
5. Resilience: stresses faced by adolescents; life adversities; coping with life stresses; adversity quotient (AQ); role of resilience in effective leadership.  
6. Morality and integrity: moral issues and moral competence; role of morality in effective leadership; ethical leadership; integrity and effective leadership.  
7. Spirituality: meaning of life and adolescent development; spirituality and mental health; role of spirituality in effective leadership; servant leadership.  
9. Relationship building, team building and conflict management: relationship quality and effective leadership; conflict management and effective leadership.  
10. Social competence and egocentrism: basic social competence skills; roles of social competence, care and compassion in effective leadership; egocentrism in university students.  
11. Interpersonal communication: theories, concepts, skills and blocks of interpersonal communication; role of communication skills in effective leadership.  
12. Self-leadership and sense of responsibility in effective leaders; life-long learning and leadership.

**Teaching/Learning Methodology**

(Note 3)

Students taking this course are expected to be sensitive to their own behavior in intrapersonal and interpersonal contexts. Intellectual thinking, reflective learning, experiential learning and collaborative learning are emphasized in the course. Case studies on successful and fallen leaders will also be covered in the course. The teaching/learning methodology includes:

1. Lectures;  
2. Experiential classroom activities;  
3. Group project presentation;  
4. Written assignment.
It is expected that classroom students will be invited to rate the performance and learning of university students? *International Journal on Disability and Human Development, 11*(3), 171-172.


Shenk, D. T. L., & Sun, R. C. F. (2013). Process evaluation of a leadership and...
intrapersonal development subject for university students. *International Journal on Disability and Human Development*, 12(2), 203-211.


### Student Study Effort Expected

| Class contact | 42 Hrs. |
| Lecture and experiential learning activities | 42 Hrs. |
| Group project preparation | 20 Hrs. |
| Reading and writing term paper | 75 Hrs. |
| **Total study effort** | 135 Hrs. |

### Reading List and References

**Basic References:**

- Last updated in July 2013

**APSSIL01** / for the academic year of 2013-14
## Supplementary References:


石丹銘 & 劉光琪 (主編) (2007). 《共創成長：賽馬會青少年培養計劃：概念架構及課程設計手冊（一）：背景、概念和設計》。香港：商務印書館。

石丹銘 & 李德仁 (主編) (2007). 《共創成長：賽馬會青少年培養計劃：概念架構及課程設計手冊（二）：青少年正面發掘概念》。香港：商務印書館。

### Note 1: Intended Learning Outcomes

Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

### Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

### Note 3: Teaching/Learning Methodology

This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

### Note 4: Assessment Method

This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

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Last updated in July 2013  APSSIL01 / for the academic year of 2013-14
SUBJECT DESCRIPTION FORM

Subject Title: Design of Mechanical Systems in Buildings
Subject Code: BSE 463

Number of Credits: 3
Workload:
- Lectures: 27 hours
- Tutorials & revision: 6 hours
- Project work: 9 hours
- Test & examination: 5 hours
- Self-study: 90 hours

Status: Electives (Specialist)

Responsible Staff and Department: M.Y. Chan, Assistant Professor, Department of Building Services Engineering

Pre-requisite: ENG232, EE321
Co-requisite: Nil
Exclusion: Nil

Objectives:
1. To provide students with a comprehensive understanding of air conditioning system, refrigeration and indoor environmental issues for different kinds of buildings common to Hong Kong; and
2. To provide students with a comprehensive understanding in formulating practical energy policies.

Student Learning Outcomes:
Upon completion of the subject, students are expected to:

Professional / academic knowledge and skills
1. Be able to undertake the design and analysis of refrigerating systems on the basis of understanding the function and working principles of refrigerating plants.
2. Be able to undertake the thermodynamic and application analysis of vapour compression refrigeration systems on the basis of understanding the function and working principles of vapour compression refrigeration systems.
3. Be able to select a proper method for estimating operation energy use for a given building air-conditioning system and associated equipment e.g. fans, pipe-works on the basis of understanding the energy analysis requirement, and the calculation principles of current major building energy analysis methods.
4. Be able to undertake the design and analysis of ventilation systems for general contaminants control on the basis of understanding the function and working principles of contaminants control, and able to undertake the ventilation measurements for evaluating the ventilation of contaminants control.
5. Be able to undertake the design and analysis of ventilation systems noise control.
6. Be knowledgeable of latest technology development and trend in HVACR Engineering, and of environmental impacts from refrigeration systems.

Attributes for all roundedness
1. Be able to communicate to others in a clear and concise manner through written reports, drawings and oral presentation; and
2. Be able to develop the skills and abilities to undertake independently, a major piece of investigation work in a specialist subject area.

Syllabus:
(1) Air conditioning: Psychrometry; duct sizing; ADPI
(2) Basics of heat transfer and its applications: thermal heat gain and loss in mechanical systems and building envelope
(3) Dimensional analysis: Simple analysis
(4) Fluid flow in air ducts or pipes: Pipe & duct sizing; Moody diagram
(5) Noise transmitted in HVAC system: EPD guidance note; Evaluation procedure; Attenuation in HVAC systems
(6) Pumps: Affinity laws; System curve; Operating point; Fan-duct system
(7) Refrigeration: Vapour compression cycle; Coefficient of performance; Refrigerant properties; Chiller plant; Heat rejection methods
(8) Air properties and psychrometry
(9) Ventilation: Simple well mixing theories

Method of Assessment:
- Assignment 15%
- Closed-book test 25%
- 3 hours Examination (closed-book): 60%

Indicative references:
Authors: G.F. Hundy, A.R. Trott, and T.C. Welch
Title: Refrigeration and Air Conditioning (Keyword Search: refrigeration + air conditioning)
Publisher: Oxford: Butterworth-Heinemann, 2008

Authors: T.D. Eastop & A. McConkey
Title: Applied Engineering Thermodynamics for Technologists (Keyword Search: thermodynamics + heat transfer)

Authors: Etheridge, David W.
Title: Building ventilation: theory and measurement (Keyword Search: ventilation + buildings)
Publisher: Chichester, England: Wiley, c1996
Subject Code: CBS1101P  
Subject Title: Fundamentals of Chinese Communication (大學中文傳意)  
Credit Value: 3  
Level: 1  
Pre-requisite / Co-requisite / Exclusion: For students entering with HKDSE Chinese subject result at Level 3 or equivalent  
Remarks: Upon completion of the subject, students will be able to:

(a) develop effective communication skills in written Chinese required for basic usage in the workplace;
(b) master properly and flexibly, the written format, organization, language and style of expression of various genres of Chinese practical writing such as official correspondences, publicity materials, reports and proposals;
(c) give formal presentation in Putonghua effectively and appropriately;
(d) engage with formal discussion in Putonghua effectively and politely.

### Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Intended Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Written Chinese for practical purposes</td>
</tr>
<tr>
<td>2. Oral Presentation</td>
</tr>
<tr>
<td>3. Final Examination</td>
</tr>
</tbody>
</table>

### Subject Synopsis / Indicative Syllabus

1. Written Chinese for practical purposes
   - Content, organization, language and style of each genre;
   - Form, organization, language and style of each genre;
   - Writing conventions, punctuation, grammar, and style;
   - Contextual, emotional and cultural appropriateness.

2. Oral Presentation
   - Choice of words in Putonghua;
   - The flow of speaking;
   - Manner of speaking and gesture.

3. Final Examination
   - Identification of main idea and key messages;
   - Evaluation of relevancy of information in a message;
   - Skills of summarizing;
   - Agreeing/disagreeing/answering to questions politely.

### Teaching / Learning Methodology

The subject will be conducted in Putonghua in highly interactive seminars. The subject will motivate students' active participation by assigning group presentation tasks for each student. Students are guided to:

1. Give a written report on a given topic;
2. Give an oral presentation on a given topic;
3. Give a power-point presentation on a given topic;
4. Give a written document on a chosen genre.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Intended Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Written Assignment</td>
<td>a</td>
</tr>
<tr>
<td>2. Oral Presentation</td>
<td>b</td>
</tr>
<tr>
<td>3. Final Examination</td>
<td>c</td>
</tr>
</tbody>
</table>

### Student Study Effort Expected

- Class contact: 42 Hrs.
- Outside Class Practice: 42 Hrs.
- Self-study: 42 Hrs.

### Total student study effort: 126 Hrs.

### Reading List and References

1. 路德慶主編 (1982) 《寫作教程》,華東師範大學出版社
2. 邵守義(1991)《演講全書》,吉林人民出版社
3. 陳建民(1994)《說話的藝術》,語文出版社
4. 李軍華(1996)《口才學》,華中理工大學出版社
5. 陳瑞端著(2000)《生活錯別字》,中華書局
6. 邢福義、汪國勝主編(2003)《現代漢語》,華中師範大學出版社
7. 于成鯤主編(2003)《現代應用文》,復旦大學出版社
8. 李白堅、丁迪蒙(2004)《大學體型寫作訓練規程》,上海大學出版社
9. 鍾文佳(2004)《漢語口才學》,西南師範大學出版社
10. 于成鯤、陳瑞端、秦扶一、金振邦主編(2011)《當代應用文寫作規範叢書》,復旦大學出版社
Subject Description Form

Subject Code: CBS1102P
Subject Title: Advanced Communication Skills in Chinese (高階中文傳意)
Credit Value: 3
Level: 1

Pre-requisite / Co-requisite / Exclusion
Remarks: For students entering with HKDSE Chinese subject result at Level 4 and 5 or equivalent

Objectives
This subject aims to develop effective communication skills of students in both spoken and written Chinese which are required for the business and professional setting.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:
(a) develop effective communication skills in both spoken and written Chinese required for in the business and professional setting;
(b) master the format, organization, language and style of expression of the following genres of Chinese practical writing: argumentative and persuasive writing, public speech;
(c) give public speech;
(d) produce creative writing.

Subject Synopsis / Indicative Syllabus
1. Written Chinese for Practical Purposes
   - Uses of words and sentences, choice of diction;
   - Coherence and thread of thinking in Chinese writing
   - Context dependent stylistic variation
   - Format, organization, language and style of expression of speeches, argumentative & persuasive writing;
2. Public Speech
   - Contextual elements: the audiences, the purpose and the topic
   - Identification of key points and collection of supporting information
   - Articulation and flow of speaking
   - Choice of words, manner and gesture
   - Using of visual aids
   - Handling of question and answer session
3. Creative Writing
   - Understanding of the features of creative writing
   - Being able to appreciate the arts of writing

Teaching / Learning Methodology
The subject will be conducted in highly interactive seminars. The subject will motivate the students’ active participation by assigning group presentation / discussion in class. In a forum-like format, students are guided to:
(1) present to the class, their understanding of each genre designed for the syllabus for discussions and improvement; (2) modify passages in a given genre/style into other genres/styles for addressing different audiences and purposes; (3) prepare a script for public speaking; (4) give a public speech in front of the whole class, then receive on spot feedback for discussion and improvement; and (5) engage in formal discussion on topics related to current issues or business operation that require persuasive and argumentative skills; then (6) produce an argumentative article on the same topic.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prose Writing</td>
<td>20%</td>
<td>√ a √ b √ c √ d</td>
</tr>
<tr>
<td>2. Written Draft for Formal Speech</td>
<td>10%</td>
<td>√ a √ b √ c √ d</td>
</tr>
<tr>
<td>3. Formal Speech</td>
<td>10%</td>
<td>√ a √ b √ c √ d</td>
</tr>
<tr>
<td>4. Feature Article</td>
<td>20%</td>
<td>√ a √ b √ c √ d</td>
</tr>
<tr>
<td>5. Class Participation</td>
<td>10%</td>
<td>√ a √ b √ c √ d</td>
</tr>
<tr>
<td>6. Final Examination</td>
<td>30%</td>
<td>√ a √ b √ c √ d</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>√ a √ b √ c √ d</td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
Both written assignments and oral presentation will focus on the functions of communication and the adequacy of language used in authentic social settings. The examination emphasizes the correctness of expression and students’ general competence in Chinese Language.

Students obtaining a subject pass must pass both components, i.e. the continuous assessment and examination component of the subject. Students will get failure of the subject if he/she fails in either one of the two components.

Student Study Effort Expected

Class contact:
- Seminar 42 Hrs.
- Hrs.

Other student study effort:
- Outside Class Practice 42 Hrs.
- Self-study 42 Hrs.

Total student study effort 126 Hrs.

Reading List and References
1. 路德慶主編(1982) 《寫作教程》，華東師範大學出版社
<table>
<thead>
<tr>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. 邵守義 (1991) 《演講全書》，吉林人民出版社</td>
</tr>
<tr>
<td>3. 陳建民（1994）《說話的藝術》，語文出版社</td>
</tr>
<tr>
<td>4. 李軍華（1996）《口才學》，華中理工大學出版社</td>
</tr>
<tr>
<td>5. 陳瑞端著（2000）《生活錯別字》，中華書局</td>
</tr>
<tr>
<td>6. 于成鯤主編（2003）《現代應用文》，復旦大學出版社</td>
</tr>
<tr>
<td>7. 邢福義、汪國勝主編（2003）《現代漢語》，華中師範大學出版社</td>
</tr>
<tr>
<td>8. 李白堅、丁迪蒙（2004）《大學體型寫作訓練規程》，上海大學出版社</td>
</tr>
<tr>
<td>9. 鍾文佳（2004）《漢語口才學》，西南師範大學出版社</td>
</tr>
<tr>
<td>10. 于成鯤、陳瑞端、秦扶一、金振邦主編（2011）《當代應用文寫作規範叢書》，復旦大學出版社</td>
</tr>
</tbody>
</table>
Subject Description Form

Subject Code: CBS3241P
Subject Title: Professional Communication in Chinese
Credit Value: 2
Level: 3
Pre-requisite / Co-requisite: Chinese LCR subjects (in Semester 2 of Year 3 or Semester 1 of Year 4)

Objectives
This subject aims to develop the language competence for professional communication in Chinese required by students to communicate effectively with various parties and stakeholders in regard to engineering-related project proposals and reports.

Intended Learning Outcomes
Upon completion of the subject, and in relation to effective communication with a variety of intended readers/audiences in Chinese, students will be able to:

a. plan, organise and produce professionally acceptable project proposals and reports with appropriate text structures and language for different intended readers
b. plan, organise and deliver effective project-related oral presentations with appropriate interactive strategies and language for different intended audiences
c. adjust the style of expression and interactive strategies in writing and speaking in accordance with different intended readers/audiences

Subject Synopsis/Indicative Syllabus
1. Project proposals and reports in Chinese
   - Planning and organising project proposals and reports
   - Explaining the background, rationale, objectives, scope and significance of a project
   - Referring to the literature to substantiate project proposals
   - Describing the methods of study
   - Describing and discussing project results, including anticipated results and results of pilot study
   - Presenting the budget, schedule and/or method of evaluation
   - Writing executive summaries/abstracts

2. Oral presentations of projects
   - Selecting content for audience-focused presentations
   - Choosing language and style appropriate to the intended audience
   - Using appropriate transitions and maintaining coherence in team presentations
   - Using effective verbal and non-verbal interactive strategies

Teaching/Learning Methodology
Learning and teaching approach
The subject is designed to develop the students' Chinese language skills, both oral and written, that students need to communicate effectively and professionally with a variety of stakeholders of engineering-related projects. It builds upon the language and communication skills covered in GUR language training subjects.

The study approach is primarily seminar-based. Seminar activities include instructor input as well as individual and group work, involving drafting and evaluating texts, mini-presentations, discussions and simulations.

The learning and teaching activities in the subject will focus on a course-long project which will engage students in proposing and reporting on an engineering-related project to different intended readers/audiences. During the course, students will be involved in:

- planning and researching the project
- writing project-related documents such as project proposals and reports
- giving oral presentations to intended stakeholders of the project

Collaboration of input/support from the Language Centres and the Engineering discipline
Students of this subject will also take the subject "Professional Communication in English", and will work on the same project in both subjects. In producing professionally acceptable documents and delivering effective presentations, students will be engaged in the use of appropriate Chinese and English language and skills, as well as applying knowledge learned in their Engineering subjects. As such, the planning, design and implementation of the teaching and learning activities and assessments will involve collaboration between the teaching staff from the CLC, the ELC, and staff from the Engineering discipline.

The study plan outlining the allocation of contact hours is attached.

Assessment
Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weight in grading</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>a  b  c</td>
</tr>
<tr>
<td>1. Project proposal in Chinese</td>
<td>60%</td>
<td>✓  ✓  ✓</td>
</tr>
<tr>
<td>2. Oral presentation of project proposal</td>
<td>40%</td>
<td>✓  ✓</td>
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<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
1. The assessments will arise from the course-long engineering-related...
Students will be assessed on written documents and oral presentations targeted at different intended readers/audiences. This facilitates assessment of students’ ability to select content and use language and style appropriate to the purposes and intended readers/audiences.

Students will collaborate in groups in planning, researching, discussing and giving oral presentations on the project. The written proposals will be individual work to ensure that students will be rigorously engaged in the application of language skills for the entire document.

2. There will be collaboration between the teaching staff from the Language Centres and the discipline in assessing students’ performances. It is expected that the teaching staff of the Engineering discipline will provide support in assessing students’ application of discipline knowledge. They will be involved in assessing the oral presentations intended for experts rather than those for laymen.

3. Hence the assessment pattern will be as follows:

<table>
<thead>
<tr>
<th>Assessment type</th>
<th>Intended readers/audience</th>
<th>Timing</th>
<th>Assessors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral presentation of project</td>
<td>Mainly engineering experts</td>
<td>Weeks 11-12</td>
<td>CLC staff and Engineering staff</td>
</tr>
<tr>
<td>Team presentation of 30 minutes, in groups of 4</td>
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<tr>
<td>Simulating a presentation of the proposal in progress</td>
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<tr>
<td>Written proposal in Chinese</td>
<td>Mainly laymen</td>
<td>Week 14</td>
<td>CLC</td>
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<tr>
<td>Document of around 1,500 words for the final proposal</td>
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</tbody>
</table>

Student Study Effort Expected

- **Class contact:**
  - Seminars 28 Hrs.

- **Other student study effort:**
  - Researching, planning, writing, and preparing the project 42 Hrs.

- **Total student study effort** 70 Hrs.

Reading List and References

a) 路德慶 主編 (1982) 《寫作教程》，華東師範大學出版社。
b) 司有和 (1984) 《科技寫作簡明教程》，安徽教育出版社。
c) 葉聖陶 吳叔湘 朱德熙 林漢 (1992) 《文章講評》，語文出版社。
d) 邢福義 汪國勝 主編 (2003) 《現代漢語》，華中師範大學出版社。
e) 于成權主编 (2003) 《現代應用文》，復旦大學出版社。
56 contact hours; with seminars for Chinese and English every week continuously over the 14 weeks (Assessments shaded)

<table>
<thead>
<tr>
<th>Writing and presenting projects in English</th>
<th>Writing and presenting projects in Chinese</th>
<th>Involvement of Engineering Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Week, contact hours and content)</td>
<td>(Week, contact hours and content)</td>
<td>• Setting the scenarios and requirements for the course-long project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 (2 hrs)</th>
<th>Introduction to course and project; pre-course task</th>
<th>1 (2 hrs)</th>
<th>Introduction to course and project; pre-course task</th>
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</thead>
<tbody>
<tr>
<td>2-5 (8 hrs)</td>
<td>Writing project proposals and reports</td>
<td>2-5 (8 hrs)</td>
<td>Writing project proposals and reports</td>
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<td></td>
<td>• Planning and organising project proposals and reports</td>
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<td>• Planning and organising project proposals and reports</td>
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<td></td>
<td>• Explaining the background; objectives; scope; significance</td>
<td></td>
<td>• Explaining the background; objectives; scope; significance</td>
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<td></td>
<td>• Supporting with the literature</td>
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<td>• Supporting with the literature</td>
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<td></td>
<td>• Describing the methodology and anticipated results</td>
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<td>• Describing the methodology and anticipated results</td>
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<tr>
<td>6 (2 hrs)</td>
<td>Tutorials on the plan for the proposal</td>
<td>6-7 (4 hrs)</td>
<td>Tutorials on the first draft of the proposal</td>
</tr>
<tr>
<td>7-9 (6 hrs)</td>
<td>Writing project proposals and reports (continued)</td>
<td>8-9 (4 hrs)</td>
<td>Writing project proposals and reports (continued)</td>
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<tr>
<td></td>
<td>• Describing and analysing project results (e.g. results of pilot study)</td>
<td></td>
<td>• Describing and analysing project results (e.g. results of pilot study)</td>
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<td></td>
<td>• Describing the budget; schedule and/or method of evaluation</td>
<td></td>
<td>• Describing the budget; schedule and/or method of evaluation</td>
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<td></td>
<td>• Writing executive summaries/abstracts</td>
<td></td>
<td>• Writing executive summaries/abstracts</td>
</tr>
<tr>
<td>10-12 (6 hrs)</td>
<td>Submit English written proposal in Week 10 (30%) (Intended readers: experts)</td>
<td>10-12 (6 hrs)</td>
<td>Delivering oral presentations of projects</td>
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<tr>
<td></td>
<td>Delivering oral presentations of projects</td>
<td></td>
<td>• Analysing needs of different audiences</td>
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<td></td>
<td>• Analysing needs of different audiences</td>
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<td>• Selecting relevant and appropriate content</td>
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<td>• Selecting relevant and appropriate content</td>
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<td>• Choosing appropriate language and tone</td>
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<td>• Choosing appropriate language and tone</td>
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<td>• Using effective interactive strategies</td>
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<td>• Using effective interactive strategies</td>
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<tr>
<td>13-14 (4 hrs)</td>
<td>Team oral presentations (20%) (Intended audience: laymen)</td>
<td>13-14 (4 hrs)</td>
<td>Team oral presentations (20%) (Intended audience: expert)</td>
</tr>
<tr>
<td></td>
<td>(Submit Chinese written proposal in Week 14 (30%) (Intended audience: laymen)</td>
<td></td>
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</tbody>
</table>

• Assessing the Chinese team presentations intended for experts
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE40462</th>
<th>Subject Title</th>
<th>Environmental Impact Assessment – Theory and Practice</th>
<th>Credit Value</th>
<th>3</th>
<th>Level</th>
<th>4</th>
<th>Exclusion</th>
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<tbody>
<tr>
<td><strong>Objectives</strong></td>
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<td>CSE462 Environmental Impact Assessment – Theory and Practice</td>
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<tr>
<td><strong>Intended Learning Outcomes</strong></td>
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<tr>
<td></td>
<td>a.</td>
<td>To understand the EIA process;</td>
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<td>b.</td>
<td>to analyse major environmental issues for large development projects;</td>
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<td>c.</td>
<td>to conduct necessary monitoring and modeling tasks within an EIA cycle.</td>
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<tr>
<td><strong>Subject Synopsis/Indicative Syllabus</strong></td>
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<tr>
<td>(i) Development of Environmental Impact Assessment and Planning Considerations in the World and Hong Kong</td>
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<tr>
<td>Environmental assessment development in the world and Hong Kong.</td>
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<tr>
<td>(ii) Scope and Objectives of Environmental Impact Assessment</td>
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<tr>
<td>Environmental considerations: land use, planning, development and management.</td>
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<td>Environmental aims and objectives.</td>
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<td>(iii) Methodology and Assessment Techniques</td>
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<tr>
<td>Methods for air, water, noise, culture, visual and social-economic impact assessment.</td>
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<td>Environmental factors (risk, visual, cultural and social-economic).</td>
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<td>(iv) Monitoring and Baseline Studies</td>
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<tr>
<td>Baseline studies, Environmental monitoring and audit, Environmental quality and regulatory requirements. Mitigation and control measures.</td>
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<td>(v) Role of Environmental Impact Statement</td>
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<tr>
<td>Statement scope &amp; content.</td>
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<tr>
<td><strong>Teaching/Learning Methodology</strong></td>
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<tr>
<td>The subject teaching will include the following elements:</td>
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<tr>
<td>(a) Lectures – to introduce the basic concepts and assessment methods;</td>
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<tr>
<td>(b) Tutorials – to answer student questions in the learning processes;</td>
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<td>(c) Group discussion and presentations – to get students to role-play different</td>
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<td>(d) Reading materials and video presentations – to give students</td>
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<td>(e) Seminars on EIA practice by invited speakers from government agencies and professional environmental consultants;</td>
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<td>(f) Course work</td>
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<td><strong>Assessment Methods</strong></td>
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<td>Method</td>
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<td>(a) Continuous Assessment</td>
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<td>(b) Written Examination</td>
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<td><strong>Assignment</strong></td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td>Students must attain at least grade D in both course work and final examination in order to attain a passing grade.</td>
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<tr>
<td>Written examination is evaluated by final examination.</td>
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<tr>
<td>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</td>
<td></td>
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</tr>
</tbody>
</table>

**Student Study Effort Expected**

- **Class contact:**
  - Lectures: 24Hrs.
  - Tutorials/Seminars: 18Hrs.
- **Other student study effort:**
  - Coursework exercise: 20Hrs.
  - Seminar reports: 2Hrs.
  - Self-study: 62Hrs.
- **Total student study effort:** 126Hrs.

**Reading List and Reference Texts**

The following texts provide the majority of the basic materials to be read:

1. AI - 28

### Subject Description Form

The subject description will include the following elements:

- **Subject Code:** CSE40462
- **Subject Title:** Environmental Impact Assessment – Theory and Practice
- **Credit Value:** 3
- **Level:** 4
- **Exclusion:** CSE462 Environmental Impact Assessment – Theory and Practice

### Objectives

- To provide students with an overview of the principles and current practices of environmental impact assessment (EIA), especially in Hong Kong.

### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

- understand the EIA process;
- analyse major environmental issues for large development projects;
- conduct necessary monitoring and modeling tasks within an EIA cycle.

### Subject Synopsis/Indicative Syllabus

1. **Development of Environmental Impact Assessment and Planning Considerations in the World and Hong Kong**
   - Environmental assessment development in the world and Hong Kong.
2. **Scope and Objectives of Environmental Impact Assessment**
   - Environmental considerations: land use, planning, development and management.
   - Environmental aims and objectives.
3. **Methodology and Assessment Techniques**
   - Methods for air, water, noise, culture, visual and social-economic impact assessment.
   - Environmental factors (risk, visual, cultural and social-economic).
4. **Monitoring and Baseline Studies**
   - Baseline studies, Environmental monitoring and audit, Environmental quality and regulatory requirements. Mitigation and control measures.
5. **Role of Environmental Impact Statement**
   - Statement scope & content.

### Teaching/Learning Methodology

The subject teaching will include the following elements:

- **Lectures** – to introduce the basic concepts and assessment methods;
- **Tutorials** – to answer student questions in the learning processes;
- **Group discussion and presentations** – to get students to role-play different roles in the EIA process;
- **Reading materials and video presentations** – to give students examples in local EIA case studies;
- **Seminars on EIA practice** by invited speakers from government agencies and professional environmental consultants;
- **Course work**

### Assessment Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>50</td>
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<tr>
<td>Written Examination</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Students must attain at least grade D in both course work and final examination in order to attain a passing grade.

Written examination is evaluated by final examination.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

**Student Study Effort Expected**

- **Class contact:**
  - Lectures: 24Hrs.
  - Tutorials/Seminars: 18Hrs.
- **Other student study effort:**
  - Coursework exercise: 20Hrs.
  - Seminar reports: 2Hrs.
  - Self-study: 62Hrs.
- **Total student study effort:** 126Hrs.

**Reading List and Reference Texts**

The following texts provide the majority of the basic materials to be read:

1. AI - 28
| References | covered in lectures. Students will need to study other publications, including local case studies.  
Hong Kong Environmental Protection Department [http://www.epd.gov.hk/eta/](http://www.epd.gov.hk/eta/) |
**Subject Description Form**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE516</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Urban Transport Planning - Theory and Practice</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
</tbody>
</table>

**Pre-requisite / Co-requisite/ Exclusion**

Recommended background knowledge:

It is expected that students will have a fundamental understanding of mathematics and computers consistent with undergraduate level study in civil engineering.

**Objectives**

To provide a comprehensive theoretically based, yet practical approach to transport planning in urban areas. Emphasis is also placed on the application of rigorous transport models and analytical techniques in case studies.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able:

a. to apply basic traffic engineering approaches to determine appropriate solutions for solving traffic problems, particularly in the planning stage for transport infrastructure projects;

b. to design and conduct traffic surveys for assessment of the impacts due to transport improvement projects, and other travel demand management measures;

c. to analyze and interpret data systematically from traffic and behavior surveys for strategic transport planning and travel demand forecasting; and

d. to utilize the four-steps modelling techniques for forecasting future travel demand and analyzing the effects of transport infrastructure facilities on a transport system.

**Subject Synopsis/Indicative Syllabus**

**Keyword Syllabus**

i) **Fundamentals of Urban Transport Planning**
   - The fundamentals of land-use and transport planning; the planning process; goals and objectives of traffic studies; levels of urban transport planning; traffic problems and transport policy.

ii) **Travel Demand and Data Collection**
   - The spatial characteristics; temporal characteristics; Hong Kong travel demand characteristics. Data collection and preparation; travel surveys and transportation system inventory.

iii) **Travel Demand Analysis**
   - Model development; nature of modelling errors. Four step models: trip generation; trip distribution; modal split; traffic assignment. Simplified approach to small area planning.

iv) **Urban Transport Technology**
   - Evaluation of urban transport technology; classification of urban transport technologies; urban transport networks; examples of urban transport systems, traffic restraint and road pricing, intelligent transport systems, route guidance and traveller information systems.

v) **Generation and Evaluation of Solutions**
   - Solution generation; evaluation techniques; economic, operational and environmental evaluation; solution evaluation; case studies and review of Hong Kong Transport studies (e.g. New Town Study, Port and Airport Development Strategy Study, Comprehensive Transport Study etc.).

vi) **Special Topics**

vii) **Project and Laboratory**

This course will be augmented by computer modelling and case studies for input to calibrate transport planning models: Network building; trip generation; trip distribution and modal split; traffic assignment; transport system evaluation.

**Teaching/Learning Methodology**

The underlying principles and techniques relating to traffic survey and transport planning will be dealt with in lectures. However, it is important that the students are exposed to the interdependence between theories and practice in transport planning. Students are therefore required to undertake survey design and data collection on sites in order to understand the associated techniques in practice. Individual assignments will consist of numerical problems on transport modelling and analysis while computer laboratory sessions will be held to demonstrate the applications of transport model and to provide opportunity for students to appreciate the difference between manual calculation and computer modelling. Professionals from government or industry will be invited to give lectures on current issues of transport planning in Hong Kong.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Assessment</td>
<td>40%</td>
<td>a. b. c. d.</td>
</tr>
<tr>
<td>2. Written Examination</td>
<td>60%</td>
<td>√ √ √ √</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessment will be based on coursework and case study discussions.

Written examination is evaluated by final examination.

Students must attain at least Grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.

**Reading List and References**

**Textbooks**

Sons (2001).

Reference Books


Sheffi, Yosef, *Urban Transportation Networks*, Prentice-Hall (1985). The official link from MIT:


Conference Proceedings and Symposia

Proceedings of Hong Kong Society for Transportation Studies (http://home.netvigator.com/~hksts)

Proceedings of the International Symposium on Transportation and Traffic Theory

Journals

Journal of Advanced Transportation

Journal of the Transportation Research Board

Journal of Transportation Engineering, American Society of Civil Engineers (ASCE)

Traffic Engineering and Control

Transportation Planning and Technology

Transport Policy

Transportation Research

Transportation Science

Transportmetrica

Reports

Technical reports by the Traffic and Transport Survey Division, Hong Kong Government

Transportation Research Records, Transportation Research Board

TRRL reports, Transport and Road Research Laboratory
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
<th>Pre-requisite/ Co-requisite/ Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI2001A</td>
<td>Applied Electromagnetics</td>
<td>3</td>
<td>2</td>
<td>Nil</td>
</tr>
</tbody>
</table>

#### Objectives
1. To introduce students to the physical laws that govern the electromagnetic phenomena commonly encountered in electrical engineering systems.
2. To familiarise students with the techniques for solving problems in electromagnetics.
3. To provide students the foundation of electromagnetic field theory required for pursuing the EE programme.

#### Intended Learning Outcomes
- Upon completion of the subject, students will be able to:
  1. Understand that electromagnetism is based on Maxwell's equations. Interpret the physical meaning and phenomena behind Maxwell's equations. Know the meanings of physical quantities of electromagnetism and their basic relationships.
  2. Be able to analyse electromagnetic phenomena related to electrical engineering systems by selecting the most appropriate laws/theorems/solution techniques.
  3. Appreciate recent developments in computational electromagnetics.
  4. Have had hands-on experience in electromagnetic measurements.

#### Subject Synopsis/ Indicative Syllabus
1. **Static fields**
   - Electrostatics: Electric fields, Coulomb's law, Gauss's law, potential, capacitance and energy storage.
   - Magnetostatics: Biot-Savart law, magnetic fields, force on a current-carrying conductor, Lorentz force.

2. **Time-varying fields**
   - Faraday's Law and Lenz's Law; self-inductance, mutual inductance and stored energy.

3. **Mathematical preliminaries**
   - Vectors analysis and coordinate systems. The operators grad, div and curl. Concept of line, surface and volume integrals. Stokes's and divergence theorems.

4. **Maxwell's equations and EM waves**
   - Maxwell's equations in integral form as a restatement of fundamentals. Differential form. The continuity equation. The displacement current. The wave equation, plane polarized wave, velocity of propagation and energy flows.

5. **Material media**
   - Dipole, polarisation, permittivity and capacitors.
   - Ferromagnetism: magnetisation curve, permeability, hysteresis and saturation.
   - Boundary conditions. Magnetic circuits: magneto-motive force, reluctance and permeance.

6. **Solution of static field problems**
   - Hand-mapping, method of images, numerical and computer-based methods.

#### Laboratory Experiments:
- Field plotting using resistance and impedance networks.
- Field plotting using the Electrolytic tank.
- Field plotting using the resistive paper.

#### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>Y</td>
</tr>
<tr>
<td>Tutorials</td>
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</tr>
<tr>
<td>Experiments</td>
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</tr>
</tbody>
</table>

#### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Intended subject learning outcomes to be assessed</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
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<tr>
<td>Tutorials</td>
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</tr>
<tr>
<td>Experiments</td>
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#### Assessment Methods

<table>
<thead>
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<tbody>
<tr>
<td>Examination</td>
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</tr>
<tr>
<td>Laboratory</td>
<td>24</td>
<td>Y</td>
</tr>
<tr>
<td>Laboratory preparation/report</td>
<td>16</td>
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</tr>
<tr>
<td>Self-study</td>
<td>10</td>
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</table>

#### Total 100%

#### Student Study Effort Expected

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<tr>
<th>Class contact:</th>
<th>Lecture/Tutorial</th>
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</tr>
<tr>
<td>Laboratory prep/report:</td>
<td>Laboratory preparation/report</td>
<td>12 Hrs.</td>
</tr>
<tr>
<td>Self-study:</td>
<td>Self-study</td>
<td>45 Hrs.</td>
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</table>

#### Total student study effort 105 Hrs.

#### Reading List and References

<table>
<thead>
<tr>
<th>Reference books:</th>
<th></th>
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</thead>
</table>

#### Specific assessment methods/tasks

<table>
<thead>
<tr>
<th>Specific assessment method(s)</th>
<th>%</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60</td>
<td>Y</td>
</tr>
<tr>
<td>Laboratory</td>
<td>24</td>
<td>Y</td>
</tr>
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</tr>
<tr>
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</table>

<table>
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</tr>
<tr>
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<td>16</td>
<td>Y</td>
</tr>
<tr>
<td>Self-study</td>
<td>10</td>
<td>Y</td>
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#### Total 100%
Subject Description Form

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<th>Subject Code</th>
<th>EE2002A</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Circuit Analysis</td>
</tr>
<tr>
<td>Credit Value</td>
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<tr>
<td>Level</td>
<td>2</td>
</tr>
<tr>
<td>Pre-requisite</td>
<td>Physics II (AP10006)</td>
</tr>
<tr>
<td>Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Objectives
1. Introduce fundamental circuit theory.
2. Develop ability for solving problems involving electric circuits.
3. Develop skills for experimentation on electric circuits.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:

Category A: Professional/academic knowledge and skills
1. Acquire a good understanding of fundamental circuit theory.
2. Solve simple problems in electric circuits.
3. Use suitable instrumentation to carry out experimental investigations to validate the theoretical investigations.

Subject Synopsis/Indicative Syllabus

1. DC Circuits
   - Introduction to electric circuits. Voltage and current as two basic variables.

2. Capacitance, Inductance and First Order Transients

3. Steady state Analysis of AC Circuits

4. Mutual Inductance and Transformer
   - Basic coupled inductance equation. Concept of ideal transformer (assuming sinusoidal voltages and currents). Dot convention. Physical transformer as ideal transformer with leakage and magnetizing inductances. Applications in galvanic isolation and voltage/current level conversion.

5. Electrical Measurement

Laboratory Experiments:
1. Kirchhoff’s laws and the maximum power transfer theorem
2. Transients in RC and RL circuits
3. Single phase transformer tests

Teaching/Learning Methodology

| Lectures, supplemented with interactive questions and answers, and short quizzes |
| 1, 2 |

| Tutorials, where problems are discussed and are given to students for them to solve |
| 1, 2 |

| Laboratory sessions, where students will perform experimental verifications. They will have to record results and write a report on one of the experiments |
| 2, 3 |

| Assignment and Homework |
| 1, 2 |

| Through working assignment and homework, students will develop a firm understanding and comprehension of the knowledge taught |

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Task</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Assessment (Total 40%)</td>
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</tr>
<tr>
<td>Assignments</td>
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</tr>
<tr>
<td>Laboratory works and reports</td>
<td>10%</td>
</tr>
<tr>
<td>Mid-semester test</td>
<td>10%</td>
</tr>
<tr>
<td>End-of-semester test</td>
<td>10%</td>
</tr>
<tr>
<td>2. Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
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</table>
### Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment/Homework</td>
<td>Assignments/Homeworks are given to students to assess their competence level of knowledge and comprehension. The criteria (i.e. what to be demonstrated) and level (i.e. the extent) of achievement will be graded according to six levels: (A+ and A), Good (B+ and B), Satisfactory (C+ and C), Marginal (D) and Failure (F). These will be made known to the students before an assignment/homework is given. Feedback about their performance will be given promptly to students to help them improve their learning.</td>
</tr>
<tr>
<td>Laboratory works and reports</td>
<td>Students will be required to perform three experiments and submit a report on one of the experiments. Expectation and grading criteria will be given as in the case of assignment/homework.</td>
</tr>
<tr>
<td>Mid-semester test</td>
<td>There will be a mid-semester test to evaluate students' achievement of all the learning outcomes and give feedback to them for prompt improvement. Expectation and grading criteria will be given as in the case of assignment/homework.</td>
</tr>
<tr>
<td>End-of-semester test and Examination</td>
<td>There will be an end-of-semester test and examination to assess students' achievement of all the learning outcomes. These are mainly summative in nature. Expectation and grading criteria will be given as in the case of assignment/homework.</td>
</tr>
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</table>

### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact (time-tabled):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
</tr>
<tr>
<td>Tutorial</td>
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<td>Laboratory</td>
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<table>
<thead>
<tr>
<th>Other student study effort:</th>
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</thead>
<tbody>
<tr>
<td>Revision and Assignments</td>
</tr>
<tr>
<td>Tutorial</td>
</tr>
<tr>
<td>Report Writing</td>
</tr>
</tbody>
</table>

Total student study effort: 105 Hours

### Reading List and References

**Textbook:**

**References:**
Laboratory Experiments:

1. Diode circuits.
2. Small-signal BJT amplifiers.
3. Operational amplifiers.

Subject Description Form

1. Filter circuits. Concepts of pole, corner frequency and bandwidth. Use of jω axis for magnitude and phase plots for sinusoidal driving sources. Extension to asymptotic plots and Bode plots.

Laboratory Experiments:

1. Diode circuits.
2. Small-signal BJT amplifiers.
3. Operational amplifiers.

Electronics

1. Credit Value
2. Subject Title
3. Level
4. Subject Code
5. Pre-requisite
6. Co-requisite
7. Exclusion
8. Teaching/Learning Methodology
9. Laboratory/Examination
10. Specific Assessment Methods/Tasks
11. Intended Subject Learning Outcomes
12. Intended Subject Learning Outcomes to be Assessed
13. Specific Assessment
14. Intended Subject Learning Outcomes
15. Remarks
<table>
<thead>
<tr>
<th>Laboratory works and reports</th>
<th>Students will be required to perform three experiments and submit a report on one of the experiments. Expectation and grading criteria will be given as in the case of assignments.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-semester test</td>
<td>There will be a mid-semester test to evaluate students’ achievement of all the learning outcomes and give feedback to them for prompt improvement. Expectation and grading criteria will be given as in the case of assignments.</td>
</tr>
<tr>
<td>End-of-semester test and Examination</td>
<td>There will be an end-of-semester test and examination to assess students’ achievement of all the learning outcomes. These are mainly summative in nature. Expectation and grading criteria will be given as in the case of assignments.</td>
</tr>
</tbody>
</table>

### Student Study Effort Expected

**Class contact (time-tabled):**
- Lecture: 28 Hours
- Tutorial: 14 Hours
- Laboratory: 12 Hours

**Other student study effort:**
- Revision: 28 Hours
- Tutorial & Assignments: 15 Hours
- Laboratory logbook & report writings: 8 Hours

**Total student study effort:** 105 Hours

### Reading List and References

**Textbook:**

**References:**
<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Specific learning methods</th>
<th>Teaching/Learning Methodology</th>
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</thead>
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<td>Lectures and case studies</td>
<td>√</td>
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<td>Experiments</td>
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<table>
<thead>
<tr>
<th>Assessment Method of Learning with Alignment with Intended Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific assessment method tasks</td>
</tr>
<tr>
<td>Examination</td>
</tr>
<tr>
<td>Lab performance and report</td>
</tr>
<tr>
<td>Assignments and case studies</td>
</tr>
<tr>
<td>Total</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Intended Learning Outcomes</th>
<th>Effort Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. To master the fundamental knowledge on electrical energy systems.</td>
<td>Lecture/Tutorial 36 Hrs.</td>
</tr>
<tr>
<td>b. To identify, analyze, and solve technical problems using mathematics and engineering techniques.</td>
<td>Laboratory 12 Hrs.</td>
</tr>
<tr>
<td>c. To be aware of equipment characteristics and environment issues on the modern electrical power system.</td>
<td>Self-study and assignments 47 Hrs.</td>
</tr>
<tr>
<td>d. To have the ability to work independently, and in teams when conducting laboratory work.</td>
<td>Case study 10 Hrs.</td>
</tr>
<tr>
<td>Total student study effort</td>
<td>105 Hrs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject Description Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code</td>
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<tr>
<td>Subject Title</td>
</tr>
<tr>
<td>Credit Value</td>
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<tr>
<td>Level</td>
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<tr>
<td>Pre-requisite/Exclusion</td>
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</table>

<table>
<thead>
<tr>
<th>Intended Syllabus/Indicative Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Generation, Energy &amp; environment: Principles of energy conversion, power plant and environment issues. The interconnected power systems, HVDC transmission, and the nature of modern power systems. The physical and environmental impacts of energy systems, as well as team work and technical report writing abilities are evaluated by project work and reports, and assignments/case study reports.</td>
</tr>
<tr>
<td>5. Rotating electrical machines: Basic operating principles of d.c. machines, induction motors and synchronous machines.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Case study:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Discuss the environmental impacts of fossil fuel power generation.</td>
</tr>
<tr>
<td>2. Discuss the environmental impacts of thermal power generation.</td>
</tr>
<tr>
<td>3. Discuss the environmental impacts of nuclear power generation.</td>
</tr>
<tr>
<td>4. Discuss the environmental impacts of renewable energy sources.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reading List and References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textbooks:</td>
</tr>
<tr>
<td>2. Electric Power Systems – B.M. Wooley, Wiley, 3rd edition or later, 1988 or later</td>
</tr>
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<td>Reference books:</td>
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<thead>
<tr>
<th>Other student study effort:</th>
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<tbody>
<tr>
<td>1. Lab performance and reports</td>
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<tr>
<td>2. Assignments/case study reports</td>
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<tr>
<td>3. Class contact:</td>
</tr>
<tr>
<td>4. Examination 60%</td>
</tr>
<tr>
<td>5. Class tests 24%</td>
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<td>6. Lab performance and report 10%</td>
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<thead>
<tr>
<th>Total student study effort</th>
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<tr>
<td>105 Hrs.</td>
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<tr>
<td>105 Hrs.</td>
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Subject Description Form

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<tr>
<th>Subject Code</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Analog and Digital Circuits</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>3</td>
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</tbody>
</table>

Pre-requisite/ Co-requisite/ Exclusion

| Pre-requisite/ Co-requisite/ Exclusion | Pre-requisite: EE2002A & EE2003A |

Objectives

1. To familiarise students with the characteristics and operation of analogue and digital circuits for analysis and design purposes.
2. To enable students to understand the common techniques used in circuit design for combinational and sequential logic circuits.
3. To provide an appreciation of advantages and limitations of different classes of power amplifiers and hence the implications on their design.
4. To enable students to analyse the operation principles of different A/D and D/A approaches and match their properties to serve the purposes of different applications.
5. To enable students to appreciate the limitations of circuit design from practical viewpoints and the importance of sound technical knowledge and team work.

Intended Learning Outcomes

Upon completion of the subject, students will be able to:

a. Design basic digital combinational and sequential circuits and list the detail procedures and possible difficulties.
b. Given the requirements of an application, justify the use of suitable A/D or D/A converters and elaborate on the advantages and limitations of the selection.
c. Compare the characteristics and operation of different classes of power amplifiers.
d. Analyse operation of digital circuits and diagnose faults with basic equipment in the laboratory.
e. Write a technical report and present the findings.
f. Recognise the constraints, technical or otherwise, on engineers in solving real-life problems and the need for organised preparation and teamwork.

Subject Synopsis/ Indicative Syllabus

Digital Circuits
1. Digital system fundamentals: Boolean algebra, number systems, logic gates and truth tables.
3. Digital integrated circuits: Digital IC families: TTL, CMOS. Basic logic gates, input and output V-I characteristics; transfer characteristics, switching thresholds, noise margins, propagation delay. Inter-family interfacing of digital ICs.
4. Sequential circuits: Typical structure, operation, design and applications of flip-flops. Design and analysis of synchronous sequential circuits, states and state table; structures of registers, counters and memory units. Design of asynchronous circuits, flow tables, stable and unstable states.

Analog Circuits
5. Large-signal transistor circuits: Classification of power amplifiers; analysis of efficiency, power dissipation and distortion of class A, B, AB and C amplifiers.

Signal conversion: Voltage comparator, Schmidt trigger, Sample & hold circuits. A/D and D/A converters: Weighted-resistor D/A converter; R-2R Ladder D/A converter; Parallel-comparator A/D converter; Successive-approximation converter; Counting converter; Dual-slope converter.

Laboratory Experiments:
- Logic circuits I – CMOS logic gates characteristics and combinational logic circuit design
- Logic circuits II – TTL, logic gates characteristics and sequential logic circuits design
- Power amplifiers – Classes A, AB & B

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
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<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
<td>a b c d e f</td>
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<tr>
<td>Laboratory performance &amp; reports</td>
<td>16%</td>
<td>a b c d e f</td>
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<tr>
<td>Mini-project &amp; report</td>
<td>12%</td>
<td>a b c d e f</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

It is a fundamental circuit design subject. The outcomes on concepts, design and applications are assessed by the usual means of examination and test whilst those on analytical skills, problem-solving techniques and practical considerations of circuit design, as well as technical reporting and teamwork, are evaluated by experiments, mini-project and the reports.

Student Study Effort Expected

- Class contact: Lecture/Tutorial: 36 Hrs.
- Laboratory: 12 Hrs.
- Total student study effort: 105 Hrs.

Reading List and References

Textbook:

Reference books:
### Subject Description Form

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<tr>
<th>Subject Code</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Electromechanical Energy Conversion</td>
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<tr>
<td>Credit Value</td>
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<td>Level</td>
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<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
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</tbody>
</table>

#### Objectives
1. To provide students a general knowledge on common types of electric machines.
2. To provide students the basic techniques of steady-state electric machine analysis.

#### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

- a. Explain the construction, operating principles, performance characteristics, control and applications of transformers and major types of rotating electric machines.
- b. Analyse the steady-state performance of electric machines using appropriate equivalent circuit models.
- c. Operate practical electric machines and to conduct relevant tests and experiments.
- d. Present results of electric machine studies in the form of tables, graphs, and written reports.

#### Subject Synopsis/Indicative Syllabus

#### Laboratory Experiments:
- Load test, efficiency and speed control of a d.c. motor.
- Performance evaluation of a three-phase cage induction motor.
- Synchronous motor V-curves.
- Temperature rise and ratings.

#### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Lectures</td>
<td>a b c d</td>
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<tr>
<td>Tutorials</td>
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<tr>
<td>Laboratory work</td>
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#### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
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</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a b c d</td>
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<tr>
<td>2. Tests</td>
<td>20%</td>
<td>a b c</td>
</tr>
<tr>
<td>3. Laboratory work and reports</td>
<td>15%</td>
<td>a</td>
</tr>
<tr>
<td>4. Assignment</td>
<td>5%</td>
<td>b c d</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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</table>

It is a fundamental subject on electric machines and transformers. The outcomes on concepts, operating principles and applications are assessed by the usual means of assignment, tests, and examination. The outcomes on practical operation of electric machines and technical communication are evaluated by laboratory work and reports.

#### Student Study Effort Expected

- **Class contact:** 36 Hrs.
  - Lecture/Tutorial
  - Laboratory 12 Hrs.

- **Other student study effort:**
  - Revision, self-study, and assignment 48 Hrs.
  - Write-up of laboratory reports 9 Hrs.

- **Total student study effort:** 105 Hrs.

#### Reading List and References

Subject Description Form

Subject Code: EE3003A

Subject Title: Power Electronics and Drives

Credit Value: 3

Level: 3

Pre-requisite/Co-requisite/Exclusion: Nil

Objectives

1. To understand the characteristics and operation of power electronics devices.
2. To expose the students to the conversion and utilization of large amount of electrical power using latest power semiconductor devices and modern control techniques.
3. To ensure the students develop an understanding of various drive systems.

Intended Learning Outcomes

Upon completion of the subject, students will:

a. Be able to explain both verbally and in written form major semiconductor devices that can be used as switches, and their electrical characteristics which include basic idealised models as well as extension to some important non-ideal characteristics.

b. Be able to explain the processes of efficient energy conversion through the use of power semiconductor switches.

c. Be able to apply the concepts of switching power conversion to analyse a variety of circuits including:
   i. DC to DC conversion
   ii. AC to DC conversion
   iii. DC to AC conversion

d. Be able to present the results of study and experiments in the form of a technical report.

Subject Synopsis/Indicative Syllabus

1. **Power electronics fundamentals**: power conversion, energy balance principle, review of fundamentals.
2. **Power semiconductor devices**: Diodes, Power Transistor, MOSFET, SCR, GTO, IGBT, switching characteristics.
4. **AC-DC rectifiers**: Uncontrolled and controlled single-phase and three-phase rectifiers, terminal characteristics, supply and load interactions.
5. **DC/AC inverters**: Basic Single-phase bridge inverters, voltage and frequency control, harmonic reduction.
6. **Electric drive systems**: Introduction to electric drives system, applications for conservation of energy, dc electric drives.

Laboratory Experiment:

DC/DC Buck Converter, Introduction to SCR circuits, PSPICE simulation of SCR Bridge.

Teaching/Learning Methodology

Lectures and tutorials are effective teaching methods:

1. To provide an overview or outline of the subject.
2. To introduce new concepts and knowledge to the students.
3. To explain difficult ideas and concepts of the subject.
4. To motivate and stimulate students’ interest.
5. To provide students feedback in relation to their learning.
6. To encourage students responsibility for their learning by extra reference books reading and computer-based circuit simulations.

Laboratory works is an essential ingredient of this subject:

1. To supplement the lecturing materials.
2. To add real experience for the students.
3. To provide deep understanding of the subject.
4. To enable students to organise principle and challenge ideas.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
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<tbody>
<tr>
<td>Lectures</td>
<td></td>
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<tr>
<td>Tutorials</td>
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<td>✓</td>
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<tr>
<td>Experiments</td>
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<td></td>
<td>✓</td>
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</table>

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed |
-----------------------------------|-------------|-----------------------------------------------|
1. Examination                    | 60%         | a, b, c, d                                    |
2. Class tests                    | 30%         | a, c, d                                       |
3. Laboratory performance & report| 10%         | d                                             |

Total 100%

The understanding on theoretical principle and practical considerations, analytical skills and problem solving technique will be evaluated. Examination, class tests, laboratory sections and reports are an integrated approach to validly assess students’ performance with respect to the intended subject learning outcomes.

Student Study Effort Expected

Class contact:

- Lecture/Tutorial
  - 36 Hrs.

- Laboratory
  - 12 Hrs.

Other student study effort:

- Laboratory preparation/report
  - 12 Hrs.

- Self-study
  - 45 Hrs.

Total student study effort 105 Hrs.

Reading List and References

Textbooks:

Subject Description Form

<table>
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<tr>
<th>Subject Code</th>
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</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Power Transmission and Distribution</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
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<tr>
<td>Level</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Pre-requisite: Electrical Energy Systems Fundamentals (EE2004A)</td>
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</table>

Objectives

1. To introduce students to the fundamental knowledge which is essential for all electrical power engineers. It leads to a deeper insight into the design, planning, operation, equipment characteristics and environmental impacts of modern electrical power systems.

Intended Learning Outcomes

Upon completion of the subject, students will:

a. Have acquired the fundamental knowledge and analytical techniques on electrical power systems.

b. Be able to identify, analyze, and solve technical problems to power system design, planning, and operation, making use of mathematics and engineering techniques.

c. Be able to work in teams when conducting laboratory investigations.

d. Be able to write a technical report and present the findings.

Subject Synopsis/Indicative Syllabus


Laboratory Experiment:

Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on system analysis, design and practical applications are given through experiments, in which the students are expected to solve the power system design, planning, and operation problems with practical constraints and to attain pragmatic solutions with critical and analytical thinking. Experiments are designed to supplement the lecturing materials so that the students are encouraged to take extra readings and to look for relevant information.

<table>
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<tbody>
<tr>
<td>Lectures</td>
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<tr>
<td>Tutorials</td>
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<td>Experiments</td>
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Assessment Methods in Alignment with Intended Learning Outcomes

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<tbody>
<tr>
<td>1. Examination</td>
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<td>a b c d</td>
</tr>
<tr>
<td>2. Class Test</td>
<td>25%</td>
<td>a b c d</td>
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<tr>
<td>3. Laboratory Performance &amp; Report</td>
<td>15%</td>
<td>a b c</td>
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<td>Total</td>
<td>100%</td>
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</table>

The outcomes on concepts, design and applications are assessed by the usual means of examination and test. Experiments and written reports assess those on analytical skills, problem-solving techniques and practical considerations of power system design, as well as technical reporting and teamwork.

Student Study Effort Expected

Class contact: Lecture/Tutorial 36 Hrs.
Laboratory 12 Hrs.

Other student study effort:
Laboratory preparation/report 12 Hrs.
Self-study 45 Hrs.

Total student study effort 105 Hrs.

Reading List and References

Textbooks:
2. W.D. Stevenson, Elements of Power System Analysis, McGraw Hill, 4th Edition or later, 1982 or later

Reference Books:
### Subject Description Form

<table>
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<tr>
<th>Subject Code</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Systems and Control</td>
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<td>Credit Value</td>
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<tr>
<td>Level</td>
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<tr>
<td>Pre-requisite/ Co-requisite/ Exclusion</td>
<td>Pre-requisite: AMA2111</td>
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</table>

#### Objectives
1. To introduce the principles and techniques used in the analysis and design of feedback control systems.
2. To provide the foundation for the later subjects in the areas of power systems, drives and control.

#### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

- Analyse the stability, transient response and steady-state response of continuous time systems.
- Design compensators and controllers for control systems.
- Model systems using block diagram and signal flow graph and evaluate the properties of the overall systems.
- Write technical reports and present the findings.

#### Subject Synopsis/ Indicative Syllabus

1. **Introduction to control system analysis**: Open-loop control systems, Closed-loop control systems, Effects of feedback, Examples of control systems.
2. **Mathematical modelling of dynamic systems**: Electrical and electro-mechanical system components, Transducers and actuators, Laplace transform, Transfer functions.
3. **System diagrams and simulations**: Block diagram, Signal flow graph, Mason’s formula, Simulation of continuous systems using Matlab.
5. **Frequency domain analysis of linear systems**: Frequency response, Bode Diagrams, Gain margin and phase margin, Polar plots, Nyquist stability criterion, Nichol plots.
6. **Compensators and PID controllers**: Compensators, PID controllers, Controller tuning.
7. **State-space analysis**: State-space models, Transfer matrix, State transition matrix.

#### Laboratory Experiment:

- Three-term controller
- Open-loop frequency response
- Modular position control system

### Teaching/Learning Methodology

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<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Lectures</td>
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<tr>
<td>Tutorials</td>
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<tr>
<td>Experiments</td>
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### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
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<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
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<tr>
<td>2. Class tests</td>
<td>30%</td>
</tr>
<tr>
<td>3. Laboratory reports</td>
<td>10%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>

The outcomes on analysis and design are assessed by the usual means of examination and tests whilst those on technical reporting and presentation are evaluated by the experiments and reports.

### Student Study Effort Expected

- **Class contact:**
  - Lecture/Tutorial: 38 Hrs.
  - Laboratory: 8 Hrs.
- **Other student study effort:**
  - Laboratory preparation/report: 12 Hrs.
  - Self-study: 47 Hrs.
- **Total student study effort:** 105 Hrs.

### Reading List and References

### Subject Description Form

**Subject Code:** EE3006A  
**Subject Title:** Analysis Methods for Engineers  
**Credit Value:** 3  
**Level:** 3  
**Pre-requisite/Exclusion:** Pre-requisite: AMA2111

#### Objectives
1. To familiarise students with the essential numerical techniques and operations research methods applicable in most engineering problems.
2. To enable students to analyse the advantages and limitations of the commonly adopted numerical techniques and operations research methods.
3. To prepare students for tackling practical engineering problems, with a combination of strong theoretical background and sound engineering sense.

#### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

- a. Match the numerical techniques and operations research techniques with the corresponding mathematical theories and compare their advantages and limitations.
- b. Given an engineering problem, justify the application of an appropriate technique, formulate the solution process and evaluate the results.
- c. Analyse essential features of different statistical problems in engineering.
- d. Apply computer software to develop iterative numerical algorithms.
- e. Write technical reports and present the findings in a logical and organised manner.

#### Subject Synopsis/Indicative Syllabus

1. **Basics**
   - Error propagation, numerical stability, solutions by iterations, Newton's method, finite difference and interpolation, Lagrange interpolation; solution of non-linear simultaneous equation; numerical differentiation and integration.

2. **Probability & Statistics**
   - Random variables, probability distributions, sample distributions and means, Central Limit Theorem, significance and hypothesis testing, stochastic processes.

3. **Optimisations**
   - Direct search and simple gradient methods; optimisations with constraints.

4. **Operations research**
   - Linear programming, Simplex algorithm, sensitivity analysis, duality and maximum flow problems, integer programming, assignment problems, shortest path and minimum spanning tree problems, maximum flow problems.

5. **Differential equations**

**Laboratory Experiments:**
- Analysis of errors in numerical algorithms through Matlab.
- Sensitivity analysis in numerical algorithms.
- Performance and optimisation in electrical systems.

#### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Subject Description Form</th>
<th>Analysis Methods for Engineers</th>
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<tbody>
<tr>
<td>Subject Code</td>
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<tr>
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<tr>
<td>Pre-requisite/Exclusion</td>
<td>Pre-requisite: AMA2111</td>
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<tr>
<td>Level</td>
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</tbody>
</table>
| Objectives               | 1. To familiarise students with the essential numerical techniques and operations research methods applicable in most engineering problems.  
2. To enable students to analyse the advantages and limitations of the commonly adopted numerical techniques and operations research methods.  
3. To prepare students for tackling practical engineering problems, with a combination of strong theoretical background and sound engineering sense. |
| Intended Learning Outcomes | Match the numerical techniques and operations research techniques with the corresponding mathematical theories and compare their advantages and limitations.  
Given an engineering problem, justify the application of an appropriate technique, formulate the solution process and evaluate the results.  
Analyse essential features of different statistical problems in engineering.  
Apply computer software to develop iterative numerical algorithms.  
Write technical reports and present the findings in a logical and organised manner. |
| Subject Synopsis/Indicative Syllabus | 1. Basics  
- Error propagation, numerical stability, solutions by iterations, Newton's method, finite difference and interpolation, Lagrange interpolation; solution of non-linear simultaneous equation; numerical differentiation and integration.  
2. Probability & Statistics  
- Random variables, probability distributions, sample distributions and means, Central Limit Theorem, significance and hypothesis testing, stochastic processes.  
3. Optimisations  
- Direct search and simple gradient methods; optimisations with constraints.  
4. Operations research  
- Linear programming, Simplex algorithm, sensitivity analysis, duality and maximum flow problems, integer programming, assignment problems, shortest path and minimum spanning tree problems, maximum flow problems.  
5. Differential equations  
| Teaching/Learning Methodology | Analysis Methods for Engineers |
| Student Study Effort Expected |  |
| Class contact | Lecture/Tutorial 38 Hrs. |
| | Laboratory 8 Hrs. |
| Other student study effort | Laboratory preparation/report 12 Hrs. |
| | Self-study and assignments 47 Hrs. |
| Total student study effort | 105 Hrs. |

#### Assessment Methods

<table>
<thead>
<tr>
<th>Assessment Methods in Alignment with Intended Learning Outcomes</th>
<th>%</th>
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<tbody>
<tr>
<td>Total</td>
<td>100%</td>
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</tr>
<tr>
<td>The outcomes on concepts, design and applications are assessed by the usual means of examination and tests. The outcomes on analytical skills, problem-solving techniques, technical reporting and teamwork are evaluated by experiments and the reports.</td>
<td>a</td>
<td>b</td>
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</table>

#### Reading List and References

- Textbooks:

- Reference books:
Subject Description Form

Subject Code: EE3007A
Subject Title: Computer System Principles
Credit Value: 3
Level: 3

Pre-requisite/Co-requisite/Exclusion: Pre-requisite: ENG2003

Objectives:
1. To enable students to establish a broad knowledge of the organization and components included in a small computer system.
2. To enable students to understand and apply assembly language programming.
3. To enable students to develop a simple embedded computer system

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:

1. Given specifications of an application and the instruction set of the microprocessor, design an assembly program to carry out the necessary operations.
2. Appreciate advanced features of the latest microprocessors and understand functions of basic computer peripherals.
3. Given a set of conditions, design a basic computer system.
4. Think logically and be able to present results in writing.

Subject Synopsis/Indicative Syllabus:

Computer Systems Hardware and Operations
1. Processor operation and internal architecture: Operations of data registers, buses and data path, operations of ALU, arithmetic hardware, and general pipeline architecture.
3. Input and output systems: Direct I/O system and memory mapped I/O; handshaking control, programmed I/O; interrupt and polling mechanisms. Protocol for serial data communications.
4. Microprocessor hardware and interfacing: System bus organization and interfacing techniques, CPU bus timing, system bus structure, design of input/output system. Interface and operations of LSI chips applied in a computer system including: interrupt controller, timer, UART and PIO.

Assembly Language Programming
5. Memory addressing space and data representation: Internal registers of 8086, Addressing modes in 8086-software model.
6. Assembly language program: Basic elements of an assembly language program, instruction mnemonics and directives, arithmetic operations and logical operations.
7. Programming techniques: Arithmetic manipulations, elementary programming constructs, parameter passing, data initialisation.
8. Coding and debugging: Conversion of source programs to machine codes, use of software debugging monitor, Compilation of assembly source program, linking of object files.

Laboratory Experiment:
Perform basic input/output operations of a microcontroller by assembly language programming. Speed control of a DC motor using a microcontroller and assembly language programming.

Teaching/Learning Methodology
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on design, practical applications and programming are given through experiments, in which the students are expected to solve design problems with real-life constraints and to attain feasible solutions with critical and analytical thinking. Interactive laboratory sessions are introduced to encourage better preparation and hence understanding of the experiments. On-the-spot assessments are conducted in the laboratory to provide additional incentives for student learning. Experiments are designed to supplement the lecturing materials, especially in assembly language programming, so that the students are encouraged to take extra readings and to look for relevant information.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>% Weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures and tutorials</td>
<td>60%</td>
<td>a b c d</td>
</tr>
<tr>
<td>Tutorials</td>
<td>15%</td>
<td>a b c d</td>
</tr>
<tr>
<td>Experiments</td>
<td>15%</td>
<td>a b c d</td>
</tr>
</tbody>
</table>

Specific assessment methods/tasks
1. Examination
2. Class Test
3. Laboratory performance & report
4. Programming test

Total: 100%

It is a fundamental computer architecture subject. The outcomes on concepts, design and applications are assessed by the usual means of examination and test whilst those on analytical skills, problem-solving techniques and practical considerations of programming, as well as technical reporting are evaluated by experiments, and the report.

Student Study Effort Expected

Class contact:
- Lecture/Tutorial: 36 Hrs.
- Laboratory: 12 Hrs.

Other student study effort:
- Laboratory preparation/report: 12 Hrs.
- Self-study: 45 Hrs.

Total student study effort: 105 Hrs.

Reading List and References

Textbooks:

Reference books:
## Subject Description Form

### Subject Code
EE3008A

### Subject Title
Linear Systems and Signal Processing

### Credit Value
3

### Level
3

### Pre-requisite/Co-requisite/Exclusion
Nil

### Objectives
1. To provide a broad treatment of the fundamentals of telecommunication systems.
2. Intended Learning Outcomes
   
   a. Understand the fundamentals of signals and linear systems.
   b. Analyze and evaluate different communication methodologies.
   c. Understand the characteristics and operating principles of typical telecommunication systems.

### Subject Synopsis/Indicative Syllabus
1. Signal representation and analysis:
   - Mathematical representation of a signal; time-domain representation. Classification of signals and systems; Special functions. Linear and Time-Invariant Systems; Convolution.
2. Fourier series and Fourier Transforms:
   - Complex exponentials; Frequency domain representation of signals; Fourier Series; Fourier transform; Fourier Transform pairs; Fourier Transform properties; Parseval's theorem; Transfer functions; filters. Applications to music and electromagnetic radiation.
3. Sinusoidal carrier modulation:
   - Amplitude and frequency modulation; Operating principle; Double side-band suppressed carrier, Conventional (Standard) AM, single side-band; Frequency division multiplexing; generation and detection circuitry; Modulation system performance comparison.
4. Pulse modulation:
   - Sampling theorem. Pulse amplitude modulation. Time-division-multiplexing. Pulse code modulation: quantization, encoding principle; Pulse amplitude modulation; Pulse width modulation.
5. Digital communications:
   - Digital transmission. Intersymbol interference; Eye diagram. Coding (source, error control, line). Digital carrier modulation; Pulse shaping, modulation, and multiplexing; Digital carrier modulation, Pulse code modulation; Quantization noise. Differential pulse code modulation, Delta modulation, Pulse modulation, Pulse code modulation, Pulse modulation, Pulse code modulation.
6. Introductions to copper-wire, wireless and optical fiber communications:
   - Historical development; Macroscopic model; Electromagnetic radiation in wire systems; multi-path interference; Light sources in optical communication systems; Light transmission in optical fibers; Light detection and measurement.

### Laboratory Experiments:
- Amplitude modulation (AM) System
- Pulse code modulation (PCM) System

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>%</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
<td>1. To provide a broad treatment of the fundamentals of telecommunication systems. 2. Understand the characteristics and operating principles of typical telecommunication systems.</td>
</tr>
<tr>
<td>Test</td>
<td>24%</td>
<td>1. To provide a broad treatment of the fundamentals of telecommunication systems. 2. Understand the characteristics and operating principles of typical telecommunication systems.</td>
</tr>
<tr>
<td>Laboratory</td>
<td>10%</td>
<td>1. To provide a broad treatment of the fundamentals of telecommunication systems. 2. Understand the characteristics and operating principles of typical telecommunication systems.</td>
</tr>
<tr>
<td>Homework or in-class exercises</td>
<td>6%</td>
<td>1. To provide a broad treatment of the fundamentals of telecommunication systems. 2. Understand the characteristics and operating principles of typical telecommunication systems.</td>
</tr>
</tbody>
</table>

### Teaching/Learning Methodology
The main teaching methods used to convey the basic concepts and fundamental theories are lectures and tutorials. The laboratory sessions are used to help the students apply the theory learned to practice.

### Assessment Methods

- **Lectures**
  - Class contact: Lecture/Tutorial 39 Hrs.
  - Laboratory 6 Hrs.
  - Other student study effort: Laboratory preparation/report 12 Hrs.
  - Self-study 48 Hrs.
  - Total student study effort 105 Hrs.

- **Tutorials**
  - Lecture/Tutorial 39 Hrs.
  - Laboratory 6 Hrs.
  - Other student study effort: Laboratory preparation/report 12 Hrs.
  - Self-study 48 Hrs.
  - Total student study effort 105 Hrs.

### Reading List and References
### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>% Weighting</th>
<th>Specific Assessment Methods/tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture/Tutorial</td>
<td>50%</td>
<td>Examination, Class Test/Quiz, Mini-project &amp; report</td>
</tr>
<tr>
<td>Tutorials</td>
<td>25%</td>
<td>Mini-projects, Class Test/Quiz, Examination</td>
</tr>
<tr>
<td>Other student study effort</td>
<td>25%</td>
<td>Self-study, Class Test/Quiz, Examination, Mini-project &amp; report</td>
</tr>
</tbody>
</table>

### Indicative Syllabus

#### 1. Power distribution in buildings
- System planning. Incoming supply arrangement for domestic, commercial and industrial installations.
- Economics of HV/LV distributions.
- Tariffs, maximum demand, load factors and diversity.
- Earthing systems. Applications of standby generator sets and uninterruptible power supplies.

#### 2. Legal and regulatory requirements
- Overview of Supply Rules and Regulations. Electric shock, interference and power quality issues.
- Installation requirements, grouping, interference, noise suppression and power supply in communication systems. Electromagnetic compatibility.
- Harmonics and voltage dips.

#### 3. Lighting
- Exterior lighting design.

#### 4. Vertical transportation systems
- Lift. Hoist and escalator drives. Safety requirements and drive characteristics. Grade of service and round trip time.

#### 5. Fire Fighting Systems
- Outline, regulations, requirements and components of fire fighting systems. Fire sprinkler systems. Heat and smoke detector systems. BTM/BCF systems.

### Reading List and References

Subject Code: EE3010A  
Subject Title: Summer Practical Training  
Credit Value: 3  
Level: SI  
Prerequisite/ Corequisite/ Exclusion:  

### Objectives

- To give the students an exposure to the industrial/engineering working environments before they complete their formal education.
- To explore and extend their understanding of engineering study in a broader perspective.
- To enrich students' all-round and/or global learning experience.

#### Intended Learning Outcomes

1. Develop and deliver a learning portfolio for presenting learning experiences and outcomes.
2. Demonstrate the awareness of the practical contexts in engineering.
3. Appreciate the work of others in an industrial/engineering working.
4. Develop a resourceful and speculative approach in making contacts and sourcing information.
5. Demonstrate good working practices to show a developing maturity and sense of responsibility.

#### Subject Synopsys/ Indicative Syllabus

In order to ensure that students have useful experience, the summer practical training must be suitably chosen and properly organized. Students are expected to carry out a minimum of 6 weeks (3 credits) industrial training in a suitable organization participating in the Preferred Graduate Development Programme. Relevant placement as student helpers in PolyU administrative departments and the Industrial Centre is also available. Any other placement in any suitable external organization for a specified period of time is also acceptable. Full-time placement in a suitable organization as part of a sandwich programme is also acceptable. Relevant placement in national/international work-base employment, attachments, etc. is also acceptable. Students are required to indicate the expected training experiences prior to the commencement of their placements. The student works on his final-year degree project which involves an industrial partner or external client. The student need not be placed in the company but make frequent visits to ensure that the project will meet the specifications required by the company.

#### Teaching/Learning Methodology

- **Teaching/Learning Methodology:**
  - Through on-the-job work placements, students learn to connect classroom theory with practical workplace applications, prepare themselves for the realities of workplaces and develop their generic skills in a real working setting. In addition to the orientation, students consult with teaching staff on a one-to-one basis.

#### Assessment Methods

The outcomes on this subject are assessed by means of student learning portfolios as well as specific assessment methods/tasks.

- **Specific assessment methods/tasks:**
  - **Learning Portfolio:** 80%  
  - **Planning and scheduling for successful completion of assessment instruments:** 20%

#### Indicative Content

- **Student Study Location:** Summarize where practical training took place and where the work team fits into the overall host organization.
- **Responsibilities:** Describe the actual responsibilities. Explain the role in terms of the work responsibilities. Describe how the knowledge and skill set evolved during the work experiences. Explain how these are relevant to the academic studies and future goals.

#### Other student study effort:

- **Skills and Knowledge:** Describe the skills and knowledge needed to fulfill the work responsibilities. Describe how the knowledge and skill set evolved during the work experiences. Explain how these are relevant to the academic studies and future goals.

#### Reading List and References

- **Textbooks:**
  - Nil

<table>
<thead>
<tr>
<th>Subject Description Form</th>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
<th>Prerequisite/ Corequisite/ Exclusion</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EE3010A</td>
<td>Summer Practical Training</td>
<td>3</td>
<td>SI</td>
<td></td>
<td></td>
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<tr>
<td></td>
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</tr>
</tbody>
</table>

---

**Indicative Content:**

- To give the students an exposure to the industrial/engineering working environments before they complete their formal education.
- To explore and extend their understanding of engineering study in a broader perspective.
- To enrich students' all-round and/or global learning experience.

#### Intended Learning Outcomes

1. Develop and deliver a learning portfolio for presenting learning experiences and outcomes.
2. Demonstrate the awareness of the practical contexts in engineering.
3. Appreciate the work of others in an industrial/engineering working.
4. Develop a resourceful and speculative approach in making contacts and sourcing information.
5. Demonstrate good working practices to show a developing maturity and sense of responsibility.

#### Subject Synopsys/ Indicative Syllabus

In order to ensure that students have useful experience, the summer practical training must be suitably chosen and properly organized. Students are expected to carry out a minimum of 6 weeks (3 credits) industrial training in a suitable organization participating in the Preferred Graduate Development Programme. Relevant placement as student helpers in PolyU administrative departments and the Industrial Centre is also available. Any other placement in any suitable external organization for a specified period of time is also acceptable. Full-time placement in a suitable organization as part of a sandwich programme is also acceptable. Relevant placement in national/international work-base employment, attachments, etc. is also acceptable. Students are required to indicate the expected training experiences prior to the commencement of their placements. The student works on his final-year degree project which involves an industrial partner or external client. The student need not be placed in the company but make frequent visits to ensure that the project will meet the specifications required by the company.

#### Teaching/Learning Methodology

- **Teaching/Learning Methodology:**
  - Through on-the-job work placements, students learn to connect classroom theory with practical workplace applications, prepare themselves for the realities of workplaces and develop their generic skills in a real working setting. In addition to the orientation, students consult with teaching staff on a one-to-one basis.

#### Assessment Methods

The outcomes on this subject are assessed by means of student learning portfolios as well as specific assessment methods/tasks.

- **Specific assessment methods/tasks:**
  - **Learning Portfolio:** 80%  
  - **Planning and scheduling for successful completion of assessment instruments:** 20%

#### Indicative Content

- **Student Study Location:** Summarize where practical training took place and where the work team fits into the overall host organization.
- **Responsibilities:** Describe the actual responsibilities. Explain the role in terms of the work responsibilities. Describe how the knowledge and skill set evolved during the work experiences. Explain how these are relevant to the academic studies and future goals.

#### Other student study effort:

- **Skills and Knowledge:** Describe the skills and knowledge needed to fulfill the work responsibilities. Describe how the knowledge and skill set evolved during the work experiences. Explain how these are relevant to the academic studies and future goals.

#### Reading List and References

- **Textbooks:**
  - Nil
**Subject Code**: EE4001A  
**Subject Title**: External Industrial Training  
**Level**: Nil  
**Credit Value**: 4  
**Exclusion**: Nil

### Intended Learning Outcomes
1. Students should develop the ability to undertake practical training in a suitable organization.
2. Students should develop the ability to plan and schedule their training activities.
3. Students should develop the ability to reflect on their training experience.
4. Students should develop the ability to communicate effectively in written and oral forms.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Methods</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Develop and deliver a learning portfolio for presenting learning experiences and outcomes.</td>
<td>Learning Portfolio</td>
<td>80%</td>
</tr>
<tr>
<td>b. Plan and schedule for successful completion of training objectives.</td>
<td>Placement Questionnaire</td>
<td>20%</td>
</tr>
</tbody>
</table>

### Reading List and References
- AI - 48
- AI - 72
- AI - 73

### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Class Contact</th>
<th>Teaching/Learning Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Placement</td>
<td>42 weeks</td>
</tr>
</tbody>
</table>

### Subject Description Form

**(I) Orientation**

Students should start their preparatory work by the commencement of the second semester of their second year study. An orientation will be provided for the following:

- **Applications**: Students are expected to carry out a minimum of 22 credits industrial training with at least 4 weeks of work experience in an external organization. Students are required to apply for the subject before the mid-semester break of the first year of their degree program.

**(II) Progress Monitoring**

Monitoring involves tracking the progress of students through regular contact with the employer. Students should maintain a monthly training journal to identify their progress and to be monitored by the training tutor. Site visits will be arranged by the training tutor to ensure that the training is progressing as planned.

**Student Study Effort Expected**

- **Time outside study effort**: 42 weeks
- **Total study effort**: 42 weeks

**Other study effort**: Nil

---

**Examples of valid WIE activities**

1. Full-time placement in a suitable organization as part of a sandwich programme.
2. Any other placement in any suitable external organization for a specified period of time.
3. Relevant placement as student helpers in PolyU administrative departments and the Industrial Centre.
4. Placement within the IAESTE (International Association for the Exchange of Students for Technical Experience) Programme in which the student is attached to a workplace abroad during the training.

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**Teaching/Learning Methodology**

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Placement</td>
<td>42 weeks</td>
</tr>
</tbody>
</table>

**Subject Description Form**

- **Collection**: Students collect relevant artifacts produced for the employer during the work term.
- **Selection**: Students examine what has been collected to decide what should be included into the learning portfolio.
- **Reflection**: Students articulate their thinking about each piece in the portfolio, as well as on the entire portfolio. Through this process of reflection, students draw connections between work experience and university-based learning, construct new knowledge, and become increasingly aware of themselves as learners.
- **Direction**: After reflection on their workplace experience, students set goals and directions for future learning, such as formulate the objectives of their Final Year Project.
## Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE4002A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Digital Control and Signal Processing</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>4</td>
</tr>
<tr>
<td>Pre-requisite/ Co-requisite/ Exclusion</td>
<td>Pre-requisite: EE3005A</td>
</tr>
</tbody>
</table>

### Objectives

1. To introduce the fundamentals and design techniques in digital control, filtering and signal processing. The analysis and design of these digital systems will be described with the aid of practical examples and CAD packages.

### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

a. Analyse the stability, transient response and steady-state response of sampled-data systems.

b. Design digital controllers for sampled-data systems.

c. Analyse discrete-time signals and extract features using different digital signal processing techniques.

d. Design a range of FIR and IIR filters.

e. Write technical reports and present the findings.

### Subject Synopsis/Indicative Syllabus

1. **Stability and transient analysis**: Sampling and z-transform, Sampled-data systems, Stability of closed-loop systems, Transient and steady state responses.

2. **Digital control design**: Translation of analogue design to digital design, Designs based on frequency response methods, Analytical design method.

3. **Design in state space**: Controllability, Observability, Pole placement, State observer, Output feedback, Servo problem.

4. **Digital filters**: Forms of realization, Design of nonrecursive and recursive filters, Finite word length effect.


### Laboratory Experiment:

- Digital controllers
- Digital signal analysis and filter design

### Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiments are designed to supplement the lecturing materials. The students are encouraged to take extra readings and to look for relevant information.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td>a b c d e</td>
<td>a b c d e</td>
<td>a b c d e</td>
</tr>
</tbody>
</table>

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>√ √ √ √ √</td>
</tr>
<tr>
<td>2. Class tests</td>
<td>30%</td>
<td>√ √ √ √ √</td>
</tr>
<tr>
<td>3. Laboratory reports</td>
<td>10%</td>
<td>√ √ √ √ √</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

The outcomes on analysis and design are assessed by the usual means of examination and tests whilst those on technical reporting and presentation are evaluated by the experiments and reports.

### Student Study Effort Expected

- **Class contact:**
  - Lecture/Tutorial: 38 Hrs.
  - Laboratory: 8 Hrs.

- **Other student study effort:**
  - Laboratory preparation/report: 12 Hrs.
  - Self-study: 47 Hrs.

Total student study effort: 105 Hrs.

### Reading List and References

- **Reference books:**
# Subject Description Form

**Subject Code**: EE4003A  
**Subject Title**: Electrical Machines  
**Credit Value**: 3  
**Level**: 4  
**Pre-requisite/Co-requisite/Exclusion**: Pre-requisite: EE3002A

## Objectives
1. After completing an elementary subject on electromechanical energy conversion, the students are exposed to the more challenging topics such as transient and unbalanced operations of electrical machines in this course.
2. This course is designed to ensure the students developing an in-depth understanding of various drive systems in the local industry.
3. To give the knowledge various electrical machines such as AC, DC and power electronic driven.

### Intended Learning Outcomes
Upon completion of the subject, students will:

- a. Have acquired a good understanding of the basic design methods of electric machines.
- b. Have had experience in synchronous machines including load characteristics, oscillation equations and displacement stability, condition monitoring, and harmonics analysis for drives. Be aware of various switched-mode driven machineries.
- c. Be capable to understand the control method for induction machines including closed loop and vector control.
- d. Be capable to understand the control method for induction machines including closed loop and vector control.
- e. Be capable to understand the control method for induction machines including closed loop and vector control.

## Subject Synopsis/Indicative Syllabus

<table>
<thead>
<tr>
<th>Syllabus Section</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Winding parameters and transformation</td>
<td>Induction parameters, Winding equations, Load characteristics of isolated generator, Generator</td>
</tr>
<tr>
<td>2. Induction machines: Performance analysis of single- and three-phase induction machines</td>
<td>Simulation tests, Condition monitoring, Dynamic operation, Torque control</td>
</tr>
<tr>
<td>3. Synchronous machines: Load characteristics and frequency response</td>
<td>Tuned filter, Transient and sub-transient</td>
</tr>
<tr>
<td>4. Field excitation and power electronics interfacing</td>
<td>The basics of induction machine control and design, as well as technical reporting and teamwork, are evaluated by mini-project and the reports.</td>
</tr>
<tr>
<td>5. Control of electric drives</td>
<td>Direct and indirect control, Torque control.</td>
</tr>
<tr>
<td>6. Switched reluctance machines</td>
<td>Field weakening operation, Torque control.</td>
</tr>
</tbody>
</table>

## Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures and Tutorials</td>
<td>Lecture/Tutorial</td>
</tr>
<tr>
<td>Laboratory/Mini-project</td>
<td>Laboratory/Mini-project</td>
</tr>
<tr>
<td>Self-study</td>
<td>Self-study</td>
</tr>
</tbody>
</table>

## Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Specific assessment methods/tasks</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>2. Class Test</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>3. Mini-project &amp; report</td>
<td>16%</td>
<td></td>
</tr>
</tbody>
</table>

## Student Study Effort Expected

- **Class contact**: Lecture/Tutorial 36 Hrs.
- **Laboratory/Mini-project**: 12 Hrs.
- **Other student study effort**: Mini-project/report 12 Hrs.
- **Self-study**: 45 Hrs.

**Total student study effort**: 105 Hrs.

## Reading List and References

- C.V. Jones, The Unified Theory of Electrical Machines, Butterworths, 1967
- B.K. Bose, Power Electronics and AC Drives, Pearson Education, 2002
- P. Vas, Vector control of AC machines, Clarendon Press, 1998
- AI - 50

### Lecture Plan

- **Lecture 1**: Transformation. Circuit equations, conversion process, torque, equation of motion.
- **Lecture 2**: Induction machines: Performance analysis of single- and three-phase induction machines.
- **Lecture 3**: Synchronous machines: Load characteristics of isolated generator, Generator.
Subject Description Form

Subject Code: EE4004A
Subject Title: Power Systems
Credit Value: 3
Level: 4

Pre-requisite/Exclusion
Pre-requisite: EE3004A

Objectives
1. To provide students with a sound knowledge of modern power systems, which is essential for all electrical power engineers to understand power system operation and control. It also provides a continuation of study of power systems in level 3 subject EE3041 "Power transmission and Distribution" and lead to more advanced topics of power systems study in final year electives.

Intended Learning Outcomes
a. Have acquired in-depth understanding of power system analysis, stability and operation.
b. Have acquired skills in identification, formulation and solution of power system analysis, operation and control problems.
c. Have acquired ability to evaluate the design and operational performance of basic power systems.
d. Have acquired communication skills with others in a team environment.
e. Have acquired skills in presentation and interpretation of experimental results and communicate in written form.

Subject Synopsis/Indicative Syllabus
5. Laboratory Experiment: Load flow study and simulation of sample power system.

Teaching/Learning Methodology
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiments on system analysis, design and practical applications are given to attain pragmatic solution with critical and analytical thinking. Experiments and mini-projects are designed to supplement the learning materials so that the students are able to apply the theories learned in class to practical experiments, to interpret the experimental results obtained and to communicate in written form.

Assessment Methods in All With Intended Learning Outcomes
1. Examination 60%
2. Laboratory performance & report 15%
3. Mini-project & report 15%
4. Class test 10%
Total 100%

Assessment Methods
Specific assessment methods/tasks
% weighting
1. Examination 60%
2. Laboratory performance & report 15%
3. Mini-project & report 15%
4. Class test 10%
Total 100%

Teaching/Learning Methodology Outcomes

Student Study Effort Expected
Class contact:
Lecture/Tutorial 38 Hrs.
Laboratory 8 Hrs.
Laboratory preparation/report 12 Hrs.
Self-study 47 Hrs.
Total student study effort 105 Hrs.

Reading List and References
1. W.D. Stevenson, Elements of Power System Analysis, McGraw Hill
2. Wood & Wollenberg, Power Generation, Operation and Control, J. Wiley
Subject Code: EE4006A  
Subject Title: Individual Project  
Credit Value: 6  
Level: 4

Pre-requisite: The student should have completed most of the subjects required in previous years of the programme before taking this subject. The enrollment of this subject is subject to the approval of the Project Coordinator.

Objectives:
1. The project accounts for a substantial part of the total assessment in Level 4 and it provides an opportunity for students to apply specialized professional engineering knowledge independently in the creative design, implementation, monitoring and evaluation of an engineering project. To achieve this goal, students are required to:
   a. Identify key engineering problems, to solve them, and to communicate what is achieved orally and in a written report.
   b. Develop a project which is creative, rich in intellectual content and sufficiently challenging.
   c. To monitor the progress of project from concept to final implementation and testing.
   d. To synthesize and apply their knowledge and analytical skills gained in various courses.

Intended Learning Outcomes:
- Upon completion of the subject, students will be able to:
  a. Identify key engineering problems and develop creative solutions.
  b. Communicate effectively in writing.
  c. Demonstrate independence and develop professionalism.
  d. Build confidence, demonstrate independence, and develop professionalism.

Subject Synopsis/Indicative Syllabus:

Choice of Project:
Projects are expected to be proposed by the students. They may also be proposed by academicians, members of staff or, possibly, by student and staff industrial experience and staff research and consultancy projects. Projects proposed by students and/or staff should be submitted to the subject coordinator before final submission.

Project Plan:

At the beginning of the project, each project is assessed by the Assessment Panel. The project coordinator shall have sufficient knowledge of the project to assess the student's progress. The panel shall consider all aspects of the project, including the student's presentation, written report, and response to questions.

Assessment:
- The project supervisor will provide informal and formal guidance throughout the project, and the project should be assessed on its technical merit, originality, and ability to work independently. The supervisor will also be in a position to contribute to the technical achievements of the student.
- The project supervisor will provide feedback on the student's progress and performance.
- The project will be assessed on the basis of the student's written report, oral presentation, and response to questions. The final grade will be determined by the marks given by the three academics.

At the end of the project, the student will submit the final report to the subject coordinator. The panel will read the project report before the assessment meeting. The Assessment Panel will reach their decision on the basis of:
- Listening to the student's presentation,
- Examining him orally on his work, and
- Seeing a demonstration of the project's outcome.

The final grade will be determined by averaging the marks given by the three academics.
constituting the Assessment Panel.

Overall assessment: 1.00 × Continuous Assessment

(I) Formal Project Proposal

Students are required to submit a formal project proposal when the project is started. One hardcopy is required. The length of the proposal should be limited to 6 pages, excluding appendix, if any. This will contribute to 5% of the final grade.

The contents of the proposal should include:
A. Aims of the project
B. Proposed specifications of the product (no matter it is a hardware or software project)
C. Summary of the literature search done up to date
D. Proposed approach/methodology to be used
E. Some brief descriptions on the theory of the approach/methodology
F. Time table/schedule of your work of the entire project

Assessment Criteria
1. Literature research
2. Problem definition
3. Writing quality

(II) The Interim Progress Report

Students are also required to submit an interim progress report at about the middle of the project duration. The length of the proposal should be limited to 12 pages, excluding appendix, if any. This will contribute to 15% of the final grade.

The contents of the progress report should include:
A. Aims of the project (especially any change from the original aims).
B. Brief outline of the theory.
C. Work that has been carried out up to the date.
D. The system design and the block diagram of the system, plus some brief descriptions on the theory.
E. Difficulties encountered and the measures taken to solve them.
F. Proposed time table/schedule for the rest of the work up to the end of the project.
G. Difficulties expected in the coming period.

Assessment Criteria
1. Method innovation and feasibility
2. Design/Implementation/Results
3. Project management
4. Writing quality

(III) The Final Report

The final project report should contain all the work carried out by the student in the project. The length of the main body of the final report should be about 45 pages in standard report format. The students are advised to form a framework for the report first, and then proceed to the formation of the titles of the chapters. The titles and structure of the sections within each chapter are then decided. Continuing the process, each section may be further expanded into appropriate sub-sections, divisions and sub-divisions etc., until a complete framework is formed. The final report will contribute to 50% of the final grade.

The content of the final report includes:
A. Aims of the project (especially any change from the original aims).
B. The motivation behind the project and a brief outline of the project work.
C. A summary of work done or developed in the project (not work done by others).
D. The system design and the block diagram of the system, plus some brief descriptions on the theory.
E. Testing and simulation results.
F. Comments on results obtained.
G. Difficulties encountered and the measures taken to solve them.
H. The achievement of the project, the conclusions from the work and suggestions for further work.
I. Materials which are closely related to the contents of the report, and which are themselves self-contained, may be included in the report as appendices.
J. A list of the references referred to the source of information in the report. This is compulsory.

Assessment Criteria
1. Problem identification
2. Conceptual clarity and accuracy
3. Technical application
4. Literature research
5. Writing quality

(IV) The Presentation and Demonstration

The student should keep the presentation concise and interesting through good use of visual aids and multimedia, logic flow of ideas, and appropriate control of the pace. Show good mastering of topics and avoid undue pauses. The student should be able to elaborate on technical details in answering questions. Good pronunciation and intonation are desirable. Be courteous during the presentation.

Hardware must be neatly built and laid out and there is good engineering sense in hardware implementation. Circuits software should function properly, and experiments should be able to support fulfillment of project objectives.

The student should show good mastering of topics during the question session of the presentation by providing satisfactory answers to questions.

The presentation and demonstration will contribute to 30% of the final grade.

Assessment Criteria
1. Problem identification
2. Conceptual accuracy and clarity
3. Technical Application
4. Success of demonstration
5. Language competence in presentation
Note 1: Each student has to submit/carry out all the above four components before he/she is considered to complete the FYP.

Note 2: The final grade for the FYP will be calculated by taking the weighted average of the grades from the above four components.

**Teaching/Learning Methodology**

As the nature of the subject implies, there will not be many formal lectures in the subject, other than a few of hours of briefings on general information, some official procedures in administration of the project and some techniques on information/components searching. Students learn the technical contents by a substantial number of individual discussions with their project supervisors and a large number of hours of self-learning. The planning of the project will be carried under the direction of the supervisor. Through the execution of the project plan with guidance from the supervisor, the student should be able to achieve the learning outcomes.

**Teaching/Learning Methodology Outcomes**

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion with the project Supervisor</td>
<td>✓</td>
</tr>
<tr>
<td>Writing of the project proposal</td>
<td>✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Writing of the interim report</td>
<td>✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Writing of the final report</td>
<td>✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Presentation and demonstration</td>
<td>✓ ✓</td>
</tr>
</tbody>
</table>

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formal project proposal</td>
<td>5%</td>
<td>a b c d e f</td>
</tr>
<tr>
<td>2. Interim progress report</td>
<td>15%</td>
<td>a b c d e f</td>
</tr>
<tr>
<td>3. Final report</td>
<td>50%</td>
<td>a b c d e f</td>
</tr>
<tr>
<td>4. Presentation and demonstration</td>
<td>30%</td>
<td>a b c</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a b c d e f</td>
</tr>
</tbody>
</table>

Assessment criteria for each of the above assessment methods are as listed in one of above sections.

**Student Study Effort Expected**

- **Class contact:**
  - Briefings: 3 Hrs.
  - Individual Discussions with supervisor: ~12 Hrs.

**Other student study effort:**

- Information search, self study, execution of the project, report writing, preparation of presentation: ~155 Hrs.

**Total student study effort:** ~170 Hrs.

**Reading List and References**

Nil
EE4007A

Advanced Power Electronics

Credit Value: 3
Level: 4

Pre-requisite:

EE3003A

Objectives:

1. To provide the students with the knowledge of advanced power electronic conversion.
2. To ensure the students having an in-depth understanding of the design and control of various power electronics converters.
3. To give the knowledge of AC switched-mode conversion.
4. To provide a concept of impact of power electronics on power quality.

Intended Learning Outcomes:

a. Have acquired a good understanding of basic switched-mode DC/DC topologies, operation, performance and modelling.

b. Have acquired a basic understanding of resonant converter and its method of loss reduction.

c. Be able to apply the switched-mode techniques to inverters.

d. Be able to perform study on power electronics circuit simulation.

e. Be aware of the impact of electromagnetic interference (EMI) and the reduction of EMI using power electronics techniques.

Subject Synopsis/ Indicative Syllabus:

1. Pulse-Width-Modulated DC/DC converters: Basic topologies and advanced DC/DC converters, transformer-based topologies, snubbers, discontinuous conduction mode operation, ripple analysis.

2. Control and CAD for power electronics converter design: Classification of power device, PWM technique, control methods and simulation techniques.


5. Laboratory Experiments: Switched-mode power converters with parasitic components and snubbers.

Teaching Learning Methodology:

Lectures and tutorials are effective teaching methods:

1. To provide an overview or outline of recent development of power electronics.
2. To introduce new concepts and knowledge in advantage power electronic converter design, soft switching technique, control method and electromagnetic interference (EMI) aspect.
3. To explain difficult ideas and concepts.
4. To provide students feedback in relation to their learning.
5. To encourage students responsibility for their learning by extra reference books reading and computer-based circuit simulations.

Laboratory works is an essential ingredient of this subject:

1. To supplement the lecturing materials.
2. To provide power converter design experience for the students.
3. To provide deep understanding of various power converter design aspects.
4. To enable students to organise principle and challenge ideas.

Teaching Learning Methodology Outcomes:

Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed |
--- | --- | --- |
Examination | 60% | a, b, c, d, e, f |
Class tests | 20% | a, b, c, d, e, f |
Laboratory reports & assignments | 20% | a, b, c, d, e, f |

Total | 100% |

Assessment Methods in Alignment with Intended Learning Outcomes:

Class contact: 38 Hrs.
Laboratory: 8 Hrs.
Laboratory preparation/report: 12 Hrs.
Self-study: 47 Hrs.

Total student study effort: 105 Hrs.

Reading List and References:

Textbooks:
2. K.W.E. Cheng, Classical Switched Mode and Resonant Power Converters, The Hong Kong Polytechnic University, 2002
3. K.C. Chang, Classical Switched Mode and Resonant Power Converters, The Hong Kong Polytechnic University, 2002

Reference Books:

Note: All the references are in accordance with the intended subject learning outcomes.
Subject Code: EE4008A
Subject Title: Applied Digital Control
Credit Value: 3
Level: 4
Pre-requisite/Co-requisite/Exclusion: Pre-requisite: EE3050A

Objectives:
1. To facilitate a working knowledge of principles of reduced-order modelling, digital control algorithms, system identification, and adaptive control.
2. To enable students designing industrial control systems for applications in different engineering areas.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:
- Understand the concepts of reduced-order modelling, deadbeat control algorithm, system identification and adaptive control.
- Understand the notions of offline and online system identification.
- Design conventional and adaptive controllers based on user specifications.
- Use CAD package for design and simulation.
- Effectively communicate experimental results in written and oral reports.

Subject Synopsis/Indicative Syllabus:
2. Direct digital control algorithms: Modified z-transform, PID algorithm, Cascade control, Finite-settling time control, Dead-time compensation, Internal model control.
3. Computer control methods: Hierarchical control configurations, Distributed approach, Description of representative systems, Programmable logic controllers (PLC).
5. Self-tuning control: Introduction to adaptive control, Self-tuning controller.

Laboratory Experiment:
There will be three laboratory experiments on the topics of reduced order modeling, digital control design and system identification by least-squares technique.

Case study:
Individual assignment related to above methods. Students will write a report and present their finding to the class.

Teaching/Learning Methodology:
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiments and case study are designed to supplement the lecturing materials. The students are encouraged to take extra readings and to look for relevant information.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a b c d e</td>
</tr>
<tr>
<td>2. Class test</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>3. Laboratory and case study</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tr>
</tbody>
</table>

The outcomes on concepts, analysis and design are assessed by the usual means of examination and tests whilst those on technical reporting and presentation are evaluated by the case study and experiments.

Student Study Effort Expected:
- Class contact: Lecture/Tutorial 38 Hrs.
- Laboratory: 8 Hrs.

Other student study effort:
- Laboratory preparation/report: 12 Hrs.
- Case study preparation/report: 12 Hrs.
- Self-study: 35 Hrs.

Total student study effort: 105 Hrs.

Reading List and References:
3. C.L. Smith and A.B. Corripio, Principle and Practice of Automatic Process Control
**Subject Description Form**

**Laboratory Experiments:** Traction power load flow simulation

**Case Study:** HK MTR systems

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**Subject Code:** EE4009A

**Subject Title:** Electric Traction and Drives

**Teaching/Learning Methodology**

Case studies will be used extensively to highlight the practicality of the subject materials being covered. Practitioners are also invited to have experience sharing sessions with the class. A group project is to be carried out to demonstrate and integrate the knowledge learned.

**Methodology Outcomes**

- **Level 1:** Subject Code EE4009A & EE4003A
- **Level 2:** Tutorials / Experiments / Mini-Projects

**Pre-requisite:** EE3003A & EE4003A

**Co-requisite/Exclusion**

Lectures / Examinations

**Teaching/Learning Effort Expected**

- **Lecture/Tutorial:** 39 Hrs.
- **Seminar:** 6 Hrs.
- **Assignment and self-studies:** 60 Hrs.

**Student Effort Expected**

- **Total student study effort:** 105 Hrs.

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**Assessment Methods**

1. **Mini-project (group project):** 20%
2. **Tests:** 20%
3. **Examination:** 60%

**Total:** 100%

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**Intended Learning Outcomes**

1. To enable students to develop a sound understanding of operation of modern electrified railway systems.
2. To provide an appreciation of the design and application of electric drives and operation principles of railway signaling, and the implications of design of traction and signaling systems on railway operations and traffic control.
3. To introduce students to the vital problems of electromagnetic interference and hardware design of enhanced electromagnetic compatibility.
4. To enhance students' awareness on the use of computer simulation in railway planning and operation, as well as the future technologies in railway systems.
5. To enable students to perform computer simulations of railway systems at an advanced level of study.

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**Integrative Sylabus**

**Indicative Syllabus**

1. **Introduction:**
   - The trends of modernization of railway systems.
   - Technical and design aspects of modernization.
   - Application of computer simulation in railway systems.
   - Design of traction and signaling systems.

2. **D.C. drives:**
   - Single-phase dual-converter drives.
   - Three-phase full-converter drives.
   - Chopper drives: line filter design, chopping frequency selection.
   - Principles of powering and regenerative braking.
   - Multiphase chopper, automatic variable field chopper.
   - Case studies on local traction industry.

3. **A.C. drives:**
   - Performance characteristics of induction motors: VVVF control, PWM control: mode transition, pulse dropping.
   - CVVF control.
   - Vector Control.

4. **Railway signaling:**
   - Basic functions.
   - Fixed and moving block signaling schemes.
   - Route and cab signaling.
   - Principles of headway and block length.
   - Factors affecting signal layout.
   - Track circuits: principles, operation and function.
   - Interlocking.
   - Traffic control.
   - Automatic train control.

5. **Train movement and simulation:**
   - Train operation modes.
   - Factors determining train movement: resistance, speed restriction, gradient and curvature of tracks.
   - Movement control: precise stopping at stations and inter-station runs.
   - Computer simulation: time-based and event-based models, simulation levels, applications.

6. **Electromagnetic compatibility:**
   - Track circuit interference.
   - Substation harmonics.

7. **Future trends of transit systems:**
   - Guided vehicles under computer control.
   - Magnetic levitation and suspension techniques.
   - Advanced automatic train control of registers, counters and memory units.
   - Design of asynchronous circuits, flow tables, table, table, and circuit faults.

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**Reading List and References**

**Textbooks:**
- Selected papers from *IEE Proceedings – Electric Power Applications*

**Reference books / journals:**
- Selected papers from *IEE Proceedings – Electric Power Applications*
## Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE4010A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Fibre Optics</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>4</td>
</tr>
</tbody>
</table>

**Pre-requisite/Co-requisite/Exclusion**
Pre-requisite: EE3080A or EIE331

### Objectives

1. To introduce students to the physical laws that govern the behavior of fibre-optics components.
2. To give students an understanding of the principles of fibre-optic sensing and optical fibre communications.
3. To equip students with the knowledge to design simple fibre-optic sensor systems.

### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

a. Appreciate recent developments in fibre optic communication systems.
b. Appreciate the important of fibre optics technology to the development of communications and fibre-optic sensors.
c. Appreciate the effect of attenuation and dispersion of optical fibres to the performance of a fibre optic system.
d. Apply fibre optic sensors for temperature and strain measurement.
e. Select the most appropriate passive and active fibre-optic components for fibre-optic sensor systems and fibre communication systems.
f. Use the appropriate fibre-optic equipment/instrument to perform optical power and spectrum measurements.
g. Have had hands-on experience in the use fusion splicer to make low-loss fibre joints.
h. Appreciate the engineering applications of fibre-optics technologies.
i. Appreciate the importance of optical fibre communications from a historical perspective.
j. Interpret the physical meaning and phenomena behind mathematical equations and computed results.

### Subject Synopsis/Indicative Syllabus

1. **Overview**: Introduction to the significance of fibre optics for electrical engineering. Summary of applications in high-field environments.
9. **Fibre optic systems design**: Fibre optic communication system design considerations. Attenuation and dispersion budgets. Digital system design.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quizzes</td>
<td>2%</td>
</tr>
<tr>
<td>2. Tests</td>
<td>28%</td>
</tr>
<tr>
<td>3. Laboratory experiment report</td>
<td>5%</td>
</tr>
<tr>
<td>4. Mini-projects</td>
<td>5%</td>
</tr>
<tr>
<td>5. Examination</td>
<td>66%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>

This subject introduces the physical laws that govern the behavior of optical fibres, semiconductor light sources and detectors, and how to employ them to design simple fibre-optic sensor systems. The outcomes are assessed by quizzes, tests, mini-projects, laboratory experiments and examination.

### Student Study Effort Expected

- **Class contact**:
  - Lecture/Tutorial: 36 Hrs.
  - Laboratory: 12 Hrs.

- **Other student study effort**:
  - Mini-projects: 20 Hrs.
  - Self-study: 37 hrs.

**Total student study effort**: 105 Hrs.

### Reading List and References


### Laboratory Experiments/Demonstrations

**Insertion loss measurement of optical fibres using optical power meters and optical spectrum analyzers**
Optical spectrum analyzer for spectral measurements of light sources
Fibre Bragg grating sensors
Subject Description Form

Subject Code: EE4011A
Subject Title: Industrial Computer Applications
Credit Value: 3
Level: 4
Pre-requisite/ Co-requisite/ Exclusion: Pre-requisite: EE3005A & EE3007A

Objectives
1. To introduce the applications of computing techniques in solving industrial problems and the following topics are included: Computer process control; Industrial instrumentation and systems; Image processing; Multimedia concepts.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:

a. Design and develop digital controllers.
b. Write ladder logic for simple PLC applications.
c. Understand the use of industrial networks.
d. Apply image processing techniques in industrial automation.

Subject Synopsis/ Indicative Syllabus
1. Computer process control: Modelling of the computer process control system, practical approaches to digital control implementation, PLC and microcomputer-based control systems.
2. Intelligent instrumentation and systems: Embedded microcontrollers, industrial process controllers, applications of distributed digital control algorithms, industrial networks and SCADA system.
3. Image processing: Digital image fundamentals, image representation, image enhancement, image segmentation, application of image processing in industrial automation.
4. Multimedia concepts and applications: Multimedia fundamentals, image compression, video compression, hardware peripherals and software tools.

Laboratory Experiment:
PC based digital controller for temperature control
Power failure monitoring using embedded controller
Sequential control using PLC
Automatic meter reading using computer vision

Teaching/Learning Methodology
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on design and practical applications are given through mini-projects, in which the students are expected to solve design problems with real-life constraints and to attain pragmatic solutions with critical and analytical thinking.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>a b c d</td>
</tr>
<tr>
<td>Tutorials</td>
<td>a b c d</td>
</tr>
<tr>
<td>Experiment</td>
<td>a b c d</td>
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</tbody>
</table>

Assessment Methods in Alignment with Intended Learning Outcomes
<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
</tr>
<tr>
<td>2. In-class Test (x2)</td>
<td>20%</td>
</tr>
<tr>
<td>3. Mini-project Report</td>
<td>10%</td>
</tr>
<tr>
<td>4. Mini-project Demo/Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
</table>

One end-of-semester written examination; one mid-semester test; one end-of-semester test; a mini-project on a small micro-processor based application; and a report/demonstration/presentation to accompany the mini-project.

Student Study Effort Expected

Class contact:
- Lecture/Tutorial: 36 Hrs.
- Laboratory (mini-project): 12 Hrs.

Other student study effort:
- Mini-project report and preparation: 12 Hrs.
- Self-study: 45 Hrs.

Total student study effort: 105 Hrs.

Reading List and References


Reference books:
Subject Description Form

Subject Code: EE4012A
Subject Title: Intelligent Buildings
Credit Value: 3
Level: 4
Pre-requisite/Co-requisite/Exclusion: Pre-requisite: EE3009A

Objectives:
1. To enable students to establish a broad knowledge on the concepts of intelligent buildings.
2. To enable students to understand that intelligence of a building can be achieved by integration and optimization of building structure, services systems, information technology, management and value-added services.
3. To enable students to understand basic features of an intelligent building and the required services systems to support these features.
4. To enable students to understand the operation principle and characteristics of various service systems/technologies of an intelligent building, such as the building automation system, intelligent vertical transportation systems, communications, structured cabling and etc.
5. To enable student to understand the impacts these services systems/technologies on the building and people.

Intended Learning Outcomes:

- Upon completion of the subject, students will be able to:
  a. Identify benefits, impacts and driving forces of intelligent buildings, and its subsystems.
  b. Describe design philosophy at system level, system configuration, system sub-modules of vertical modern vertical transportation systems and building automation systems, including the outdoor stations, etc.
  c. Describe general design concept and principles of communication systems in intelligent buildings, such as voice communication system, video communication systems, LAN, wireless LAN, mobile phone system, data networks, office automation systems, etc.
  d. Describe the general principle, concepts and system configurations of structure cabling, including the features, characteristics and applications of different categories of cables.
  e. Given a technical topic, carry out literature search and present the findings in a technical report.

Teaching/Learning Methodology:

- Lectures and tutorials are effective teaching methods:
  1. To provide an overview or outline of the subject.
  2. To introduce new concepts and knowledge to the students.
  3. To explain difficult ideas and concepts of the subject.
  4. To motivate and stimulate students' interest.
  5. To provide students feedback in relation to their learning.

- Mini-project works/Assignments are essential ingredients of this subject:
  1. To supplement the lecturing materials.
  2. To add real experience for the students.
  3. To provide deep understanding of the subject.
  4. To enable students to organise principles and challenge ideas.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Class tests</td>
<td>20%</td>
</tr>
<tr>
<td>Mini-project/Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The understanding on theoretical principle and practical considerations, analytical skills and problem solving techniques will be evaluated. Examination, class tests and mini-project report are an integrated approach to validly assess students' performance with respect to the intended subject learning outcomes.

Student Study Effort Expected:

- Lecture/Tutorial: 42 Hrs.
- Mini-project/Assignments: 21 Hrs.
- Self-study: 42 Hrs.

Total student study effort: 105 Hrs.

Subject Synopsis/Indicative Syllabus:

1. Intelligent building characteristics: Features and benefits of intelligent buildings. The anatomy of intelligent buildings. Environmental aspect. The marketplace and other driving forces behind the emergence of intelligent buildings. (6 hours)
2. Building automation systems & controls: Philosophy, system configuration, system modules, distributed systems, communication protocols and on-line measurements. Fire protection, security and energy management. Control objectives. Sensors, controllers and actuators. Control system schematics system design. Microprocessor based controllers & digital controllers. Examples of sub-systems such as: Digital Addressable Lighting Interface (DALI) (7 hours)
3. Modern intelligent vertical transportation systems: Sky lobby, double-deck lifts, twin lifts, advanced call registration systems, large scale monitoring systems, applications of artificial intelligence in supervisory control, energy saving measures related to lift systems/escalator systems, other modern vertical transportation systems, such as: gondola systems, materials handling systems, etc. (6 hours)
4. Communication systems: Voice communication systems, local area network, wireless LAN, public address, Digital TV, CCTV, teleconferencing, cellular phone system, radio paging and CB/SMATV. Data networking: Short- and long-haul networks. Wireless network. Office automation. Public Address/Sound reinforcement systems (10 hours)
5. Structured cabling systems: Characteristics and benefits. Standards, configurations and physical media. EMI/EMC issues, grounding problems. System design. Different Categories of cables. (6 hours)
6. Integrating the technologies and systems: The impact of information technology on buildings and people. Shared tenant services. Interaction and integration between building structure, systems, services, management, control and information technology. Application & design software packages. (5 hours)

Case Study:
International Financial Centre II, International Commerce Centre, Central Plaza and similar buildings

Teaching/Learning Methodology

- Lectures and tutorials are effective teaching methods:
  1. To provide an overview or outline of the subject.
  2. To introduce new concepts and knowledge to the students.
  3. To explain difficult ideas and concepts of the subject.
  4. To motivate and stimulate students' interest.
  5. To provide students feedback in relation to their learning.

- Mini-project works/Assignments are essential ingredients of this subject:
  1. To supplement the lecturing materials.
  2. To add real experience for the students.
  3. To provide deep understanding of the subject.
  4. To enable students to organise principles and challenge ideas.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Class tests</td>
<td>20%</td>
</tr>
<tr>
<td>Mini-project/Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The understanding on theoretical principle and practical considerations, analytical skills and problem solving techniques will be evaluated. Examination, class tests and mini-project report are an integrated approach to validly assess students' performance with respect to the intended subject learning outcomes.

Student Study Effort Expected:

- Lecture/Tutorial: 42 Hrs.
- Mini-project/Assignments: 21 Hrs.
- Self-study: 42 Hrs.

Total student study effort: 105 Hrs.

Reading List and References

Reference books:
1. A.C. Sidwell, Australia’s intelligent home, Construction Industry Institute, Australia, 1996
2. A. Harrison, Intelligent buildings in South East Asia, E & FN Spon, 1998

Subject Synopsis:

- Intelligent building characteristics: Features and benefits of intelligent buildings. The anatomy of intelligent buildings. Environmental aspect. The marketplace and other driving forces behind the emergence of intelligent buildings. (6 hours)
- Building automation systems & controls: Philosophy, system configuration, system modules, distributed systems, communication protocols and on-line measurements. Fire protection, security and energy management. Control objectives. Sensors, controllers and actuators. Control system schematics system design. Microprocessor based controllers & digital controllers. Examples of sub-systems such as: Digital Addressable Lighting Interface (DALI) (7 hours)
- Modern intelligent vertical transportation systems: Sky lobby, double-deck lifts, twin lifts, advanced call registration systems, large scale monitoring systems, applications of artificial intelligence in supervisory control, energy saving measures related to lift systems/escalator systems, other modern vertical transportation systems, such as: gondola systems, materials handling systems, etc. (6 hours)
- Communication systems: Voice communication systems, local area network, wireless LAN, public address, Digital TV, CCTV, teleconferencing, cellular phone system, radio paging and CB/SMATV. Data networking: Short- and long-haul networks. Wireless network. Office automation. Public Address/Sound reinforcement systems (10 hours)
- Structured cabling systems: Characteristics and benefits. Standards, configurations and physical media. EMI/EMC issues, grounding problems. System design. Different Categories of cables. (6 hours)
- Integrating the technologies and systems: The impact of information technology on buildings and people. Shared tenant services. Interaction and integration between building structure, systems, services, management, control and information technology. Application & design software packages. (5 hours)
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE4013A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Power System Protection</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>4</td>
</tr>
<tr>
<td>Pre-requisite/ Co-requisite/ Exclusion</td>
<td>Pre-requisite: EE3004A</td>
</tr>
</tbody>
</table>

Objectives
1. To introduce students the modern knowledge of power system protection.
2. To enable students to understand the design philosophy and working principle of different protective schemes, and how they are applied to power systems.

Intended Learning Outcomes
Upon completion of the subject, students will:

a. Have acquired a good understanding of knowledge, techniques and skills of power system protection.
b. Be able to interpret nameplate data and able to select the most appropriate transducers for various protection schemes.
c. Be able to carry out tests and analyse the performance of transducers and protection relays.
d. Have the ability to apply and adapt applications of mathematics, engineering skills in the analysis, comparison, and interpretation of various power system protection schemes.
e. Be able to present technical results in the form of a technical report.

Subject Synopsis/ Indicative Syllabus
2. Transducers: Input sources for protection system. Current and voltage transformers; sources of error; their performance under normal and abnormal conditions.

Laboratory Experiment:
- Current/Transformer Saturation.
- Directional Overcurrent Protection.
- Low Impedance and High Impedance Bushar Protection.
- Fault Simulation and Simulation of Digital Relay in EHV Transmission Line.

Case study:
1. Explain how source impedance and fault location affect the performance of protective relays.
In lectures and tutorials, materials that emphasize practical problem-solving methods are balanced with materials that emphasize fundamental understanding. Students are expected to take initiative to learn through the process of engagement and participation in lectures and tutorial sessions. Practical protection schemes used in industry, where appropriate, are discussed interactively in class. In laboratory classes, experiments are planned to let students design and carry out an experimental strategy, record and critically analyze their results, reach conclusions about the interpretation and performance of power system protective schemes. Students are also asked to make preparations such as information gathering before laboratory classes. Mini-Projects are used to enhance students learning experiences and practical applications. They provide students with the opportunity to develop independent design/planning and technical report writing skills pertinent to the field of power system protection.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>x</td>
</tr>
<tr>
<td>Tutorials</td>
<td>x</td>
</tr>
<tr>
<td>Experiments</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Methods in Alignment with Intended Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific assessment methods/tasks</td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>1. Examination</td>
</tr>
<tr>
<td>2. Class Test/Quiz</td>
</tr>
<tr>
<td>3. Laboratory performance &amp; reports</td>
</tr>
<tr>
<td>4. Mini-project &amp; report</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

The subject outcomes on concepts understanding, interpretation, analysis and applications of power system protection schemes are assessed by means of examination, quizzes and tests. The outcomes on engineering skills and applications, performance testing and analysis, as well as technical writing techniques, are evaluated by experiments, mini-project and reports.

<table>
<thead>
<tr>
<th>Student Study Effort Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class contact:</td>
</tr>
<tr>
<td>• Lecture/Tutorial</td>
</tr>
<tr>
<td>• Laboratory</td>
</tr>
<tr>
<td>Other student study effort:</td>
</tr>
<tr>
<td>• Laboratory preparation/report</td>
</tr>
<tr>
<td>• Self-study</td>
</tr>
<tr>
<td>Total student study effort</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reading List and References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference books:</td>
</tr>
</tbody>
</table>
EE4014A
Intelligent Systems Applications in Electrical Engineering
3
4
Nil
1. To introduce students to the fundamentals of intelligent systems and their applications in Electrical Engineering including electrical power systems, control and utilization.

Intended Learning Outcomes
a. Have acquired a good understanding of the fundamental concepts and methodologies of intelligent systems.
b. Be able to appreciate the power and usefulness of intelligent techniques.
c. Be able to know the design of artificial intelligence systems, evolutionary computation algorithms, uncertainty representation and reasoning mechanisms.
d. Be able to integrate intelligent system approaches in real-life electrical power engineering problems and control problems.
e. Have acquired communication skills with others in a team environment.
f. Have acquired skills in presentation and interpretation of mini-project results and communicate in written form.

Subject Synopsis/Indicative Syllabus
6. Applications in power systems: Planning, operation and control of electrical power systems.

Mini-project
Performance of Genetic Algorithm
Case Study
To study the performance of genetic algorithm on solving different functions such as De Jong problems and Colville problems. To investigate the effect of solution acceleration techniques on the performance of genetic algorithm.

Specific assessment methods/weighting
1. Examination: 50% 2. Class Test: 20% 3. Mini-project and Presentation: 30%

Total: 100%

The outcomes on concepts, design and applications are assessed by the usual means of examination and assignments. The outcomes on analytical skills, problem solving techniques and practical considerations of intelligent system applications, as well as technical reporting, teamwork and presentation skills, are assessed by mini-projects.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Student Study Effort Expected</th>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Class Test</td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Mini-project and Presentation</td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

The outcomes on concepts, design and applications are assessed by the usual means of examination and assignments. The outcomes on analytical skills, problem solving techniques and practical considerations of intelligent system applications, as well as technical reporting, teamwork and presentation skills, are assessed by mini-projects.

Teaching/Learning Methodology
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on system analysis, design and practical applications are given through mini-projects, in which the students are encouraged to take an active role in performing relevant calculations and model simulations. Experience in using and manipulating examples and case studies are important ingredients in ensuring the effective use of the lectures. Mini-projects are designed to be self-contained problems with critical and analytical thinking, designed to supplement the lecture materials so that the students are encouraged to take extra reading and look for other information.

Teaching/Learning Methodology Outcomes

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Mini-project</th>
<th>Other student work effort</th>
<th>Self-study</th>
<th>Total student study effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>20%</td>
<td>20%</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Reading List and References

Subject Description Form
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE4015A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Electrical Engineering Materials</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>4</td>
</tr>
<tr>
<td>Pre-requisite / Co-requisite / Exclusion</td>
<td>Pre-requisite: Engineering Materials (ENG2001)</td>
</tr>
</tbody>
</table>

### Objectives

- To introduce the students of electrical engineering or related discipline the basic electrical engineering materials. An introduction to materials in electrical engineering design and an advanced topic on smart materials will also be given.

### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

**Category A: Professional/academic knowledge and skills**
1. Acquire some understanding in basic and advanced electrical engineering materials.
2. Solve basic problems in electrical engineering materials.
3. Acquire better skills in performing laboratory experiments.

**Category B: Attributes for all-roundedness**
5. Work as a team in laboratory sessions.

### Subject Synopsis/Indicative Syllabus

<table>
<thead>
<tr>
<th>Syllabus:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Types and Applications of Materials</td>
</tr>
<tr>
<td>Materials for engineering. Classification of materials. Types and applications of engineering metals, ceramics, polymers and composites.</td>
</tr>
<tr>
<td>2. Conducting, Semiconducting, Insulating and Superconducting Materials</td>
</tr>
<tr>
<td>3. Magnetic Materials</td>
</tr>
<tr>
<td>4. Materials in Electrical Engineering Design</td>
</tr>
<tr>
<td>Corrosion, oxidation and degradation. Selection of materials for electrical engineering design (case studies).</td>
</tr>
</tbody>
</table>

### Laboratory Experiments:

1. Electrical conduction and dielectric behavior of materials.
2. Ferromagnetic behavior and Hall Effect in materials.
3. Ferroelectric, piezoelectric, and magnetostrictive behaviors of materials.

### Teaching/Learning Methodology

- Lectures, supplemented with interactive questions and answers
- In lectures, students are introduced to the knowledge of the subject, and comprehension is strengthened with interactive Q&A.

- Tutorials, where problems are discussed and are given to students for them to solve
- In tutorials, students apply what they have learnt in solving the problems given by the tutor.

- Laboratory sessions, where students will perform experimental verifications. They will have to record results and write a report on one of the experiments.
- Students acquire hands-on experience in using electronic equipment and apply what they have learnt in lectures/tutorials to experimentally validate the theoretical investigations.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous assessment</td>
<td>40 %</td>
</tr>
<tr>
<td>Examination</td>
<td>60 %</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
</tr>
</tbody>
</table>

### Smart Materials

Explanations of the appropriateness of the assessment methods in assessing the intended learning outcomes:

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Assignments are given to students to assess their competence level of knowledge and comprehension. The criteria (i.e., what to be demonstrated) and level (i.e., the extent) of achievement will be graded according to six levels: (A+ and A), Good (B+ and B), Satisfactory (C+ and C), Marginal (D) and Failure (F). These will be made known to the students before an assignment is given. Feedback about their performance will be given promptly to students to help them improve their learning.</td>
</tr>
<tr>
<td>Laboratory works and reports</td>
<td>Students will be required to perform three experiments and submit a report on one of the experiments. Expectation and grading criteria will be given as in the case of assignments.</td>
</tr>
<tr>
<td>Mid-semester test</td>
<td>There will be a mid-semester test to evaluate students' achievement of all the learning outcomes and give feedback to them for prompt improvement. Expectation and grading criteria will be given as in the case of assignments.</td>
</tr>
<tr>
<td>End-of-semester test and Examination</td>
<td>There will be an end-of-semester test and examination to assess students' achievement of all the learning outcomes. These are mainly summative in nature. Expectation and grading criteria will be given as in the case of assignments.</td>
</tr>
</tbody>
</table>

Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lecture</td>
<td>28 Hrs.</td>
</tr>
<tr>
<td>• Tutorial</td>
<td>14 Hrs.</td>
</tr>
<tr>
<td>• Laboratory</td>
<td>12 Hrs.</td>
</tr>
</tbody>
</table>

Other student study effort:

| Revision               | 28 Hrs.|
| Tutorial & assignments | 15 Hrs.|
| Laboratory logbook & report writings | 8 Hrs.|

Total student study effort: 105 Hrs.

Reading List and References

Textbooks:

References:
### Subject Description Form

**Subject Code**  
EE501A

**Subject Title**  
Alternative Energy Technologies

**Credit Value**  
3

**Level**  
5

**Pre-requisite/ Co-requisite/ Exclusion**  
Nil

**Objectives**

1. To enable students to establish a broad concept on alternative energy techniques in engineering.
2. To provide an in-depth knowledge on selected topics of alternative energy systems in engineering.
3. To enable students to understand typical alternative energy technologies, its associated issues of application and related technical considerations.
4. To enable students to understand the potential of alternative energy and characteristics & performance of various types of alternative energy systems.
5. To enable students to understand various techniques and systems for control and monitoring of alternative energy technologies, as well as the related communication protocol and interfacing requirements.

**Teaching/Learning Methodology**

- **Lectures and tutorials are effective teaching methods:**
  1. To provide an overview or outline of the subject contents.
  2. To introduce new concepts and knowledge to the students.
  3. To explain difficult ideas and concepts of the subject.
  4. To allow students to feedback on aspects related to their learning.

**Mini-project works/Assignments are essential ingredients of this subject:**

1. To supplement the lecturing materials.
2. To add real experience for the students.
3. To provide a deeper understanding of the subject.
4. To enable students to organise principles and challenge ideas.

**Case studies:**

1. To give real example for some of the concept presented in the lectures.
2. To explain some practical considerations when applying technologies in real projects.
3. To motivate and stimulate students interest.
4. To provide case studies and reports to highlight the importance of alternative energy technologies.

**Assessment Methods in Alignment with Intended Learning Outcomes**

- **Teaching/Learning Methodology Outcomes:**
  - a
  - b
  - c
  - d
  - e

- **Lectures:**
  - √
  - √
  - √
  - √
  - √

- **Tutorials:**
  - √
  - √
  - √
  - √
  - √

- **Case studies:**
  - √
  - √
  - √
  - √
  - √

**Specific assessment methods/tasks % weighting Intended subject learning outcomes to be assessed**

1. Class tests 20%  
   - a
   - b
   - c
   - d
   - e

2. Mini-project/Assignments/ Presentations 20%  
   - √
   - √
   - √
   - √
   - √

3. Examination  60%  
   - √
   - √
   - √
   - √
   - √

**Total 100%**

The understanding on theoretical principle and practical considerations, analytical skills and problem solving technique will be evaluated. Examination, class tests, assignments, presentations and mini-project report are an integrated approach to validly assess students’ performance with respect to the intended subject learning outcomes.

**Student Study Effort Expected**

- **Total student study effort 105 Hrs.**

**Reading List and References**


**Subject Synopsis/Indicative Syllabus**

1. **Energy resources and types:** Renewable and non-renewable energy resources. World potential and trends. Environmental effects. Alternative energy types and present roles. Importance and role of alternative energy.
5. **Cogeneration and combined-cycle plants:** New technologies for co-generation and CCGT. Efficiency and environmental benefits. Case study examples. Future development potentials.

**Case study:** Selections of practical alternative energy systems in Hong Kong and overseas.
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
<th>Prerequisite/ Co-requisite/ Exclusion</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE502A</td>
<td>Modern Protection Methods</td>
<td>3</td>
<td>5</td>
<td>Nil</td>
<td>1. To introduce the concept of modern power system protection to students. 2. To integrate theory and practical knowledge of power system protection. 3. To understand the working principle of power system protection. 4. To master the analytical techniques. 5. To apply protective relaying in power systems.</td>
</tr>
</tbody>
</table>

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Intended Subject Learning Outcomes to be Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (L) / Tutorials (T)</td>
<td>a b c d</td>
</tr>
<tr>
<td>Laboratory (Lab) / Report</td>
<td>e</td>
</tr>
<tr>
<td>Case studies</td>
<td>f</td>
</tr>
<tr>
<td>Total</td>
<td>g</td>
</tr>
</tbody>
</table>

**Teaching/Learning Methodology Outcomes**

<table>
<thead>
<tr>
<th>Lectures (L)</th>
<th>Tutorials (T)</th>
<th>Case studies</th>
<th>Laboratory (Lab)</th>
<th>Report</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

**Student Study Effort Expected**

<table>
<thead>
<tr>
<th>Class contact: Lecture/Tutorial (36 hrs)</th>
<th>Laboratory (12 hrs)</th>
<th>Other student study effort: Laboratory preparation/report (12 hrs)</th>
<th>Self-study (45 hrs)</th>
<th>Total student study effort (105 hrs)</th>
</tr>
</thead>
</table>

**Reading List and References**

Subject Code: EE505A  
Title: Power System Control & Operation  
Credit Value: 3  
Level: 5  
Pre-requisite/Exclusion: Nil

### Objectives
1. To introduce the concept of modern power system control & operation to students;  
2. To integrate theory and practical knowledge of power system control & operation;  
3. To understand the working principle of power system control and operation;  
4. To apply the theory in power system control & operation; and  
5. To understand the industrial practice and tools used in power system control and operations.

### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

- a. Analyse power system security control & operation;  
- b. Analyse interconnected power system interchange and economic operation;  
- c. Analyse power system computer control and applications;  
- d. Understand the functionalities and able to use to appropriate level of competence of selected specialty software for power system control and operation; and  
- e. Be aware of new technologies development trends and environmental impacts of modern power system control and operation techniques; and  
- f. Write technical reports and present the findings through individual effort as well as team work.

### Subject Synopsis/Indicative Syllabus
2. **Frequency control & AGC**: Frequency control and voltage control concepts. Control loops and analysis. Automatic generation control methodology and implementation.  
3. **Interconnected systems operation**: Interconnected power system operation and control. Multi-area operation.  
4. **Unit commitment and economic dispatch**: Priority lists. Methodologies for large system economic dispatch and unit commitment. Programming methods.  

### Case Study:
1. Local system control centre arrangement.  
2. Case study of system blackout in overseas countries.  
3. AGC and voltage control case studies.  
4. Power system developments in HK and China as well as overseas countries.

### Teaching/Learning Methodology
<table>
<thead>
<tr>
<th>Lectures</th>
<th>Tutorials</th>
<th>Reports</th>
<th>1. Exam</th>
<th>2. Class test</th>
<th>3. Mini project and report</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>60%</td>
<td>20%</td>
<td>20%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods &amp; criteria</th>
<th>% weightings</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exam</td>
<td>60%</td>
<td>a. b. c. d. e. f.</td>
</tr>
<tr>
<td>2. Class test</td>
<td>20%</td>
<td>a. b. c. d. e. f.</td>
</tr>
<tr>
<td>3. Mini Project and Report</td>
<td>20%</td>
<td>a. b. c. d. e. f.</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a. b. c. d. e. f.</td>
</tr>
</tbody>
</table>

### Teaching/Learning Methodology Outcomes

<table>
<thead>
<tr>
<th>Class contact</th>
<th>Self-study</th>
<th>Other student effort</th>
<th>Total student effort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 hrs.</td>
</tr>
</tbody>
</table>

### Assessment Methods

<table>
<thead>
<tr>
<th>Specific assessment methods &amp; criteria</th>
<th>% weightings</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Exam</td>
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</tr>
<tr>
<td>2. Class test</td>
<td>20%</td>
<td>a. b. c. d. e. f.</td>
</tr>
<tr>
<td>3. Mini Project and Report</td>
<td>20%</td>
<td>a. b. c. d. e. f.</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a. b. c. d. e. f.</td>
</tr>
</tbody>
</table>

### Intended Subject Learning Outcomes

1. Written report and presentation  
2. Written examination  
3. Self-study and report preparation

### Reading List and References

- Reference books:  
  2. Wollenberg, Power Generation, Operation and Control, Wiley.  

- Other reading materials:  
  1. Power system stability and control.  
  2. AGC and voltage control.  
  3. Power system developments in HK and China as well as overseas countries.

### Student Study Effort Expected

- Class contact: Lecture/Tutorial 42 Hrs.  
- Other student study effort: Miniproject preparation/report 10 Hrs.  
- Self-study: 53 Hrs.  
- Total student study effort: 105 Hrs.
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE509A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>High Voltage Engineering</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Objectives
1. To provide students with knowledge to understand the techniques of analysis and design pertaining to high voltage engineering including causes and manner of insulation failure and problems encountered in practice.

### Intended Learning Outcomes
Upon completion of the subject, students will:

a. Be able to describe the insulation breakdown mechanisms so as to identify the failure phenomena of different insulation systems.

b. Be aware of the design features of high voltage equipment so as to understand the application of common high voltage practices in the industry.

### Subject Synopsis/Indicative Syllabus

1. **Introduction to electrical insulation:** Electric fields; dielectric breakdown; electrical insulating materials; industrial applications of electrical insulating materials.

2. **Breakdown of gaseous insulation:** Ionization processes; Townsend breakdown mechanism; breakdown in electronegative gases; streamer breakdown mechanism; Paschen’s law; corona discharge; breakdown in non-uniform fields; post-breakdown phenomena and applications; vacuum insulation and breakdown.

3. **Breakdown of liquid insulation:** Breakdown in pure liquids; breakdown in commercial liquids; purification and breakdown test.

4. **Breakdown of solid insulation:** Breakdown due to treeing; breakdown due to surface flashover; breakdown due to surface tracking; breakdown in composite insulation.

5. **Partial discharges:** Classification of partial discharges by origin; partial discharge measurements.

6. **High-voltage equipment:** Applications of the above sections to the design of bushings, transformers, overhead lines, cables and circuit breakers.

7. **Generation of high voltages:** Cascade and series resonant methods for alternating voltages; doubler and multistage rectifiers for direct voltages; single-stage and Marx generators for impulse voltages.

8. **High-voltage measurements:** Measurement of leakage current; hv voltmeters; measurement of impulse voltages (peak voltage and wave-shape); Schering bridge.

9. **High-voltage Applications Outside of T&D:** Electrostatic hazards (such as dust explosions, oil-tanker explosions, integrated circuit damage); applications such as in electrostatic precipitator, paint spraying (and powder coating), ore separation; lightning protection of buildings.

### Teaching/Learning Methodology
Lectures are the primary means of conveying the fundamental knowledge to understand the techniques of analysis and design pertaining to high voltage engineering. Experiences on design and practical applications are given and demonstrated, and the students are expected to solve design problems with real-life constraints and to attain pragmatic solutions with critical and analytical thinking. Students will be required to form groups to work through cases covering practice on high voltage engineering applications and learn through active participation in the presentation of their findings.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>( \checkmark )</td>
</tr>
<tr>
<td>Case study</td>
<td>( \checkmark )</td>
</tr>
<tr>
<td>Demonstration</td>
<td>( \checkmark )</td>
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</tbody>
</table>

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
<td>a, b</td>
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<tr>
<td>Continuous assessment</td>
<td>30%</td>
<td>a, b</td>
</tr>
<tr>
<td>Case study</td>
<td>10%</td>
<td>b</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

The assessment methods include end of subject examination (60%), continuous assessment (30%) and case study (10%). Examination and continuous assessment cover intended subject learning outcomes 1 and 2, while case study involves intended subject learning outcome 2. Examination is in form of three-hour, closed book examination; continuous assessment contains coursework, homework, class test, etc.; and case study provides practice on high voltage engineering applications.

### Student Study Effort Expected

- **Class contact:**
  - Lecture/Tutorial: 42 Hrs.

- **Other student study effort:**
  - Case study: 12 Hrs.
  - Self-study: 51 Hrs.

- **Total student study effort:** 105 Hrs.

### Reading List and References

**Reference Books:**

1. M.S. Naidu and V. Kamaraju, High Voltage Engineering, 2004
4. A. Bradwell, Electrical Insulation, 1983
5. T.K. Bhar and E.J. McMahon, Electrostatic Discharge Control, 1983
6. W. Barkenoch, Dust Explosions, 1989
7. H. Haase, Electrostatic Hazards: Their Evaluation and Control, 1977
Subject Description Form

Subject Code: EE510A
Subject Title: Electrical Traction Engineering
Credit Value: 3
Level: 5

Pre-requisite/ Co-requisite/ Exclusion: EE4251

Objectives
1. To provide students with a comprehensive understanding of traction systems from a systems engineering viewpoint.
2. To provide an appreciation of the current state-of-the-art design and applications of electric drives and railway signalling systems.
3. To enable students to understand the implications of design of traction and signalling systems on railway operations and traffic control.
4. To introduce the quality indicators of railway operations and their relationships with the performance of traction drives, power supply and signalling systems.
5. To identify the necessary future technologies to improve the service quality in railway systems.

Teaching/Learning Methodology
Video clips together with computer animations are used to supplement conventional lectures. Case studies will be used extensively to highlight the practicality of the subject materials being covered. Practitioners are also invited to have experience sharing sessions with the class. A group project is to be carried out to demonstrate and integrate the knowledge learned.

Teaching/Learning Methodology | Outcomes
--- | ---
Lectures | √
Tutorials | √
Project Work | √

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed
--- | --- | ---
1. Mini-project (group project) | 20% | a √ b √ c √
2. Tests | 20% | √
3. Examination | 60% | √
Total | 100% | √

This is an advanced and yet introductory subject for students, particularly practising engineers in the railway industry. The subject encompasses all the important elements in a typical railway and a number of case studies are used to supplement the theoretical discussions. The outcomes are assessed through a mini-project (which aims to integrate the various aspects learnt), tests and written examinations.

Student Study Effort Expected

Class contact:
- Lecture/Tutorial: 33 Hrs.
- Invited lectures: 3 Hrs.
- Laboratory: 6 Hrs.

Other student study effort:
- Assignment and self-studies: 63 Hrs.

Total student study effort: 105 Hrs.

Reading List and References

Textbooks:

Reference books/journals:
1. J. Pachl, Railway Operation and Control. VTD Rail Publishing, Mountlake Terrace (USA) 2004
6. Selected papers from IEE Proceedings – Electric Power Applications

Subject Synopsis/ Indicative Syllabus

1. General aspects of traction systems: Technical and design aspects of railway electrification. Train dynamics and speed-time characteristics. AC and DC railways, power supplies and interference. Supply system requirements: performance under normal and emergency feeding conditions.
2. Traction drives and railway signalling: Single-phase drives; chopper drives; inverter drives. Requirement of Inverter substations. Principles of powering and regenerative braking; blended regenerative and rheostatic brake control. Induction motor control: VVVF control, PWM control and CVVF control. Philosophy of railway signalling: route capacity; track circuits; principles and equipment; layout of signals and track circuits; interlocking and control; train description; train protection and control.
3. Computer-aided design and operation of traction systems: Elements of design and analysis of traction systems: cost/benefit analysis; digital simulation of AC/DC power converter drives and traction equipment; computer-based design of block layouts and track circuits; power-factor, control, maximum-demand and energy-efficient operation; digital simulation of train performance for optimum headway, schedule speed and energy consumption; use of expert systems for system control and train scheduling. Computer modeling of non-linear source and traction load. Power quality issues of single phase AC traction: imbalance, harmonics and voltage dip; impact to traction system and public. Corrective measures and filter design.

Laboratory Experiment:
- Load-flow analysis in traction power system

Case Study:
## Subject Description Form

### Subject Code
EE512A

### Subject Title
Electric Vehicles

### Credit Value
3

### Level
5

### Pre-requisite/Co-requisite/Exclusion
Exclusion: EE543

### Objectives
1. To acquire a broad knowledge on modern electric vehicles (EVs).
2. To understand the development of EVs from technological, environmental, and societal perspectives.

### Intended Learning Outcomes
- Upon completion of the subject, students will be able to:
  1. Understand the importance of EVs for environment, energy sustainability and climate change.
  2. Conduct a systematic analysis of the drivetrain and vehicle mechanics given the pertinent technical data.
  3. Understand various underpinning technologies for modern EVs, including electric motor drives, energy storage, batteries, charging methods, infrastructure, and auxiliary systems.
  4. Explain the emerging technologies such as hybrid electric vehicles (HEVs), fuel cell electric vehicles (FEVs) and energy storage methods.
  5. Present the results of study in the form of written reports and oral presentations.

### Subject Synopsis/Indicative Syllabus
1. **Introduction to electric vehicles (EVs):** Historical perspective, EV advantages and impacts, EV market and promotion, infrastructure needs, legislation and standardization.
2. **Electric vehicle (EV) design options:** EV configurations, fixed vs. variable gearing, single vs. multiple-motor drive, in-wheel drives. EV parameters, driving cycles and performance specifications. Choice of system voltage levels: electrical safety and protection.

### Teaching/Learning Methodology
- Delivery of the subject is mainly through formal lectures, complemented by tutorials and worked examples. Self-learning on the part of students is strongly encouraged and extensive use of web resources will be made.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods</th>
<th>Intended subject learning outcomes to be assessed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Test</td>
<td>25%</td>
</tr>
<tr>
<td>Term paper</td>
<td>10%</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>5%</td>
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</table>

### Teaching/Learning Methodology Outcomes

<table>
<thead>
<tr>
<th>Class contact</th>
<th>Lecture</th>
<th>Tutorials</th>
<th>Assignment and oral presentation</th>
<th>Other student effort</th>
<th>Self-study and revision</th>
<th>Total student study effort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36 Hrs.</td>
<td>6 Hrs.</td>
<td></td>
<td></td>
<td></td>
<td>105 Hrs.</td>
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</table>

### Assessment

<table>
<thead>
<tr>
<th>Specific assessment methods</th>
<th>Percentage</th>
</tr>
</thead>
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<tr>
<td>Term paper</td>
<td>10%</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>5%</td>
</tr>
</tbody>
</table>

### Reading List and References
4. Selected papers from relevant journals and conference proceedings, such as EVS proceedings.
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE514A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Real Time Computing</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**Objectives**

1. To understand the properties of real time languages, operating systems, associated hardware.
2. To apply real time system software in engineering applications.
3. To test and verify real time systems and software.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able to:

a. To appreciate the important issues in real time computing systems, and their relations in engineering applications.
b. To identify and understand the real time issues in a computing OS system, and their mechanism of overcoming these obstacles.
c. Communicate effectively during discussions and presentations.
d. Have the ability to work independently, and in teams when conducting laboratory work.

**Subject Synopsis/Indicative Syllabus**


**Laboratory Experiment:**

- Appreciation of real time Linux and its application in Motor Control
- Case study: Real time power system simulation / High precision motion control

**Teaching/Learning Methodology**

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on design and practical applications are given through a practical case study, in which the students are expected to understand design problems with real-life constraints and to attain pragmatic solutions.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a b</td>
</tr>
<tr>
<td>2. Tests (x2)</td>
<td>20%</td>
<td>a b</td>
</tr>
<tr>
<td>3. Assignment/Presentation</td>
<td>10%</td>
<td>a b</td>
</tr>
<tr>
<td>4. Laboratory exercise/Report</td>
<td>10%</td>
<td>a b</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a b c d</td>
</tr>
</tbody>
</table>

The outcomes on concepts, design and applications of real-time systems are assessed by the usual means of examination and test whilst those on analytical skills, problem-solving techniques and practical considerations, as well as technical reporting and teamwork, are evaluated by experiments, mini-project and the reports.

**Reading List and References**

7. Selected papers from Proceedings of Real-time Systems Symposium (IEEE)
Subject Description Form

Subject Code: EE517A
Subject Title: Fibre Optic Components
Credit Value: 3
Level: 5
Pre-requisite/Co-requisite/Exclusion: Nil

Objectives:
1. To enable students to understand the fundamentals of light emission, detection, amplification, and light propagation in optical fibers.
2. To apply the knowledge learned to design fiber components and devices with specific specifications.
3. To appreciate the applications of fiber components in communication and sensing systems.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:

a. Appreciate the importance of optic fiber development from a historical perspective, understand important role of advanced fiber components in enhancing the performance of modern fiber systems.

b. Know the operating principle of various fiber components, be able to analyze/characterize the performance of fiber components.

c. Know the same function may be achieved by using different technology (e.g., electro-optic and acousto-optic modulation) and understand the advantage and limitations of each technology.

d. Select the most appropriate principles/techniques to design a fiber optic component with required specification, read the data sheets of various fiber-optic components.

Subject Synopsis/Indicative Syllabus:


5. Optical amplifiers: Rare-earth doped fibers, optical fiber amplifiers, semiconductor amplifiers.

6. Photo-detectors: Photomultipliers, photoconductive detectors, junction detectors (p-i-n diode, avalanche photodiode).


Laboratory Demonstration:
Observation of fiber modal patterns Characterization of single mode fibers: loss, dispersion, polarization dependent loss Measurement of source (LED, multi and single mode diode lasers) spectrum and power-current relations.

Group-project Topics:
To choose from a list of 15 topics and write a study report and give a presentation

Teaching/Learning Methodology:
Lectures are the primary means of teaching the basic concepts and theories. The understanding of basic principle is further enhanced through tutorials and laboratory demonstrations. Experiences and knowledge on design and applications of various integrated/fiber optic components, and on the use of alternative technologies to realise similar functionalities are gained through the use of examples during lectures and discussions during tutorials, and through assignments and group-study projects.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a b c d</td>
</tr>
<tr>
<td>2. Tests and assignments</td>
<td>25%</td>
<td>a b c d</td>
</tr>
<tr>
<td>3. Laboratory Demonstration</td>
<td>5%</td>
<td>a b c d</td>
</tr>
<tr>
<td>4. Group-project &amp; report</td>
<td>10%</td>
<td>a b c d</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a b c d</td>
</tr>
</tbody>
</table>

The outcomes on concepts, design and applications are assessed by examinations, test and assignments whilst those on practical considerations of optical components and systems design, as well as team work and technical report writing abilities are evaluated by group projects and the reports.

Student Study Effort Expected:

Class contact:
- Lecture/Tutorial: 39 Hrs.
- Laboratory demo: 3 Hrs.

Other student study effort:
- Self study and assignments: 53 Hrs.
- Group project and Report: 10 Hrs.

Total student study effort: 105 Hrs.

Reading List and References:
5. Selected papers from relevant journals
Three examples will be selected from the following list:

a. Optical based position tracking in CD-ROMs and Laser discs.
b. Magnetic head positioning in hard disk drives.
c. Motion control system design in multi-axis robot manipulation.
d. Gantry robot motion systems for SMF component insertion machines.
e. Motion systems in high precision CNC tooling machines.

Case study:

Report on a high performance motion control application example

Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on design and practical applications are given through a practical case study, in which the students are expected to understand design problems with real-life constraints and to attain pragmatic solutions.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment method/tasks | % weighting | Intended subject learning outcomes to be assessed |
--- | --- | --- |
1. Examination | 60% | a b c d |
2. Tests (x2) | 20% | a b c d |
3. Report | 10% | a |
4. Presentation | 10% | a |
Total | 100% | |

One end-of-semester written examination; one mid-semester test; one end-of-semester test; a report on an assigned topic; and a power point presentation for the particular topic.

Subject Synopsis/Indicative Syllabus

1. Structures of intelligent motion systems: Specifications and requirements of intelligent motion systems. Operating modes: point to point motion, trajectory path tracking, velocity path tracking, force and tension control, compliance control, vibration damping. Switching between operation modes.


4. Motion control platform: Computer hardware requirements. Tightly coupled systems versus distributed systems. Application of DSPs in motion control. Communication methods in motion systems. Real time operating system for motion control.


7. Case studies in intelligent motion systems:
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE521A</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Industrial Power Electronics</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Objectives

1. To provide power electronics engineers with in depth knowledge of the industrial power electronics.
2. To provide latest development in power supplies, industrial power electronics system and more electric aircraft will be covered.
3. To give industrial concern in power electronics design including passive components, packaging and standards.

### Intended Learning Outcomes

Upon completion of the subject, students will:

a. Have acquired a good understanding of power supply concept and design and be able to analyse the industrial needs for static power conversion.

b. Understand the international standards on power electronics design.

c. Have had a global view on recent development on power electronics and be aware of applications of power electronics in various industries.

d. Be able to work in teams and independently when conducting power electronics design and testing.

### Subject Synopsis/Indicative Syllabus

1. **Industrial power systems**: Static power systems, battery systems, AC systems, DC systems and AC-DC power conversion.
2. **Power conversion**: Soft-switching, power factor correction, inverter configurations and static converters.
3. **Special environment power electronics**: Power electronics distribution system, industrial guidelines, variable speed and constant frequency systems, actuation systems, brushless drives and other applications of power electronics in industry.
4. **Industrial power supplies**: Converter topologies, decentralised power, power modules, electro-magnetic compatibility, international standards and reliability.
5. **Devices and packaging**: Hermetic and plastic packages, wire bonding, power devices, high temperature effect and substrates.
6. **Magnetics and capacitors**: High frequency inductors and transformers, winding techniques, core loss analysis, optimisation of magnetics and power capacitors.

### Laboratory Experiments:
- Computer aided design for power electronics
- Power electronics for DC brushless motor
- Power Factor correction

### Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on design and practical applications are given through experiments and mini-projects, in which the students are expected to solve design problems with real-life constraints and to attain pragmatic solutions with critical and analytical thinking. Interactive laboratory sessions are introduced to encourage better preparation and hence understanding of the experiments. Experiments are designed to supplement the lecturing materials so that the students are encouraged to take extra readings and to look for relevant information.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Lectures</td>
<td>b. Tutorials</td>
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</table>

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a. b. c. d.</td>
</tr>
<tr>
<td>2. Test (x2)</td>
<td>20%</td>
<td>a. b. c. d.</td>
</tr>
<tr>
<td>3. Laboratory performance/report</td>
<td>20%</td>
<td>a.</td>
</tr>
</tbody>
</table>

Total 100%

One end-of-semester written examination; one mid-semester test; one end-of-semester test; laboratory performance evaluation (including punctuality, initiative, and technical reasoning); and laboratory report on a particular experiment.

### Student Study Effort Expected

- **Class contact**:
  - Lecture/Tutorial: 30 Hrs.
  - Laboratory: 12 Hrs.

- **Other student study effort**:
  - Laboratory preparation/report: 15 Hrs.
  - Self-study: 48 Hrs.

Total student study effort: 105 Hrs.

### Reading List and References

- **Reference books**:
  5. K.W.E. Cheng, Classical Switched Mode and Resonant Power Converters, The Hong Kong Polytechnic University, 2002
Subject Description Form

Subject Code: EE522A
Subject Title: Optical Fibre Systems
Credit Value: 3
Level: 5
Pre-requisite/Co-requisite/Exclusion: Nil

Objectives:
1. To introduce to students the theory and application of optical fibre communication and sensing technology.
2. To introduce to students the state-of-the-art and future techniques for higher-performance fibre-optic systems.
3. To equip students the ability to analyse fibre-optic digital communication systems.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:

a. Appreciate recent developments in fibre-optic communication systems.
b. Appreciate the important of fibre optics technology to the development of communications.
c. Calculate the link budgets of a fibre-optic link.
d. Select the most appropriate passive and active fibre-optic components for fibre-optic sensor systems and fibre optic communication links.
e. Appreciate the pros and cons of the various optical multiplexing techniques.
f. Apply the appropriate fibre-optic equipment/instrument to perform temperature and strain measurements.
g. Calculate the bit-error-rate performance of optical fibre communication systems and the use of optical spectrum analyzer for spectral measurements.
h. Appreciate the engineering applications of fibre-optic technologies.
i. Appreciate the importance of optical fibre communications from a historical perspective.
j. Appreciate the advantages of fibre-optic sensors to the electrical engineering industry.
k. Interpret the physical meaning and phenomena behind mathematical equations and computed results.

Subject Synopsis/Indicative Syllabus:
1. Overview of optical fibre communications: Historical perspective, basic concepts, lightwave systems and components, channel capacity.

Laboratory Experiments/Demonstrations:
- Optical spectrum analyzer for the observation of nonlinear effects and laser spectrum
- Insertion loss measurement of optical fibres
- Fibre Bragg grating sensors
- Optical fibre amplifiers

Teaching/Learning Methodology:
- Lectures, quizzes, tests, laboratory experiments, mini-projects, and examination.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quizzes</td>
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<tr>
<td>2. Tests</td>
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<td>3. Laboratory experiment report</td>
<td>5%</td>
<td>a b c d e f g h i j k l</td>
</tr>
<tr>
<td>4. Mini-projects</td>
<td>5%</td>
<td>a b c d e f g h i j k l</td>
</tr>
<tr>
<td>5. Examination</td>
<td>60%</td>
<td>a b c d e f g h i j k l</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a b c d e f g h i j k l</td>
</tr>
</tbody>
</table>

This subject introduces the theory and applications of optical fibre communication and sensor technology. The outcomes are assessed by quizzes, tests, mini-projects, laboratory experiments and examination.

Student Study Effort Expected:
- Class contact: Lecture/Seminar 42 Hrs.
- Other student study effort:
  - Mini-projects 9 Hrs.
  - Self-study 54 Hrs.
Total student study effort 105 Hrs.

Reading List and References:
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE524A</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Open Electricity Market Operation</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
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<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

#### Objectives

1. To enable students to establish a broad knowledge of open electricity market operation and to understand the major market models in the world.
2. To enable students to understand the key issues in open electricity market operation including deregulated power system operation, transmission pricing, procurement of ancillary services, congestion management, available transmission capacity so that students are provided with knowledge and techniques they need to meet the electric industry's challenges in the 21st century.

#### Intended Learning Outcomes

Upon completion of the subject, students will:

a. Be able to acquire a good understand of different power market models and financial tools to hedge risks used in electricity supply industries.

b. Be able to analyse the available transmission capacity and formulate equitable transmission pricing in electricity markets.

c. Be able to assess ancillary services requirements based on security and economic considerations.

d. Be able to present technical results in the form of technical report and verbal presentation.

#### Subject Synopsis/Indicative Syllabus


3. **Transmission and ancillary services:** Transmission ownership and restructuring. Measuring available transmission capacity in energy markets. Purchasing transmission capacity. Network and point to point transmission services. Fixed and firm transmission rights. Ancillary services.


### Teaching/Learning Methodology

The concept of electricity market modelling and economic analysis framework will be presented through lectures and tutorials with reference to real-life market environment. Students will be required to form groups to work through cases covering the market structure and operational aspects so as to develop ability to critically evaluate principles and operation of electricity markets. Tutorials will be structured on different sessions for better understanding on the theoretical concepts which require sufficient contribution from students. Students will also learn through active participation in the presentation of finding of their case studies.

#### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a b c d</td>
</tr>
<tr>
<td>2. In-class Test</td>
<td>20%</td>
<td>v</td>
</tr>
<tr>
<td>3. Cases study &amp; presentation</td>
<td>20%</td>
<td>v v v v</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
</table>

The outcomes on the concepts of modelling, analysis and applications are assessed by the usual means of examination and test whilst those on problem-solving techniques and presentation of findings, as well as technical reporting and teamwork, are evaluated by the case study exercise.

#### Reading List and References

**Textbooks books:**

**Reference books:**
Subject Code: EE525A  
Subject Title: Energy Policy and Restructuring of Electricity Supply Industry  
Credit Value: 3  
Level: 5  
Pre-requisite/Co-requisite/Exclusion: Nil  

Objectives:
1. To provide students with a comprehensive knowledge in formulating practical energy policies for sustainable energy utilization.
2. To develop a conceptual framework for understanding key and practical issues of restructuring electricity supply industry.

Intended Learning Outcomes:
Upon completion of the subject, students will:

a. Be able to explain the effects of energy policy on development of environmental control measures and alternative energy technologies.

b. Be able to identify the constraints in making energy utilization sustainable.

c. Be able to formulate and evaluate energy conservation policies relating to recycling of materials, end-use energy management and integrated resources planning.

f. Be able to identify the rationale and key issues for restructuring electricity supply industry.

g. Be able to explain the market structures and regulatory framework for electricity supply industry.

h. Be able to explain and evaluate different pricing concepts and pricing contracts in restructured electricity supply industry.

i. Be able to present the results of study in the form of written technical reports and oral presentations.

Subject Synopsis/Indicative Syllabus:


3. Restructuring of the ESI: Electricity supply industry structures; Privatisation and competition; Market structures and architectures; Regulation of Electricity Markets; Key issues for China and Hong Kong.


Case Studies:
1. Functional analysis on energy policies
2. Practical applications of sustainable energy measures
3. Implementation issues on ESI restructuring

Teaching/Learning Methodology:
The concept of energy policy, identification and discussion of ways of restructuring electricity supply industry will be presented through lectures and tutorials on case studies and international experiences. Miniprojects are used to enhance students learning experiences and practical applications. They provide students with the opportunity to develop independent research and writing skills pertinent to the field of energy policy and restructuring electricity supply industry.

Teaching/Learning Methodology Outcomes:

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Mini-projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>%</th>
<th>Intended Subject Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>a, b, c, d, e, f, g</td>
</tr>
<tr>
<td>2. Class Test/Quiz</td>
<td>25%</td>
<td>a, b, c, d, e, f, g</td>
</tr>
<tr>
<td>3. Mini-project/Report</td>
<td>15%</td>
<td>a, b, c, d, e, f, g</td>
</tr>
</tbody>
</table>

Total: 100%

Student Study Effort Expected:
Class contact: 30 Hrs. Lecture/Tutorial 30 Hrs. Case studies/Group discussion 12 Hrs. Other student study effort: Mini-project discussion/report 20 Hrs. Self-study 43 Hrs. Total student study effort: 105 Hrs.

Reading List and References:

2. S. Hunt and G. Shuttleworth, Competition and Choice in Electricity, Wiley, 1999
### Subject Description Form

**Subject Code:** EE526A  
**Subject Title:** Power System Analysis and Dynamics

<table>
<thead>
<tr>
<th>Credit Value</th>
<th>Objectives</th>
<th>Intended Learning Outcomes</th>
</tr>
</thead>
</table>
| 3            | 1. To introduce the students to the advanced concepts and analytical skills for the stability analysis in modern power systems.  
2. To understand the impact due to different system instabilities.  
3. To analyse and provide solutions to the power system stability problems. | a. Have acquired in-depth understanding of different types of power system stability problems.  
2. To be able to model the dynamic behaviour of system components under different disturbances.  
3. To be able to discuss the causes and effects of instabilities and recommend possible solutions.  
4. To have acquired skills in presentation and interpretation of experimental results and communicated on an international level. |

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Specific assessment methods/tasks</th>
<th>%</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>Experiments</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Examinations</td>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Laboratory and projects</td>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Performance &amp; Report</td>
<td></td>
<td>a</td>
<td>b</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Assessment Methods in Alignment with Intended Learning Outcomes</th>
</tr>
</thead>
</table>
| Lectures /g165 /g165 /g165 /g165  
Tutorials /g165  
Experiments /g165 /g165 |

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology Outcomes</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
</tr>
<tr>
<td>Examinations</td>
</tr>
<tr>
<td>Laboratory and projects</td>
</tr>
<tr>
<td>Performance &amp; Report</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject Synopsis/Indicative Syllabus</th>
</tr>
</thead>
</table>
3. Dynamic stability & power system stabilisers: Eigenvalue and modal analysis.  
4. FACTS: Converter and load modulation.  
6. Control of FACTS devices: HVDC link operation.  

<table>
<thead>
<tr>
<th>Laboratory Experiment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power system stability analysis using Power System Stability Tools “DST”</td>
</tr>
</tbody>
</table>

### Reading List and References

Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE527A</th>
</tr>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Auto-tuning for Industrial Processes</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Objectives
1. To facilitate a solid understanding of system identification.
2. To provide students with a solid knowledge of adaptive control.
3. To present a detailed survey of different auto-tuning methods used in industry.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:
- c. Design auto-tuning control systems based on relay auto-tuner.
- d. Use CAD package for design and simulation.
- e. Effectively communicate experimental results in written and oral reports.

Subject Synopsis/Indicative Syllabus
2. **Auto-tuning**: PID auto-tuning, Relay auto-tuner, Applications in industry.
3. **Self-tuning control**: Self-tuning algorithms, Minimum variance and generalised minimum variance, Pole-placement algorithms, Model reference adaptive systems.

Case study:
Individual assignment related to above methods. Students will write a report and present their finding to the class.

Teaching/Learning Methodology
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Case studies are designed to supplement the lecturing materials. The students are encouraged to take extra readings and to look for relevant information.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tutorials</td>
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<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Case studies</td>
<td></td>
<td></td>
<td></td>
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<td>✓</td>
</tr>
</tbody>
</table>

Assessment Methods in Alignment with Intended Learning Outcomes
Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed | a | b | c | d | e |
Subject Code: EE528A
Subject Title: System Modelling and Optimal Control
Credit Value: 3
Level: 5
Pre-requisite/Co-requisite/Exclusion: Nil

Objectives:
1. Provide students with a sound knowledge of system modelling techniques in areas of prediction and control. In addition, modern control design techniques will also be introduced.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:

a. Model systems using State Variable and Bond Graph Models.
b. Design optimal controllers for system models.
c. Apply computer packages for control system modelling and design.
d. Report and present the technical findings in logical and organised manner.
e. Practice their knowledge in team work.

Subject Synopsis/Indicative Syllabus:
2. Optimisations: Multivariable optimisations; Optimisations with constraints.

Laboratory Experiments:
Matlab Fundamentals
Transformation of System Models with Matlab
Simulations of optimal control systems

Teaching/Learning Methodology:
Basic concepts and theories are taught in lectures and tutorials. When conducting the experiments, the students are expected to solve practical control problems with critical and analytical thinking. Interactive assignments and on-the-spot discussions are conducted in both lectures and laboratory sessions. Experiments are designed so that the students should use the references in the instruction sheets to look for the supplementary information.

Assessment Methods:
Specific assessment % Intended subject learning outcomes to

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>a b c d e</td>
</tr>
<tr>
<td>Tutorials</td>
<td>√ √ √</td>
</tr>
<tr>
<td>Experiments</td>
<td>√ √</td>
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</tbody>
</table>

<table>
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<tr>
<th>Assessment Methods</th>
<th>%</th>
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</table>

The outcomes on concepts, design and applications are assessed by the usual means of examination and tests. The outcomes on analytical skills, problem-solving techniques and practical considerations of designing control systems, as well as technical reporting and teamwork, are evaluated by experiments and the reports.

Student Study Effort Expected:

- Class contact: Lecture/Tutorial 33 Hrs.
- Laboratory 9 Hrs.
- Other student study effort:
  - Laboratory preparation/report 15 Hrs.
  - Self-study and assignments 48 Hrs.
- Total student study effort 105 Hrs.

Reading List and References:

3. K. Ogata, Modern Control Engineering, Prentice-Hall, 2002
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
<th>Prerequisite/ Co-requisite/ Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power Electronics for Utility Applications</td>
<td>3</td>
<td>5</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Objectives

1. To enable students to understand the problems faced by modern power utilities and how power electronics can overcome these problems.
2. To introduce students to the various topologies of the power electronics circuits and how these differ from low power applications.
3. To provide basic understanding of the emerging power electronics technologies for power utility applications.
4. To enable students to understand the harmonics issues in power utility and means of controlling it using power electronics.
5. To enable students to design power electronics circuit that can control active and reactive power flow.

### Intended Learning Outcomes

- **a.** Explain why power electronics are needed in modern power system and understand of various emerging power electronics technologies for power utility applications.
- **b.** Explain the main topologies of power electronic circuits used in utility applications and how these differ from low power applications.
- **c.** Communicate and work effectively on why and how power electronics can be used for power utility applications.
- **d.** Identify power electronics topologies for used in controlling active and reactive power in a power system.
- **e.** Determine the harmonic filter required to satisfy the harmonic standard for a given harmonic load in a power system.

### Assessment Methods in Alignment with Intended Learning Outcomes

- **Lecture:** 30 Hrs.
- **Tutorial/Student presentation:** 12 Hrs.
- **Mini-project/report:** 15 Hrs.
- **Self-study:** 48 Hrs.
- **Examination:** 60%
- **Class Test:** 20%
- **Total:** 100%

### Reading List and References

- **Textbooks:**
  4. K.W.E.Cheng, Classical Switch Mode and Renewable Power Converters, The Hong Kong Polytechnic University, 2002

- **Reference books:**
  4. Reactive power compensations: Basic principles of current and voltage source inverters, Analysis of their performance, and applications of voltage source inverters for static var compensation (SVC).

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**Subject Synopsis/ Indicative Syllabus**

1. **Power electronics in utility applications:** Concepts, design and implementation of power electronics in utility applications.
2. **Control of high power applications:** High power inverters, principles of operation, and control of active and reactive power in power systems.
3. **Harmonics and power quality:** Measurement and mitigation of harmonics in power systems, power quality standards, and the role of power electronics in improving power quality.
4. **Active Filters:** Design and implementation of active filters for power quality improvement.
5. **Future trends:** Emerging technologies and trends in power electronics for power utility applications.
6. **Self-study:** Further reading and exploration of advanced topics in power electronics.
Selections of practical real life energy-saving systems in Hong Kong.

**Teaching/Learning Methodology**

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Practical experiences on power electronics design, energy saving and applications are given through mini-projects. Mini-projects are given at the beginning of the study. Students are encouraged to form groups to jointly investigate an industrial problem and they have to present the projects in front of the class.

**Assessment Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
</tr>
<tr>
<td>2. Class Test</td>
<td>20%</td>
</tr>
<tr>
<td>3. Mini-project &amp; Report</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</table>

It is a fundamental energy saving subject. The outcomes on concepts, design and applications are assessed by the usual means of examination and test whilst those on analytical skills, problem-solving techniques and practical considerations of circuit design, as well as technical reporting and teamwork, are evaluated by experiments, mini-project and the reports.

**Student Study Effort Expected**

- Lecture/Tutorial: 36 Hrs.
- Seminar/Case study: 12 Hrs.
- Other student study effort:
  - Mini-project/report: 15 Hrs.
  - Self-study: 48 Hrs.
- Total student study effort: 105 Hrs.

**Reference books:**

- S. Dhameja, Electric Vehicle Battery Systems, Boston, Mass.: Newnes, c2002
- S. Yannas, Solar Energy and Housing Design, Architectural Association, 2004
- Solar Energy Utilisation
  - Solar energy utilisation
  - Solar irradiation on earth, potentials of solar energy, solar thermal system systems, photovoltaic system systems, characteristics and performance of different solar devices and systems of different configurations, case study.
  - Energy saving control and monitoring systems: Theory of energy saving, remote control and monitoring systems, communication protocols, interface requirements, energy saving examples in multi-storey buildings, intelligent home concept, energy saving control in industrial plants.
  - Lighting, ballast, and variable speed drives: Magnetic ballast, electronic ballast, lighting design, fluorescent, LED and HID lamps, variable speed drives for HVAC systems and elevators, harmonics implications.

Laboratory Experiments, Seminars, Site Visits:

- Demonstration on operating principles of some selected energy-saving systems.
- Case study:
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**Subject Description Form**

**Subject Code**
ELC 1011

**Subject Title**
Practical English for University Studies

**Credit Value**
3

**Level**
1

**Pre-requisite / Co-requisite / Exclusion**
Nil

### Objectives

The subject aims to develop and enhance students’ general proficiency and communication skills in English. A strong focus will be given to enhancing competence and confidence in grammar, vocabulary, pronunciation and fluency.

### Intended Learning Outcomes

Upon successful completion of the subject, students will be able to:

- **a.** use a variety of strategies to comprehend meaning and messages of a range of written and spoken texts
- **b.** organise and write accurate and coherent short texts
- **c.** use appropriate verbal and non-verbal skills in spoken communication

To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present their ideas logically and coherently.

### Subject Synopsis / Indicative Syllabus

1. **Written communication**
   - Enhancing the use of accurate and appropriate grammatical structures and vocabulary in written communication
   - Understanding the content and structure of information delivered in written and spoken texts
   - Developing effective reading and listening strategies and using study tools such as dictionaries to obtain lexical and phonological information

2. **Oral communication**
   - Improving and extending relevant features of pronunciation, vocabulary, and coherence in spoken texts
   - Developing effective reading and listening strategies and using study tools such as dictionaries to obtain lexical and phonological information

3. **Language development**
   - Developing written English through web-based and face-to-face interactions
   - Improving and extending relevant features of grammar, vocabulary, and pronunciation and fluency

### Teaching / Learning Methodology

The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input as well as in-and-out-of-class group work, online and other digital resources, and peer and self-assessment. Additional reference materials will be recommended as required.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Intended Learning Outcomes</th>
<th>Specific assessment methods</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>1. In-class grammar and vocabulary tests</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>2. Oral assessment</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>3. Writing assessment</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The in-class tests, which assess students’ grammar and vocabulary and their ability to organise short texts, are used to assess achievement of LOs (a) and (b). The oral assessment is used to assess achievement of LO (a) and (c). Students will use the tests to collect information from a variety of sources, present the information in a digital story (ref. LOs (a) and (b)).

In addition to these assessments, students are required to complete further language training using web-based and face-to-face interactions. The additional language training offered in online tasks is aligned with all the above LOs and corresponds to their learning in class.

### Student Study Effort Expected

- **Class contact:**
  - Seminar: 42 Hrs.
  - Total student study effort: 126 Hrs.

- **Self-study/preparation:**
  - 42 Hrs.

- **Other study effort:**
  - 84 Hrs.

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July 2013
<table>
<thead>
<tr>
<th>Reading List and References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Material</strong></td>
</tr>
<tr>
<td>Learning materials developed by the English Language Centre</td>
</tr>
<tr>
<td><strong>Recommended References</strong></td>
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</table>
Subject Description Form

Subject Code: ELC1012/ELC1013
Subject Title: English for University Studies

(This subject will be offered in two versions for students who will primarily be using (1) APA/Harvard referencing styles or (2) IEEE/Vancouver referencing styles in their university studies.)

Credit Value: 3
Level: 1

Pre-requisite / Co-requisite / Exclusion:
Students entering the University with Level 5 from the HKDSE will be exempted from this subject. They can proceed to Advanced English for University Studies (ELC1014).

Objectives:
This subject aims to help students study effectively in the University’s English medium learning environment, and to improve and develop their English language proficiency within a framework of university study contexts.

Intended Learning Outcomes:
Upon successful completion of the subject, students will be able to:

1. refer to sources in written texts and oral presentations
2. paraphrase and summarise materials from written and spoken sources
3. plan, write and revise expository essays with references to sources
4. deliver effective oral presentations

To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present information logically and coherently.

Subject Synopsis/Indicative Syllabus:
1. Written communication
   - Analysing and practising common writing functions; improving the ability of writing topic sentences and strategies for paragraph development; understanding common patterns of organisation in expository writing; taking notes from written and spoken sources; practising summarising and paraphrasing skills; improving coherence and cohesion in writing; developing revision and proofreading skills.

2. Spoken communication
   - Recognising the purposes of and differences between spoken and written communication in English in university study contexts; identifying and practising the verbal and non-verbal interaction strategies in oral presentations; developing and applying critical thinking skills to discussions of issues.

3. Language development
   - Improving and extending relevant features of grammar, vocabulary and pronunciation.

Teaching/Learning Methodology:
The study method is primarily seminar based. Following a blended delivery approach, activities include teacher input as well as in- and out-of-class presentations, group work and simulations. The process approach to writing is adopted and students make use of learning resources to engage in academic discussions and to reflect on their learning.

Assessment Methodology:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>% Weighting</th>
<th>Intended Learning Outcomes to be Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Academic essay 1</td>
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<td>(a), (b), (c)</td>
</tr>
<tr>
<td>2. Academic essay 2</td>
<td>30%</td>
<td>(a), (b)</td>
</tr>
<tr>
<td>3. Oral presentation</td>
<td>40%</td>
<td>(a), (b), (c), (d)</td>
</tr>
</tbody>
</table>

Total 100%

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
Assessments 1 and 2 measure achievement of LOs (a), (b) and (c) in order to develop effective academic oral and written presentation skills. In order for students to be able to present an effective oral presentation, they will need to critically read and summarise information contained in a variety of sources, as required in LOs (a) and (b).

In addition to these assessments, students are required to complete further language training, through web-based language work, reading tasks and online reflections. The additional language training offered in online tasks is aligned with all the four LOs. In order for students to critically read and summarise information contained in a variety of sources, as required in LOs (a) and (b), students are expected to use language and text structure appropriate to the context, select information critically, and present information logically and coherently.

Reading List and References:

- Course material: Learning materials developed by the English Language Centre
- Recommended references:

Student Study Effort Expected:
Class contact:
- Seminars: 42 Hrs.

Other student study effort:
- Self-study/preparation: 84 Hrs.

Total student study effort: 126 Hrs.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
Assessments 1 and 2 necessitate achievement of LOs (a), (b) and (c) in order to write an effective academic essay via the process of extending and improving the essay for assessment 1. In order for students to be able to present an effective oral presentation, they will need to critically read and summarise information contained in a variety of sources, as required in LOs (a) and (b).
**Subject Description Form**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
<th>Co-requisite/Exclusion</th>
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<tbody>
<tr>
<td>ELC 1014</td>
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<td>3</td>
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<td>(unless exempted)</td>
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<table>
<thead>
<tr>
<th>Objectives</th>
<th>Intended Learning Outcomes (Note 1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This subject aims to help students study effectively in the University's English medium learning environment, and to improve and develop their English language proficiency within a framework of university study contexts.</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject Synopsis/Indicative Syllabus (Note 2)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Written communication</td>
<td>Developing logical and persuasive arguments: applying a variety of organisation patterns in discursive writing, including the writing of explanatory prose and argumentative essays; presenting information logically and persuasively; maintaining coherence and cohesiveness in discursive writing; achieving appropriate style and tone.</td>
</tr>
<tr>
<td>2. Spoken communication</td>
<td>Enhancing and practising the specific oral and aural skills required to participate effectively in academic discussions and to present views in a formal academic context.</td>
</tr>
<tr>
<td>3. Reading and listening</td>
<td>Understanding the content and structure of information in oral and written texts; comprehending, interpreting and evaluating messages and written texts.</td>
</tr>
<tr>
<td>4. Language development</td>
<td>Improving and extending relevant features of grammar, vocabulary and pronunciation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology (Note 3)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The study method is primarily seminar-based. Following a blended delivery approach, activities include interactive input as well as individual reading, listening and note-taking. Discussions, presentations and simulations also involve elearning resources to engage students academically.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific assessment methods/tasks</td>
<td>%</td>
</tr>
<tr>
<td>1. Written Argument Essay (draft)</td>
<td>20</td>
</tr>
<tr>
<td>2. Written Argument Essay (final)</td>
<td>45</td>
</tr>
<tr>
<td>3. Academic presentation &amp; discussion</td>
<td>35</td>
</tr>
<tr>
<td>4. Self-study effort</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Study Effort Expected</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Class contact</td>
<td>42 Hrs</td>
</tr>
<tr>
<td>Other student study effort</td>
<td>84 Hrs</td>
</tr>
<tr>
<td>Total student study effort</td>
<td>126 Hrs</td>
</tr>
</tbody>
</table>

**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**

Assessments 1 and 2 assess the students' ability in producing a coherent academic text which requires effective use and referencing of sources (Ref. LOs 1 and 2). 

Assessments 3 and 4 assess the students' ability in planning and presenting their ideas in two different academic contexts (Ref. LOs 1 and 3). 

In addition to these assessments, students are required to complete further language training through working on their ePortfolios throughout the course. This will involve students in reading texts and subsequent online writing and discussion that will parallel the process approach involved in assessments 1 and 2, and align with all three LOs.

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
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<th>Intended subject learning outcomes to be assessed (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Written Argument Essay (draft)</td>
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<td>a, b, c</td>
</tr>
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<table>
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</tr>
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</table>
Courses

Reading List and References

Course material

Learning materials developed by the English Language Centre

Recommended readings


(Revised: July 2013)
### Subject Description Form

**Subject Code**: ELC2011

**Subject Title**: Advanced English Reading and Writing Skills

**Credit Value**: 3

**Level**: 2

**Pre-requisite / Co-requisite / Exclusion**: Pre-requisite: Advanced English for University Studies (ELC1014)

### Objectives

This subject aims to help students become more effective readers. It focuses on developing students’ facility to read a variety of texts in a critical manner, and to be able to discuss the stance of the writer as well as their own reflective response to a text.

### Intended Learning Outcomes

Upon successful completion of the subject, students will be able to examine a variety of texts, including literary texts, and:

1. Identify salient ideas and implications, and distinguish unsupported claims from supported ones, and fallacies from valid arguments
2. Produce critical or interpretative texts which discuss and evaluate texts and writer positions
3. Write and discuss critical responses to various texts

To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present and support stance and opinion.

### Subject Synopsis / Indicative Syllabus

1. **Reading strategies**
   - Reading critically to investigate a particular topic and develop an in-depth understanding of issues and stances.
   - Reading extensively to appreciate the use of language, acquire information, promote understanding and develop empathy.

2. **Writing strategies**
   - Presenting views and arguments to educated readers, describing and analysing different perspectives.
   - Writing and discussing critical responses to various texts.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reflective writing</td>
<td>20%</td>
<td>a. Upon successful completion of the subject, students will be able to examine a variety of texts, including literary texts, and; b. Students will be able to discuss the stance of the writer as well as their own collective response to a text.</td>
</tr>
<tr>
<td>2. Analysing texts written in different styles and from various perspectives</td>
<td>40%</td>
<td>c. Students will be able to identify salient ideas and implications, and distinguish unsupported claims from supported ones, and fallacies from valid arguments.</td>
</tr>
<tr>
<td>3. Writing a feature article</td>
<td>40%</td>
<td>d. Students will be able to produce critical or interpretative texts which discuss and evaluate texts and writer positions.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td><strong>Total</strong>: a) Identify salient ideas and implications, and distinguish unsupported claims from supported ones, and fallacies from valid arguments. b) Produce critical or interpretative texts which discuss and evaluate texts and writer positions. c) Write and discuss critical responses to various texts. <strong>In total, students will be assessed on 126 hours of study.</strong></td>
</tr>
</tbody>
</table>

### Teaching / Learning Methodology

- **Study method**: Primarily seminar-based.
- Following a blended learning approach, activities include teacher input as well as in- and out-of-class individual work and peer group work involving drafting and evaluating texts, with the aim of learning through exposure. Students will be referred to learning resources on the Internet and in the ELC’s Centre for Independent Language Learning.
- Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC’s Centre for Independent Language Learning.
- The study method is primarily seminar-based. Following a blended learning approach, activities include teacher input as well as in- and out-of-class individual work and peer group work involving drafting and evaluating texts, with the aim of learning through exposure. Students will be referred to learning resources on the Internet and in the ELC’s Centre for Independent Language Learning.

### Assessment

**Method in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reflective writing</td>
<td>20%</td>
<td>a. Identify salient ideas and implications, and distinguish unsupported claims from supported ones, and fallacies from valid arguments.</td>
</tr>
<tr>
<td>2. Analysing texts written in different styles and from various perspectives</td>
<td>40%</td>
<td>b. Produce critical or interpretative texts which discuss and evaluate texts and writer positions.</td>
</tr>
<tr>
<td>3. Writing a feature article</td>
<td>40%</td>
<td>c. Write and discuss critical responses to various texts.</td>
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<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td><strong>Total</strong>: a) Identify salient ideas and implications, and distinguish unsupported claims from supported ones, and fallacies from valid arguments. b) Produce critical or interpretative texts which discuss and evaluate texts and writer positions. c) Write and discuss critical responses to various texts. <strong>In total, students will be assessed on 126 hours of study.</strong></td>
</tr>
</tbody>
</table>

**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**

Assessment 1 requires students to write reflective responses to texts and/or books they have read and is aligned with LO (c). Assessments 2 and 3 assess LO (a) and involve students employing effective critical reading and thinking skills. Assessment 3 requires students to conduct library searches and produce a critical text, which critically assesses the texts they have read. All three assessments assess students’ abilities with regard to LO (a) but in different ways, and require students to present and support their interpretation of the texts they read.

### Student Study Effort Expected

- **Class contact**: 42 Hrs.
- **Self study/preparation**: 84 Hrs.
- **Total student study effort**: 126 Hrs.
<table>
<thead>
<tr>
<th>Reading List and References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course material</strong></td>
</tr>
<tr>
<td>Learning materials developed by the English Language Centre</td>
</tr>
<tr>
<td><strong>Recommended references</strong></td>
</tr>
<tr>
<td>Subject Code</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>ELC2012</td>
</tr>
</tbody>
</table>

### Objectives

This subject aims to help students become more persuasive communicators in a variety of contexts that they may encounter at university and in the workplace.

1. **Class contact:**
   - Seminars: 42 Hrs.
2. **Other student study effort:**
   - Self-study/preparation: 84 Hrs.
3. **Total student study effort:** 126 Hrs.

### Intended Learning Outcomes

Upon successful completion of the subject, students will be able to:

- **a.** Communicate persuasively in written contexts
- **b.** Communicate persuasively in spoken contexts
- **c.** Make persuasive arguments in formal discussions
- **d.** Use language and text structure appropriately to achieve coherence and opinion.
- **e.** Select information critically, and present and persuade the audience.

### Teaching/Learning Methodology

The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input as well as individual and group work involving reading and appreciating texts, discussions and presentations of ideas.

### Assessment

<table>
<thead>
<tr>
<th>Specific assessment methods</th>
<th>% weighting</th>
<th>Intended subject learning outcomes</th>
<th>(Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Persuasive written text</td>
<td>40%</td>
<td>b</td>
<td>42 Hrs.</td>
</tr>
<tr>
<td>2. Persuasive speaking</td>
<td>30%</td>
<td>a, c</td>
<td>84 Hrs.</td>
</tr>
<tr>
<td>3. Debate</td>
<td>30%</td>
<td>a, b, c</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Reading List and References

- **Course material**
  - Recommended readings developed by the English Language Centre

### Subject Synopsis / Indicative Syllabus

1. **Preparing an effective persuasive speech:**
   - Assessing and selecting relevant content, organizing ideas and arguments, using appropriate visual imagery to support the communication of messages.
2. **Persuasion through writing:**
   - Developing and practising appropriate language, tone, style and structure.
3. **Persuasion through speaking:**
   - Developing and practising appropriate verbal and non-verbal skills for persuasive oral communication, improving and extending relevant pronunciation features, including articulation, pausing, intonation, word stress and sentence stress.

### Assessment in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Persuasive written text</td>
<td>40%</td>
<td>a, b</td>
</tr>
<tr>
<td>2. Persuasive speaking</td>
<td>30%</td>
<td>a, b</td>
</tr>
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<td>3. Debate</td>
<td>30%</td>
<td>a, b, c</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

### Student Study Effort Expected

- **Total student study effort:** 126 Hrs.
Subject Description Form

Subject Code: ELC2013
Subject Title: English in Literature and Film
Credit Value: 3
Level: 2
Pre-requisite / Co-requisite / Exclusion: Pre-requisite: Advanced English for University Studies (ELC1014)

Objectives: This subject aims to introduce students to a range of literary genres in English as well as to enable them to consider differences in media representations of genres, and to appreciate and negotiate the meanings of a variety of literary texts.

It is also intended that the subject will help students further develop literacy, as well as higher order thinking and life-long learning skills.

Intended Learning Outcomes: Upon successful completion of the subject, students will be able to:

a. examine and analyse literary texts on various themes from different perspectives
b. discuss literary techniques employed by writers
c. appreciate and articulate differences in textual and visual media representations

To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present and support stance and opinion.

Subject Synopsis/Indicative Syllabus:
1. Written communication
   Describing and interpreting content and language in literary texts; employing appropriate grammatical structures and vocabulary.
2. Spoken communication
   Presenting critical evaluation of literary works effectively and convincingly.
3. Reading
   Developing understanding of and competence in using literary devices such as metaphor, simile and symbolism, via reading literary texts and viewing film versions.
4. Language development
   Improving fluency and pronunciation, and extending grammatical and lexical competence.

Teaching/Learning Methodology:
The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input as well as in- and out-of-class individual and group work involving listening to and viewing a variety of audio-visual sources, reading and drafting texts, conducting internet research, making mini-presentations, participating in discussions, and comparing various representations of literature. Students will make use of elearning resources and web-based work to further improve their English literacy skills.

Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC’s Centre for Independent Language Learning. Additional reference materials will be recommended as required.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Individual paper</td>
<td>30%</td>
<td>a √  b √  c √</td>
</tr>
<tr>
<td>2. Written test</td>
<td>40%</td>
<td>a √  b √  c √</td>
</tr>
<tr>
<td>3. Group project</td>
<td>30%</td>
<td>a √  b √  c √</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
In assessment 1, students are required to write an individual paper in which they critically reflect on their reading of prose, and by so doing, demonstrate their achievement of LO (a). Assessments 2 and 3 are aligned with all three LOs. Assessment 2 assesses students’ understanding of a literary drama and requires comparison of the merits of its textual and theatrical versions. Assessment 3 is a group project that requires reading and interpretation of more creative literature and presentation of audio-visual sources.

Student Study Effort Expected:
Class contact: 42 Hrs.
Other student study effort:
- Self study/preparation: 84 Hrs.
Total student study effort: 126 Hrs.

Reading List and References:
Required reading:
The PolyU library retains either hardcopies or electronic copies of the following titles. The titles can also be found online.


http://shakespeare.mit.edu/midsummer/full.html

Other readings will be specified by the ELC teacher, and may contain short fiction, novelettes, plays and poetry.
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EL3521</th>
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<tbody>
<tr>
<td>Subject Title</td>
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</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite / Co-requisite</td>
<td>English LCR subjects</td>
</tr>
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**Objectives**

This subject aims to develop the language competence for professional communication in English required by students to communicate effectively with various parties and stakeholders in regard to engineering-related project proposals.

**Intended Learning Outcomes**

Upon completion of the subject, and in relation to effective communication with a variety of intended readers and stakeholders in English, students will be able to:

1. Plan, organise and produce professionally acceptable project proposals with appropriate text structures and language for different intended readers.
2. Plan, organise and deliver effective project-related oral presentations with appropriate interactive strategies and language for different intended audiences.
3. Adjust the style of expression and interactive strategies in writing and speaking in accordance with different intended readers/audiences.

**Subject Synopsis/Indicative Syllabus**

1. Project proposals in English
   - Planning and organizing project proposals
   - Explaining the background, rationale, objectives, scope and significance of a project
   - Referring to the literature to substantiate project proposals
   - Describing the methods of study
   - Describing and discussing project results, including anticipated results and results of pilot study
   - Presenting the budget, schedule and/or method of evaluation
   - Writing executive summaries/abstracts

2. Oral presentations of project proposals in English
   - Selecting content and style appropriate to the intended audience
   - Using appropriate verbal and non-verbal interactive strategies
   - Describing and discussing project results, including anticipated results and results of pilot study
   - Presenting the budget, schedule and/or method of evaluation
   - Writing executive summaries/abstracts

**Assessment Methods in Alignment with Intended Learning Outcomes**

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<tbody>
<tr>
<td>1. Project proposal in English</td>
<td>60%</td>
<td>a b c</td>
</tr>
<tr>
<td>2. Oral presentation of project proposal in English</td>
<td>40%</td>
<td>a c</td>
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**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**

1. The assessments will arise from the course-long engineering-related project. Students will be assessed on written documents and oral presentations targeted at different intended readers and stakeholders. This facilitates assessment of students' ability to select content and use language and style appropriate to the purposes and intended readers/audiences.

2. Students will collaborate in groups in planning, researching, discussing and giving oral presentations on the project. The written proposals will be rigorously engaged in the application of language skills for the entire document.

**Learning and Teaching Methodology**

The subject is designed to develop students' English language skills, both oral and written, that enable them to communicate effectively and professionally with a variety of stakeholders in engineering-related projects. It builds upon the language and communication skills covered in GUR language training subjects. The study approach is primarily seminar-based. Seminar activities include instructor input as well as individual and group work, involving drafting and evaluating texts, planning and researching the project, giving oral presentations, discussions and simulations. Students of this subject will also take the subject Professional Communication in Chinese, and will work on the same project. In producing the project documents, students will be involved in:

- Collaborating on the writing and research of project-related documents such as project proposals and oral presentations.
- Giving oral presentations to varied stakeholders of the project.

The study plan outlining the allocation of contact hours is attached.

### Assessment

- **1. Project proposal in English**
  - Planning and organizing project proposals
  - Explaining the background, rationale, objectives, scope and significance of the project
  - Referring to the literature to substantiate project proposals
  - Describing the methods of study
  - Describing and discussing project results, including anticipated results and results of pilot study
  - Presenting the budget, schedule and/or method of evaluation
  - Writing executive summaries/abstracts

- **2. Oral presentation of project proposal in English**
  - Selecting content and style appropriate to the intended audience
  - Using appropriate verbal and non-verbal interactive strategies
  - Describing and discussing project results, including anticipated results and results of pilot study
  - Presenting the budget, schedule and/or method of evaluation
  - Writing executive summaries/abstracts

### Teaching/Learning Methodology

The subject is designed to develop students' English language skills, both oral and written, that enable them to communicate effectively and professionally with a variety of stakeholders in engineering-related projects. It builds upon the language and communication skills covered in GUR language training subjects. The study approach is primarily seminar-based. Seminar activities include instructor input as well as individual and group work, involving drafting and evaluating texts, planning and researching the project, giving oral presentations, discussions and simulations. Students of this subject will also take the subject Professional Communication in Chinese, and will work on the same project. In producing the project documents, students will be involved in:

- Collaborating on the writing and research of project-related documents such as project proposals and oral presentations.
- Giving oral presentations to varied stakeholders of the project.

The study plan outlining the allocation of contact hours is attached.
2. There will be collaboration between the teaching staff from the English Language Centre and the discipline in assessing students’ performances. It is expected that the teaching staff of the Engineering discipline will provide support in assessing students’ application of discipline knowledge. They will be involved in assessing the oral presentations intended for experts rather than those for laymen.

3. Hence the assessment pattern will be as follows:

<table>
<thead>
<tr>
<th>Assessment type</th>
<th>Intended readers/audience</th>
<th>Timing</th>
<th>Assessors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written proposal in English</td>
<td>Mainly engineering experts</td>
<td>Week 10</td>
<td>ELC and Engineering staff</td>
</tr>
<tr>
<td>– Document of around 1,500 words for the initial proposal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral presentation of project in English</td>
<td>Mainly non-experts</td>
<td>Weeks 13-14</td>
<td>ELC</td>
</tr>
<tr>
<td>– Team presentation of 30 minutes, in groups of 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Simulating a presentation of the final proposal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Student Study Effort Expected**

- **Class contact:**
  - Seminars: 28 Hrs.

- **Other student study effort:**
  - Researching, planning, writing, and preparing the project: 56 Hrs.

- **Total student study effort:** 84 Hrs.

**Reading List and References**

4. Freshman Project (36 hours)

The Freshman Project aims at developing students' creative problem-solving skills and teamwork abilities through hands-on tasks. Students will work in small groups under the guidance of instructors to design and implement an engineering solution to a given problem, attending seminars/workshops, and developing a simple business plan.

5. Entrepreneurship Project (45 hours)

The Entrepreneurship Project is designed to develop students' appreciation and understanding of entrepreneurship and the commercialization process by attending seminars/workshops, identifying technology opportunities and developing a simple business plan.

### Entrepreneurship Project

- **Objectives**
  - Introduce students to the engineering broad discipline and enthuse them about their major study.
  - Cultivate students' creativity and problem-solving ability, and global outlook.
  -Expose students to the concept and understanding of entrepreneurship.
  -Engage the students in desirable forms of learning at university that emphasizes, self-regulation, autonomous learning and deep understanding of academic integrity during University study.
  -Help the students understand the importance of academic integrity. By going through the Online Tutorial on Academic Integrity, students will be given opportunities to develop good practices by which to stay clear of dishonest behaviors and academic plagiarism.

- **Methods**
  - The renowned speaker seminars and departmental seminars are designed to introduce students to the engineering broad discipline and their major study.
  - Students will then work in small groups to design and implement an engineering solution to a given problem under the guidance of instructors. There will be close staff-student and student-student interaction.
  - Students will be given opportunities to develop creativity, problem-solving, and team-work abilities.

- **Teaching/Learning Methodology**
  - Online Tutorial on Academic Integrity

- **Indicative Syllabus**

  - **Seminars**
    - One seminar will be given by a renowned speaker to introduce students to the engineering broad discipline and their major study. The seminar will be composed of a pre-seminar (2 hours), and then the actual seminar (2 hours). The students will then work in small groups in a workshop to appreciate the essential elements of the development of a business plan and subsequently to produce a simple business plan. Assessment will focus towards students' understanding of entrepreneurship, innovation and engineering.
  - **Departmental Seminars**
    - Four to six 1-hour Departmental Seminars will be delivered by chair professors and/or reputable professionals in the engineering broad discipline to arouse students' interests in engineering and to cultivate their understanding of and sense of belonging to the profession.

- **Assessment**
  - Online Tutorial on Academic Integrity through the Online Tutorial, students will be aware of the importance of academic integrity. They will also learn good practices by which to stay clear of dishonest behaviors and academic plagiarism.

- **Online Tutorial on Academic Integrity**

  - The Online Tutorial on Academic Integrity is developed by the University to help the students understand the importance of academic integrity. By going through the Online Tutorial on Academic Integrity, students will be given opportunities to develop good practices by which to stay clear of dishonest behaviors and academic plagiarism.

- **Teaching/Learning Methodology**

  - Online Tutorial on Academic Integrity

- **Indicative Syllabus**

  - **Seminars**
    - One seminar will be given by a renowned speaker to introduce students to the engineering broad discipline and their major study. The seminar will be composed of a pre-seminar (2 hours), and then the actual seminar (2 hours). The students will then work in small groups in a workshop to appreciate the essential elements of the development of a business plan and subsequently to produce a simple business plan. Assessment will focus towards students' understanding of entrepreneurship, innovation and engineering.
  - **Departmental Seminars**
    - Four to six 1-hour Departmental Seminars will be delivered by chair professors and/or reputable professionals in the engineering broad discipline to arouse students' interests in engineering and to cultivate their understanding of and sense of belonging to the profession.
### Assessment Methods in Alignment with Intended Learning Outcomes

Students' performance in this subject will be assessed by using a letter-grading system in accordance with the University's convention from grade F (failure) to A+. The relative weights of the different assessment components are as follows:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Online Tutorial on Academic Integrity</strong></td>
<td>0%</td>
</tr>
<tr>
<td><strong>Seminars</strong></td>
<td>20%</td>
</tr>
<tr>
<td><strong>Freshman Project</strong></td>
<td>40%</td>
</tr>
<tr>
<td><strong>Entrepreneurship Project</strong></td>
<td>40%</td>
</tr>
</tbody>
</table>

#### Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

**Quizzes** (online or paper-based) can measure the students' understanding about the engineering discipline. Through **reflective essays**, students can reflect on their appreciation and understanding about the engineering discipline. Through **project demonstration, presentation, and project reports**, students can demonstrate their creativity, problem-solving skills, and teamwork abilities. They can also demonstrate their ability to search for information, formulate a project plan, and manage a project with initiative. Through **business plan**, students can demonstrate their understanding about entrepreneurship.

### Pass Conditions

For students studying the 4-year degree programmes, and students studying in Higher Diploma programmes whose host departments have stipulated that they are required to take the Online Tutorial, in order to pass this subject, they must obtain a Grade D or above for total marks comprising the Seminars, Freshman Project and Entrepreneurship Project as described here AND passed the Online Tutorial on Academic Integrity on or before week 5 of semester 1 as described in the previous section. For students studying in Higher Diploma programmes whose host departments have not stipulated that they are required to take the Online Tutorial, there is no requirement to pass the Online Tutorial in order to pass this subject.

**Note:** This is only applicable to 4-year degree programmes and those Higher Diploma programmes that require the students to complete the Online Tutorial on Academic Integrity.

### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact</th>
<th>62 hours (for Online Tutorial on Academic Integrity, background information search, project work, meeting and discussion, preparation for presentation and demonstration, report and reflective essay writing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman project: 2 hours per week for 9 weeks</td>
<td>18 Hrs.</td>
</tr>
<tr>
<td>Entrepreneurship project: 1.5-3 hours per week for 6 weeks</td>
<td>15 hours</td>
</tr>
<tr>
<td>Renowned Speaker Seminar</td>
<td>4 hours</td>
</tr>
<tr>
<td>Departmental Seminar</td>
<td>6 hours</td>
</tr>
</tbody>
</table>

### Reading List and References

Subject Description Form

**Subject Code**: ENG2001  
**Subject Title**: Fundamentals of Materials Science and Engineering  
**Credit Value**: 3  
**Level**: 2  
**Pre-requisite / Co-requisite / Exclusion**: Nil

### Objectives
1. To realize the impact of the development of engineering materials on human civilization;
2. To enable students to establish a broad knowledge base on the structure and properties of materials for solving engineering problems;
3. To enable students to understand the applications and selection of engineering materials based on the consideration of properties, cost, ease of manufacture, environmental issues and their in-service performance.

### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

1. comprehend the importance of materials in engineering and society;
2. explain the properties and behaviour of materials using fundamental knowledge of materials science;
3. apply the knowledge of materials science to analyze and solve basic engineering problems related to stress, strain and failure of materials;
4. select appropriate materials for various engineering applications taking into consideration of issues in cost, quality and environmental concerns.

### Subject Synopsis/Indicative Syllabus

#### 1. Introduction
- Historial perspective: Evaluation of engineering materials; Materials science and engineering; Classification of materials
- Atomic structure: Bonding forces and energies; Primary interatomic bonds and secondary bonding; Crystalline and non-crystalline materials; Phase diagram and microstructure of alloys

#### 2. Atomic Structure and Properties
- Crystallography:晶格 structure; Crystallographic defects; Crystallographic texture
- Electronic properties: Electrical and optical properties of materials; Conductors, semiconductors, and insulators; PN junction; Light interactions with materials; Light propagation in optical fibers; Liquid crystal; Photoluminescence

#### 3. Mechanical Properties
- Stress-strain analysis: Elasticity, plasticity, and fracture; Tensile properties; Elastic recovery after plastic deformation; Hardness; Stress concentration; Impact energy; Fracture toughness; Design and safety factors

### Teaching/Learning Methodology
The subject will be delivered mainly through lectures but tutorials, case studies and laboratory work will be substantially supplement which practical problems and laboratory exercises, the laboratory sessions will be used to illustrate and assimilate some fundamental principles of materials science. The subject emphasis on developing students’ problem-solving skills.

### Assessment Method with Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>15%</td>
<td>a. b. c. d.</td>
</tr>
<tr>
<td>Test</td>
<td>20%</td>
<td>a. b. c. d.</td>
</tr>
<tr>
<td>Laboratory report</td>
<td>5%</td>
<td>a. b. c.</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
<td>a. b. c.</td>
</tr>
</tbody>
</table>

Total 100%

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

- The assignments are designed to reflect students’ understanding of the subject and to assist them in self-monitoring of their progress.
- The laboratory report is designed to assess the capability of students in analyzing and reporting experimental data relevant to learning outcome (b).
- The test and examination are for determining students’ understanding of key concepts as well as for assessing their achievement of the learning outcomes.

The laboratory report is designed to assess the capability of students in analyzing and reporting experimental data relevant to learning outcome (b).

The test and examination are for determining students’ understanding of key concepts as well as for assessing their achievement of the learning outcomes.
### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th>42Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lectures, tutorials, practical</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other student study effort:</th>
<th>35Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Guided reading, assignments and reports</td>
<td></td>
</tr>
<tr>
<td>• Self-study and preparation for test and examination</td>
<td>46Hrs.</td>
</tr>
</tbody>
</table>

**Total student study effort** 123Hrs.

### Reading List and References


3. Materials World  
   (Magazine of the Institute of Materials, Minerals and Mining)
Subject Description Form

Subject Code: ENG2002

Subject Title: Computer Programming

Credit Value: 3

Level: 2

Pre-requisite / Co-requisite / Exclusion: Nil

Objectives:
(i) To introduce the fundamental concepts of computer programming
(ii) To equip students with sound skills in C/C++ programming language
(iii) To equip students with techniques for developing structured and object-oriented computer programs
(iv) To demonstrate the techniques for implementing engineering applications using computer programs.

Intended Learning Outcomes:
Upon completion of the subject, students will be able to:

1. Familiarize themselves with at least one C/C++ programming environment.
2. Be proficient in using the basic constructs of C/C++ to develop a computer program.
3. Be able to develop a structured and documented computer program.
4. Understand the fundamentals of object-oriented programming and be able to apply it in computer program development.
5. Be able to apply the computer programming techniques to solve practical engineering problems.

Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching and Learning Method</th>
<th>Intended Subject Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures, supplemented with short quizzes</td>
<td>2, 3, 4</td>
<td>Students are introduced to the knowledge of computer programming through explanation and illustrative examples. Comprehension of the knowledge is strengthened with short quizzes. Students will be able to monitor the skills of using C/C++ and apply the techniques of developing structured object-oriented applications.</td>
</tr>
<tr>
<td>Laboratories/tutorials where problems are given to students for them to solve</td>
<td>1, 2, 3, 4, 5</td>
<td>Students apply what they have learnt in lectures and solve problems in exercises. The purpose is to ensure students have captured the important points. Tutors will aid the lecturer in helping the students finishing the exercises, and interactive Q&amp;A will take place.</td>
</tr>
<tr>
<td>Homework, and tests</td>
<td>1, 2, 3, 4, 5</td>
<td>Through working homework, students will develop a firm understanding and comprehension of the knowledge taught. They will analyse given C/C++ applications and apply knowledge in solving problems. For some design type of problems, they will have to synthesize solutions by evaluating different alternatives. To assure students' understanding of fundamental concepts, closed-book tests are arranged regularly. To enhance the students' problem solving skill in a given programming environment, open-book programming tests are arranged regularly.</td>
</tr>
<tr>
<td>Mini-project</td>
<td>1, 2, 3, 4, 5, 6</td>
<td>After all the subject materials have been delivered, students are asked to finish a mini-project in a team. The project involves a practical engineering problem of some stated specification.</td>
</tr>
</tbody>
</table>

Subject Synopsis/Indicative Syllabus

Syllabus:
1. Introduction to programming - Components of a computer; Programming environment; Process of application development.
2. Bolts and Nuts of C/C++ - Preprocessor; Program code; Functions; Comments; Variables and constants; Expressions and statements; Operators.
3. Program Flow Control - Branching and looping; Function parameters passing; Return values; Local and global variables; Scope of variables.
4. Program Design and Debugging - Structured program design; Modular programming; Exceptions and debugging; Case study: Using the Visual C++ debugger.
5. Basic Object Oriented Programming - Objects and classes; Private versus public; Implementing class methods; Constructors and destructors.
6. Pointer and Array - Stack and Free store; Create and delete objects in the free store; Pointer arithmetic; Passing function arguments by pointer; Returning values by pointer; Array of objects; Array and pointer; Array of pointers; Pointer of array; Character array; Command-line processing.
7. Stream I/O - Input and output as streams; File I/O using streams.
8. Using C/C++ in Engineering Applications - Solving practical problems using C/C++; Developing graphical user interfaces for engineering applications.
### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In-class exercises</td>
<td>10</td>
<td>1 2 3 4 5 6</td>
</tr>
<tr>
<td>2. Short-quizzes</td>
<td>10</td>
<td>1 2 3 4 5 6</td>
</tr>
<tr>
<td>3. Closed-book tests</td>
<td>20</td>
<td>1 2 3 4 5 6</td>
</tr>
<tr>
<td>4. Programming tests</td>
<td>30</td>
<td>1 2 3 4 5 6</td>
</tr>
<tr>
<td>5. Mini-project</td>
<td>30</td>
<td>1 2 3 4 5 6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 %</strong></td>
<td></td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The short-quizzes are for assessing the understanding of fundamental concepts. The in-class exercises, closed-book tests and programming tests are conducted to help students familiarized with the programming language and skills. The problems to be solved by the students are typically presented as practical engineering problems. Through conducting a mini-project that lasts for several weeks, students would be able to experience how to solve problems by using a systematic approach in a team.

### Student Study Effort Expected (Within TWO semesters)

<table>
<thead>
<tr>
<th>Class contact:</th>
<th>64 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lecture</td>
<td>30 Hours</td>
</tr>
<tr>
<td>• Tutorial</td>
<td>19 Hours</td>
</tr>
<tr>
<td>• Test/Quiz</td>
<td>14 Hours</td>
</tr>
<tr>
<td>• Mini-project presentation</td>
<td>1 Hours</td>
</tr>
</tbody>
</table>

**Other student study effort:**

<table>
<thead>
<tr>
<th>61 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Self-studying</td>
</tr>
<tr>
<td>• Homework</td>
</tr>
<tr>
<td>• Mini-project/Report</td>
</tr>
</tbody>
</table>

**Total student study effort**

<table>
<thead>
<tr>
<th>125 Hours</th>
</tr>
</thead>
</table>

### Reading List and References

1. S. Rao, Sams Teach Yourself C++ in One Hour a Day. Indianapolis, IN: Sams, 2012.
Subject Code: ENG2003
Subject Title: Information Technology
Credit Value: 3
Level: 2

**Pre-requisite / Co-requisite / Exclusion:** Nil

**Objectives:**

To provide the foundation knowledge in internet applications, computer networks and database management that is essential to modern information system design.

**Intended Learning Outcomes:**

Upon completion of the subject, students will be able to:

**Category A: Professional/academic knowledge and skills**
1. Understand the functions and features of modern computers and operating systems.
2. Understand the client-server architecture and be able to set up multiple internet applications.
3. Understand the principles of computer networks and be able to set up simple computer networks.
4. Understand the basic structure of a database system and be able to set up a simple database system.

**Category B: Attributes for all-roundedness**
1. Solve problems using systematic approaches.
2. Understand the principles of computer networks and be able to set up simple database systems.
3. Understand the structure and function of a database system.

**Subject Synopsis/Indicative Syllabus:**

1. Introduction to computers
   - Introduction to information technology using Cloud Computing as a real-life example. Present applications of information technology in different engineering disciplines. Introduction to modern computer (Personal Computers/Computer Clusters) and operating systems (Resource Management/Privilege Control).
2. Computer Networks
3. Introduction to data processing and information systems
   - Database management systems, Web and database linking, database application and development. Introduction to Information Technology, Database Management, and Database Application and Management.
4. Introduction to Systems Analysis and Design
   - Structured systems analysis and design. Development methodology.
5. Database Application Development
   - Development methodology. Introduction to Information Technology, Database Management, and Database Application and Management.

**Teaching/Learning Methodology:**

There will be a mix of lectures, tutorials and laboratory sessions/workshops to facilitate effective learning. Students will be given case studies to understand and practice the usage of modern information systems.

**Assessment Methods in Alignment with Intended Learning Outcomes:**

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>50%</td>
<td>A1, A2, A3, A4, B1</td>
</tr>
<tr>
<td>Examination</td>
<td>50%</td>
<td>A1, A2, A3, A4, A5</td>
</tr>
</tbody>
</table>

Total 100%

**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**

The examination cover intended subject learning outcomes A1, A2, A3, A4 and B1. The laboratory sessions/workshops cover intended subject learning outcomes A2, A3 and A5. The assessment methods include an end-of-subject examination (50%), two assignments (20%), and two tests (20%). The assessment aims to evaluate students' understanding of the subject content and their ability to apply knowledge in practical scenarios.
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>ENG3002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Multidisciplinary Project</td>
</tr>
<tr>
<td>Credit Value</td>
<td>6</td>
</tr>
<tr>
<td>Level</td>
<td>3</td>
</tr>
</tbody>
</table>

**Objectives**

- Project definition, time, cost, and technical requirements, values
- Project planning, project scheduling, critical path method, resource levelling, time-cost trade-off
- Structured Study
- Subject Description Form

**Project Execution**

This is the major part of the project. The contribution of each individual within the group will be specified before embarking on the project plan. After the group has specified and produced deliverables according to the schedule and budget constraints, the students and the project supervisor will meet regularly to discuss the progress.

1. Adherence to the schedule information among students towards accomplishing the overall objectives of the project.
2. The group meets regularly to review progress of the project. These meetings are held by the students.
3. Initiative of the students to work on different aspects and to solve problems.
4. Tenacity and perseverance of the students to achieve the project objectives.
5. Systematic documentation of data, design, results, etc., throughout the project.

**Project Report**

On completion of the project, the students will write a project report, which will be presented to the class and evaluated. The report will be presented by each individual student in a group. The following elements will be important:

1. Project log book to be kept by each individual student
2. Project report (hardcopy and softcopy)
3. Presentation and Oral Examination

**Project Specification**

In this stage, the students will work in conjunction with the project supervisor to draw up a concrete project plan specifying at least the following:

1. Background of the project
2. Aims and objectives
3. Deliverables
4. Methodology to be adopted
5. Schedule

**Teaching/Learning Methodology**

Structured study will be provided to the students so that they learn how to plan, design, and evaluate a project. The project supervisor will meet with the students at least once a week to discuss their project design, information searching, implementation, testing, troubleshooting, report writing, and presentation. The students' progress will be documented in their log-books and the supervisor will give them continuous feedback and comments with regard to the extent to which the students have adhered to the schedule, quality of work, and skills required.

**Structured Study**

- Project definition, time, cost, and technical requirements, values
- Project planning, project scheduling, critical path method, resource levelling, time-cost trade-off
- Structured Study
- Subject Description Form

**Subject Synopsis/Indicative Syllabus**

- Teaching/Learning Methodology
- Subject Description Form
- Project Specification
- Project Report
- Project Execution

**Intended Learning Outcomes**

- Category A: Professional/academic knowledge and skills
- Work breakdown structure, project cost control
- Upon completion of the subject, students will be able to:
  1. Understand the background, objectives, time, cost, and technical requirements of the project.
  2. Realize applicable constraints and produce optimal results when designing a solution to an engineering problem.
  3. Apply professional skills and knowledge in engineering to achieve the objectives of the project and to produce the deliverables.
  4. Use the appropriate tools and facilities to develop the product/prototype for the project.

**Category B: Attributes for all-roundedness**

- Category B: Attributes for all-roundedness
- Work in a multidisciplinary team with people from different backgrounds
- Upon completion of the subject, students will be able to:
  1. Communicate effectively.
  2. Work in a multidisciplinary team with people from different backgrounds
  3. Communicate effectively with people from different backgrounds
### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><em>Group Assessment:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Communication and progress management</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>2. Product/prototype development and demonstration</td>
<td>15%</td>
<td>✓</td>
</tr>
<tr>
<td><em>Individual Assessment:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Structured study</td>
<td>15%</td>
<td>✓</td>
</tr>
<tr>
<td>4. Teamwork skills, originality and resourcefulness</td>
<td>10%</td>
<td>✓</td>
</tr>
<tr>
<td>5. Project proposal, log-book, oral presentation, project report</td>
<td>15%</td>
<td>✓</td>
</tr>
<tr>
<td>6. Technical competence</td>
<td>35%</td>
<td>✓</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**

Students are evaluated based on their performances working as a group member and their individual contributions to their projects.

1. Through the evaluation of the students’ performance in terms of communication and progress management, they can demonstrate their communication skills and their ability to work with people in a multidisciplinary team. This addresses learning outcomes (5) and (6).

2. Through the development of a product/prototype and the set-up of a demonstration, students can show their understanding of the project and the ways to accomplish its goals. This addresses learning outcomes (1) to (4).

3. Through the structured study provided to the students, they can demonstrate how to plan, implement, and evaluate their projects. This addresses learning outcomes (1) and (2).

4. Through the assessment of leadership skills, teamwork skills, originality and resourcefulness in the development of the product/prototype, students can demonstrate their ability in the design of the solution to an engineering problem, the application of their knowledge, the use of appropriate tools, and working as an effective member of a team. All these address learning outcomes (2) to (6).

5. Through the project proposal, log-book, presentations, and project report, students will demonstrate their understanding of the project. They will document the progress of the project throughout the entire project period, can give detailed explanations of their design, solution, use of tools and results, and can communicate their achievement to an audience. Hence, all 6 learning outcomes can be assessed.

6. Through the technical competence of the individual students, their capability in designing and implementing a project can be assessed. This will address learning outcomes (2) and (3).

**Student Study Effort Expected**

<table>
<thead>
<tr>
<th>Class contact:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Structured study (2 hours per week for 6 weeks)</td>
<td>12 Hrs</td>
</tr>
<tr>
<td>• Meeting with project supervisor (1 hours per week)</td>
<td>28 Hrs</td>
</tr>
<tr>
<td>• Meeting among the group members (3 hours per week) - search for information, study the background knowledge, design, implement solutions, testing, trouble-shooting</td>
<td>84 Hrs</td>
</tr>
<tr>
<td>Other student study effort:</td>
<td></td>
</tr>
<tr>
<td>• Reports writing, preparing for presentation and oral examination</td>
<td>86 Hrs</td>
</tr>
<tr>
<td><strong>Total student study effort</strong></td>
<td>210 Hrs</td>
</tr>
</tbody>
</table>

**Reading List and References**

**General Text:**


**Specific Text:**

To be prescribed by the project supervisor.
**Subject Code**: ENG3003

**Subject Title**: Engineering Management

**Credit Value**: 3

**Level**: 3

**Pre-requisite/Co-requisite/Exclusion**: Nil

### Objectives

1. A practical introduction to management and a comprehensive guide to the tools and techniques used in managing people and other resources.
2. Opportunities to trace the historical development and describe the functions of management, from planning, and decision making to organizing, staffing, motivating, and controlling. It also includes a discussion on engineering ethics.
3. Opportunities to explore the core business strategy, technology, and innovation, and examine how these functions intertwine to play a central role in structural design, as well as supporting an organization's overall success.

### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

a. perform tasks in an organization related to organizing, planning, and controlling project and process activities;

b. select appropriate management techniques for improving organizational structures, work procedures, and quality performance of operational tasks;

c. analyze the factors that affect changes in the work environment, and be aware of the approaches in implementing change in an organization;

### Teaching/Learning Methodology

A mixture of lectures, tutorial exercises, and case studies are used to deliver various topics. Some topics are covered by problem-based learning, while others are covered by directed study to develop students' research and critical thinking abilities. The case studies, largely based on real experience, are designed to integrate the topics covered in the subject and to illustrate the ways various techniques are incorporated and applied in real-life situations.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Specific Assessment Methods/Indicators</th>
<th>Intended Learning Outcomes to Be Assessed</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coursework</td>
<td>Group learning activities (20%)</td>
<td>a</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Final presentation (individual (20%)</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and group report)</td>
<td>c</td>
<td></td>
</tr>
<tr>
<td>2. Final examination</td>
<td></td>
<td>d</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

### Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The coursework of this subject involves students working in groups to study cases that reflect the realities of management situations in an engineering setting. Through such exercises, students are able to apply and synthesize knowledge, as well as support their organizational and personal success.
<table>
<thead>
<tr>
<th>Student Study Effort Expected</th>
<th>Class contact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures and review</td>
<td>30 Hrs.</td>
</tr>
<tr>
<td>Tutorials and presentations</td>
<td>12 Hrs.</td>
</tr>
</tbody>
</table>

Other student study effort:

- Research and preparation 30 Hrs.
- Report writing 10 Hrs.
- Preparation for oral presentation and examination 34 Hrs.

Total student study effort 116 Hrs.

|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------|
Subject Code: ENG3004

Subject Title: Society and the Engineer

Credit Value: 3

Level: 3

Pre-requisite/Co-requisite/Exclusion: Nil

Objectives:

1. This subject is designed for engineering students as a complementary subject on the role of the professional engineer in practice and their responsibilities toward the profession, colleagues, employers, clients, and the public. The objectives of the subject are to enable students to:
   a. appreciate the historical context of modern technology and the nature of the process whereby technology develops and its relationship between technology and the environment, as well as the implied social costs and benefits;
   b. understand the social, political, legal, and economic responsibilities and accountability of the engineering profession and the organizational activities and accountability of professional engineering institutions;
   c. be aware of the short-term and long-term effects related to safety and health and safety and health dimension of the society;
   d. observe the professional conduct as well as the legal and other applicable constraints related to various engineering issues.

Intended Learning Outcomes:

Upon completion of the subject, students will be able to:

a. identify and evaluate the effects of technology applications in the social, economic, cultural, and political dimensions of the society;

b. explain the importance of local and international professional training, professional conduct, ethics, and responsibilities in various engineering disciplines, particularly the Washington Accord;

Teaching/Learning Methodology:

Class comprises short lectures to provide essential knowledge and information on the relationship between society and the engineer under a range of dimensions. Other methods include discussions, case studies, and seminars to develop students' in-depth analysis of the relationship. Students work in groups throughout the course, and they will work on engineering cases by completing the following learning activities:

1. Case studies, where students provide weekly summary reports on the relationship between society and the engineer under specific dimensions;
2. Final report as a case portfolio, which includes:
   a. Presentation slides;
   b. Feedback critique;
   c. Weekly summary report;
   d. Final presentation.

Assessment Methods in Alignment with Intended Learning Outcomes:

Specific assessment methods/tasks % weighting

1. Continuous assessment 60%
   a. Group weekly learning activities (24%)
   b. Individual final (24%)
   c. Group weekly learning activities (24%)
   d. Individual final (24%)

Subject Synopsis/Indicative Syllabus

1. Impact of Technology on Society
   - Innovation and creativity; History and trends of technology on social and cultural development
   - Roles of the engineer in energy conservation, ecological balance, and sustainable development

2. Environmental Protection and Related Issues
   - Roles of the engineer in energy conservation, ecological balance, and sustainable development
   - Sustainability and environmental protection

3. Outlook of Hong Kong's Industry
   - Support organizations and impacts on economic development
   - Roles of the engineer in energy conservation, ecological balance, and sustainable development

4. Industrial Health and Safety
   - Roles of the engineer in energy conservation, ecological balance, and sustainable development
   - Legal dimensions such as contract law and industrial legislation

5. Professional Institutions
   - Roles of the engineer in energy conservation, ecological balance, and sustainable development
   - Local and overseas professional institutions; Washington Accords and the qualifications and criteria of professional engineers
<table>
<thead>
<tr>
<th>Presentation</th>
<th>(18%)</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group report, individual reflection report</td>
<td>(18%)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2. Examination</td>
<td>40%</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The coursework requires students to work in groups to study cases from the perspectives of the eight dimensions in an engineering setting. Through these exercises, students' ability to apply and synthesize acquired knowledge can be assessed on the basis of their performance in group discussion, oral presentations, and the quality of their portfolio reports on the case studies.

The open-book examination is used to assess students' critical thinking and problem-solving skills when working on their own.

### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures and review</td>
<td>30 Hrs.</td>
</tr>
<tr>
<td>Tutorial and presentation</td>
<td>12 Hrs.</td>
</tr>
</tbody>
</table>

Other student study efforts:

| Research and preparation | 60 Hrs. |
| Report writing | 14 Hrs. |

Total student study effort 116 Hrs.

### Reading List and References

#### Reference books:

#### Reading materials:
- Engineers by The Hong Kong Institution of Engineers
- Engineering and Technology by The Institution of Engineers and Technology

Magazines: Time, Far East Economic Review

Current newspapers: South China Morning Post, China Daily, Ming Pao Daily
Subject Description Form

**Subject Code:** ENG4001  
**Subject Title:** Project Management  
**Credit Value:** 3  
**Level:** 4  
**Pre-requisite/Co-requisite/Exclusion:** Nil

### Objectives

1. Engineering project management tools in business organizations, taking into account the time-cost relationships, resources, processes, risks, the project life cycle, organization, and management principles;
2. Project management methodologies and their application;
3. Choosing project variables for effective project management; and
4. Various developments of project management.

### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

- a. Develop suitable project methodologies and techniques in various phases of the project life cycle;
- b. Select appropriate project variables and practices that are applicable to engineering projects;
- c. Propose project management solutions, taking into consideration the project objectives and constraints; and
- d. Measure and report project progress.

### Subject Synopsis/Indicative Syllabus


2. Project Methodologies, Project Templates, and Planning Techniques

3. Pricing, Estimation, and Cost Control for Projects

4. Assessment and Control of Projects

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Assessment Method/Criteria</th>
<th>% Weighting</th>
<th>Intended Subject Learning Outcomes to Be Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous assessment</td>
<td>40%</td>
<td>(a), (b), (c), and (d).</td>
</tr>
<tr>
<td>Written examination</td>
<td>60%</td>
<td>(a), (b), (c), and (d).</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

### Student Study Effort Expected

- **Class contact:**
  - Lectures: 2 hours/week for 12 weeks (24 Hrs.)
  - Tutorials: 1 hour/week for 9 weeks (9 Hrs.)
  - Case studies: 3 hours/week for 2 weeks (6 Hrs.)
  - Laboratory work: 3 hours/week for 1 week (3 Hrs.)

- **Other student study effort:**
  - Preparation for assignments, short tests, and the written examination: 76 Hrs.

Total student study effort: 118 Hrs.

### Reading List and References

Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IC2105</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Engineering Communication and Fundamentals</td>
</tr>
<tr>
<td>Credit Value</td>
<td>4 Training Credits</td>
</tr>
<tr>
<td>Level</td>
<td>2</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Objectives

This subject offers a wide spectrum of coverage on various engineering fundamental matters, including Engineering Drawing and CAD, Basic Scientific Computing, Basic Mechatronic Practice, and Industrial Safety, that aims at providing the necessary fundamental knowledge and computing skills to all year 1 students interested in engineering.

Intended Learning Outcomes

Upon completion of the subject, students will be able to:

a) explain the principles and conventional representation of engineering drawings according to engineering standards and be able to use it as a medium in technical communication and documentation with CAD application, modelling and practice with application in mechanical, industrial systems, electrical, electronic and information engineering;

b) apply scientific computing software for computing in science and engineering including visualization and programming;

c) design and analyze practical controller hardware, software, actuation devices and human-machine interface for simple mechatronic systems including basic practice in hydraulic, pneumatic and electric systems with common engineering components such as motor drives, mechanical drives, gears, cams, belts, pulleys, couplings, bearings, seals and fasteners; and

d) explain basic occupational health and industrial safety requirements for engineering practice.

Subject Synopsis/Indicative Syllabus

<table>
<thead>
<tr>
<th>Syllabus:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(TM8050) Engineering Drawing and CAD</td>
</tr>
<tr>
<td>1. Fundamentals of Engineering Drawing and CAD</td>
</tr>
<tr>
<td>Principles of orthographic projection; sectioning; dimensioning; sketching; general tolerances and surface finishes; conventional representation of screw threads and fasteners; types of drawings including part drawing and assembly drawing.</td>
</tr>
<tr>
<td>Introduction to CAD; 2D drawings and general concepts on 3D computer modeling including extruding, revolving, sweeping, and lofting; parametric feature based solid modeling; construction and detailing of solid features; solid model modification and its limitations; concepts of assembly modeling including bottom up and top down approaches for the generation of parts, subassemblies, and final assembly; virtual validation and simulation, generation of 2D drawings from 3D parts and assemblies; drawing annotation including dimensioning, tolerancing, and part list.</td>
</tr>
<tr>
<td>1.2. Electrical Drawing</td>
</tr>
<tr>
<td>Wiring diagram and wiring table for electronic and electrical installation, functional representation of circuit, system block diagram, electrical and electronic device symbols and layout, architectural wiring diagram with reference to the architectural symbols for electrical drawings in Hong Kong and international standards.</td>
</tr>
<tr>
<td>1.3. Electronic Design Automation</td>
</tr>
<tr>
<td>Introduction to electronic design automation software; circuit schematics capture and representation; placement of components, capturing, annotation, labeling, net list. Electronic parts library, symbols, decals, physical packages, discrete components, integrated circuits, logic and analogue circuits, electronic parts creation and application.</td>
</tr>
<tr>
<td>(TM3012) Basic Scientific Computing</td>
</tr>
<tr>
<td>2.1. Introduction to MATLAB; interactive calculations, random number generators, variables, vectors, matrices and string; mathematical operations, polynomial operation, data analysis and curve fitting, file I/O functions.</td>
</tr>
<tr>
<td>2.2. Basic plotting, formatting graph, 2D and 3D plots, annotations, contour, mesh and surface plots, colormap.</td>
</tr>
<tr>
<td>2.3. M-file programming and debugging; scripts, functions, logic operations, flow control and graphic user interfaces.</td>
</tr>
</tbody>
</table>
3. (TM0510) Basic Mechatronic Practice

3.1. Definitions of mechatronics; design and operation of typical mechatronic systems; appreciation of measurement system, actuator system, motor drives, mechanical drives, gear train and linkage, pneumatic and hydraulic systems, signal conditioning, and human-machine interfaces.

3.2. Integration of system components using appropriate controller hardware and software such as PLC, PAC, and Microcontroller system; use of simulation software packages for pneumatic and hydraulic circuit design.

4. (TM2009) Industrial Safety


4.3. Occupational Hygiene and Environmental Safety: Noise hazard and control; dust hazard and control; ergonomics of manual handling.

4.4. Safety Technology: Mechanical lifting, fire prevention, dangerous substances and chemical safety, machinery hazards and guarding, electrical safety, first aid, job safety analysis, fault tree analysis, personal protective equipment.

**Learning Methodology**

The teaching and learning methods include lectures, workshop tutorials, and practical works. The lectures are aimed at providing students with an overall and concrete background knowledge required for understanding key issues in engineering communication, use of standard engineering components and systems, and importance of industrial safety. The workshop tutorials are aimed at enhancing students’ in-depth knowledge and ability in applying the knowledge and skills to complete specific tasks. The practical works aim at facilitating students to review the diverse topics covered in this course and perform active learning with research, practice, questioning, and problem solving in a unified activity.

**Assessment in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td></td>
<td>a b c d</td>
</tr>
<tr>
<td>1. Assignment / Project</td>
<td>Refer to individual Module Description Form</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>2. Test</td>
<td></td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>3. Report / Logbook</td>
<td></td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Assessment Methods**

- **1. Assignment / Project**: The project is designed to facilitate students to reflect and apply the knowledge periodically throughout the training.
- **2. Test**: Test is designed to facilitate students to review the breadth and depth of their understanding on specific topics.
- **3. Report / Logbook**: Report / Logbook is designed to facilitate students to acquire deep understanding on the topics of the training and to present those concepts clearly.

**Student Study Effort Expected**

<table>
<thead>
<tr>
<th>Class Contact</th>
<th>TM8050</th>
<th>TM3012</th>
<th>TM0510</th>
<th>TM2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>12 Hrs.</td>
<td>9 Hrs.</td>
<td>6 Hrs.</td>
<td>14 Hrs.</td>
</tr>
<tr>
<td>In-class Assignment/Hands-on Practice</td>
<td>36 Hrs.</td>
<td>18 Hrs.</td>
<td>24 Hrs.</td>
<td>1 Hr.</td>
</tr>
</tbody>
</table>

**Other Study Effort**

- **Coursework**: 4 Hrs.

**Total Study Effort**: 124 Hrs.
### Reading List and References

<table>
<thead>
<tr>
<th>Reference Software List</th>
<th>Reference Standards and Handbooks</th>
<th>Reference Books</th>
</tr>
</thead>
</table>

### Reference Books:

4. IEEE 61082 Preparation of Documents used in Electrotechnology.
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IC2112</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>IC Training I (EE)</td>
</tr>
<tr>
<td>Credit Value</td>
<td>4 Training Credits</td>
</tr>
<tr>
<td>Level</td>
<td>2</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**Objectives**

1) To provide trainees with simulated working environments and training of industrial practices in Electrical Engineering.

2) This subject covers a wide range of fundamental electrical engineering application technology that including electrical installation practice, lighting and electrical system design, LV switchboard and power monitoring, integral building system and basic electronic practice.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able to:

- a) identify relevant engineering theories and principles and to apply them in hands-on training exercises to determine system feasibility;
- b) compare and contrast conceptual design, develop actual work sequences and methods for various electrical installations;
- c) undertake the design, construction, testing and commissioning electrical distribution system in buildings on the basis of recognize the engineering standards, regulations and practices;
- d) apply intelligent building control technology effectively and evaluate new building automation/intelligent control schemes; and
- e) apply their knowledge and skills for system analysis.

<table>
<thead>
<tr>
<th>Subject Synopsis/Indicative Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(TM0367) Lighting and Electrical System Design</strong></td>
</tr>
<tr>
<td>Interior lighting design and calculation; daylight illumination consideration; lumens and reflectors; T5, T8 and T11 lamps; energy conservation.</td>
</tr>
<tr>
<td>Introduction of low-voltage power distribution system and code of practices of electrical design in Hong Kong; examine architectural drawings; design lighting and electrical services; prepare layout drawings and schematics.</td>
</tr>
</tbody>
</table>

| **(TM0389) Low-voltage Switchboard and Power Monitoring, AC Control and PLC** |
| Specifications, standards and requirements of LV switchboard; IDMTL and electronic protection relays; schematic diagram, testing, commissioning and maintenance. |
| Power monitoring and analysis, noise and harmonics; active filters and real-time capacitor bank. |
| Introduction of programmable controller systems, sensors, actuators, drives, timers, counters, ladder logic programming and testing. |

| **(TM0383) Integrated Building Systems** |
| Proprietary and open systems (BMS, EIB and DALI); sensors and actuators; wiring circuit, scenes control; system design, programming and commissioning; intelligent building system integration. |
| Wiring for conventional low voltage installations and intelligent building control systems (EIB and DALI); final lighting and power circuits, control gears and protective devices; inspection, testing. |
| Identification of electronic circuit components, soldering and de-soldering, dry film process, Etching process. |

**Learning Methodology**

The teaching and learning methods include lectures, workshop tutorials, and practical works to convey general principles, techniques and related technologies to students. Their learning knowledge will be strengthened through the practical exercises and case studies in a problem-based format for the development of system integration skills, and to effectively apply those on real world environments.
<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM0373 Electrical Insulation and Basic Electronic Practice</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
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<tr>
<td></td>
<td>Assignment 2</td>
<td>30</td>
<td>Assignment 2</td>
<td>30</td>
<td>Assignment 2</td>
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<td>Assignment 3</td>
<td>30</td>
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<td></td>
<td>Total</td>
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<td>100</td>
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</tbody>
</table>

The assignment is designed to facilitate students to reflect and apply the knowledge periodically throughout the training.

Test is designed to facilitate students to review the breadth and depth of their understanding on specific topics.

Training Report is designed to facilitate students to acquire deep understanding on the topics of the training and to present those concepts clearly.

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
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<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM0367 Lighting and Electrical System Design</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
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<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM0389 Low-Voltage Switchboard and Power Monitoring, AC Control and PLC</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
<td>Assignment 1</td>
<td>40</td>
</tr>
<tr>
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<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Intended Learning Outcomes Assessed</th>
<th>Weighting (%)</th>
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Student Study Effort Required

<table>
<thead>
<tr>
<th>Class Contact</th>
<th>Other Study Effort</th>
<th>Total Study Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture / Tutorial / Demonstration</td>
<td>30 Hrs.</td>
<td>0 Hr.</td>
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<tr>
<td>Workshop Practice</td>
<td>88 Hrs.</td>
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<tr>
<td>Test</td>
<td>2 Hrs.</td>
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</table>

Total Study Effort: 120 Hrs.

Reading List and References

1. Training material, manual and articles published by the Industrial Centre.
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE404</td>
<td>Total Quality Management</td>
<td>3</td>
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</table>

#### Pre-requisite/Co-requisite/Exclusion

Students who do not have background knowledge in quality control and quality engineering should be prepared to do additional reading.

#### Objectives

This subject provides students with the knowledge to:

1. understand the philosophy and core values of Total Quality Management (TQM);
2. determine the voice of the customer and the impact of quality on economic performance and long-term business success of an organization;
3. apply and evaluate best practices for the attainment of total quality.

#### Intended Learning Outcomes

Upon completion of the subject, students will be able to:

a. select and apply appropriate techniques in identifying customer needs, as well as the quality impact that will be used as inputs in TQM methodologies;

b. measure the cost of poor quality and process effectiveness and efficiency to track performance quality and to identify areas for improvement;

c. understand proven methodologies to enhance management processes, such as benchmarking and business process reengineering;

d. choose a framework to evaluate the performance excellence of an organization, and determine the set of performance indicators that will align people with the objectives of the organization.

#### Subject Synopsis/Indicative Syllabus

1. **Principles of Total Quality**
   - Concepts of quality; Core values and paradigms for TQM, including corporate citizenship and protection of the environment; Models for performance excellence: Deming Prize, Baldrige Quality Award, European Quality Award

2. **Customer Needs**
   - Internal and external customers; Voice of the customer; Customer satisfaction; Customer loyalty; Service recovery; Crisis management

3. **Economics of Quality**

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3. **Economics of Quality**

#### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assignments</td>
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<td>✔️ ✔️ ✔️ ✔️</td>
</tr>
<tr>
<td>2. Tests</td>
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<td>✔️ ✔️ ✔️ ✔️</td>
</tr>
<tr>
<td>3. Examination</td>
<td>45%</td>
<td>✔️ ✔️ ✔️ ✔️</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

The assignments, reflective journals, essays, and case studies facilitate the application of concepts and skills learned in analyzing and attaining total quality while emphasizing factors that may affect decisions.

Examination/tests allow students to demonstrate the extent of their understanding of concepts, as well as their abilities to analyze and solve problems related to the subject.

#### Teaching/Learning Methodology

A mixture of lectures, group discussions (tutorials), and mini-case studies are used to achieve the objectives of this subject. Some topics are taught in the classroom environment; students have to learn these topics by themselves in the process of writing problem-based assignments. Directed study is also used to develop the self-learning ability of students.

#### Student Study Effort Expected

- **Class contact:**
  - Lecture/Tutorial: 2 hours/week for 14 weeks = 28 Hrs.
  - Tutorial/Case Study: 1 hour/week for 14 weeks = 14 Hrs.
### Other student study effort:

- Studying and self learning: 50 Hrs.
- Assignment and report writing: 28 Hrs.

Total student study effort: 120 Hrs.

### Reading List and References

4. Selected articles in *Quality Progress* and the web site of American Society for Quality
**Subject Description Form**

**Subject Code**: MM4522  
**Subject Title**: China Business Management  
**Credit Value**: 3  
**Level**: 4  

**Pre-requisite/Exclusion**:  
- Exclusion: China Trade Management (MM4521)

**Role and Purposes**:  
This course covers the business environment and key issues about doing business in China. The course offers a broad survey of a wide range of topics related to China business rather than in-depth study of particular aspects. The primary objectives are to introduce the students to the broad terrain, and help them to explore those aspects in their future pursuit.

**Subject Learning Outcomes**:  
Upon completion of the subject, students will be able to:  
- a. understand, analyse, and evaluate the nature and changing shape of business connection between Hong Kong and the Chinese Mainland. (BBA Outcome 7)  
- b. explain and assess the institutional and legal issues of doing business in China. (BBA Outcome 4)  
- c. describe, analyse and evaluate business strategies and practices in China. (BBA Outcome 4)  
- d. develop critical thinking about how different contextual and cultural factors affect business success, and learn to better communicate with people in different international environments. (BBA Outcomes 4 & 6)  
- e. have further developed their oral and written communication skills (BBA Outcome 1)

**Assessment Methods in Alignment with Intended Learning Outcomes**  
Continuous Assessment: 50%  
- 1. Group Project 30%  
- 2. Presentation 15%  
- 3. Written Report 15%

Examination: 50%  
- 4. Class Participation 20%  
- 5. Reading 20%

Total student study effort: 105 Hrs.

This course does not have a textbook. Readings are drawn from China Hand, a database compiled by the Economist Intelligence Unit, and China Business Review, a publication of the US- China Business Council, and other sources. The readings have been uploaded to WebCT.

**Student Study Effort Expected**  
- Class contact: Lecture 28 Hrs.  
- Tutorial 14 Hrs.  
- Group project 20 Hrs.  
- Reading 43 Hrs.

**Reading List and References**  
- Tim Clissold's Mr. China (Constable & Robinson, 2004)  
Appendix II

Minor Programme
in Electrical Engineering
1 **Objective**

The present-day engineering profession has become more and more multi-disciplinary in nature. The possession of adequate knowledge in electrical engineering will be an asset for engineering personnel whose major is in other disciplines. The objective of the programme is to provide a working knowledge on selected topic areas in electrical engineering for students with non-electrical-engineering background.

2 **Programme Outcomes**

After completing the programme, students should be able to

(i) Apply fundamental principles of mathematics, science and engineering to solve practical problems in selected areas of electrical engineering.

(ii) Conduct experiments with appropriate techniques and tools and interpret and analyse the data.

(iii) Keep abreast of developments in certain areas of electrical engineering.

3 **Eligibility**

Full-time students pursuing a four-year undergraduate degree in Faculty of Engineering or Faculty of Civil & Structural Engineering (excluding a Major in Transportation Systems Engineering or a Major in Electrical Engineering) may choose this programme. Only students with a GPA of 2.5 or above can be considered for Minor study. The department may set a quota for admitting students into this Minor programme.

4 **Curriculum**

The student has to complete 18 credits of discipline-specific subjects in Electrical Engineering as shown in the following table, with at least 9 credits at level 3 or above.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Number of Credits</th>
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</thead>
<tbody>
<tr>
<td>EE2001A</td>
<td>Applied Electromagnetics</td>
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<tr>
<td>EE2002A</td>
<td>Circuit Analysis</td>
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<tr>
<td>EE2003A</td>
<td>Electronics</td>
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</tr>
<tr>
<td>EE2004A</td>
<td>Electrical Energy Systems Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>EE3001A</td>
<td>Analogue and Digital Circuits</td>
<td>3</td>
</tr>
<tr>
<td>EE3002A</td>
<td>Electromechanical Energy Conversion</td>
<td>3</td>
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<tr>
<td>EE3003A</td>
<td>Power Electronics and Drives</td>
<td>3</td>
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<tr>
<td>EE3004A</td>
<td>Power Transmission and Distribution</td>
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<tr>
<td>EE3005A</td>
<td>Systems and Control</td>
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<td>EE3007A</td>
<td>Computer System Principles</td>
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<tr>
<td>EE3008A</td>
<td>Linear Systems and Signal Processing</td>
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</tr>
<tr>
<td>EE3009A</td>
<td>Electrical Services in Buildings</td>
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</tr>
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<tr>
<td>EE4002A</td>
<td>Digital Control and Signal Processing</td>
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<tr>
<td>EE4003A</td>
<td>Electrical Machines</td>
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</tr>
<tr>
<td>EE4004A</td>
<td>Power Systems</td>
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<tr>
<td>EE4007A</td>
<td>Advanced Power Electronics</td>
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<tr>
<td>EE4008A</td>
<td>Applied Digital Control</td>
<td>3</td>
</tr>
<tr>
<td>EE4009A</td>
<td>Electric Traction and Drives</td>
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<tr>
<td>EE4010A</td>
<td>Fibre Optics</td>
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<tr>
<td>EE4011A</td>
<td>Industrial Computer Applications</td>
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<td>EE4012A</td>
<td>Intelligent Buildings</td>
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<td>EE4013A</td>
<td>Power System Protection</td>
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<tr>
<td>EE4014A</td>
<td>Intelligent Applications in Electrical Engineering</td>
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<tr>
<td>EE4015A</td>
<td>Electrical Engineering Materials</td>
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</tbody>
</table>

Note: The Department reserves the right of NOT offering all these subjects in each year.

5 Award Classification

For students who have completed a Major/Minor programme, a single classification will be awarded and their award classification will mainly be based on the "Major GPA", but it can be moderated by the Board of Examiners with reference to the "Minor GPA". For students who have completed a Major programme combined with free electives, their award classification will be determined by their "Major GPA" and the grades obtained for the free electives.

"Major GPA" is derived based on all subjects of the Major programme, including those meeting the mandatory General University Requirements (GUR) and programme-specific language requirement, but not necessarily including the training credits.

"Minor GPA" is derived based on the 18 credits of specific Minor programme.

The "Major GPA" and the "Minor GPA" will be presented separately to the Board of Examiners for consideration. The guidelines for determining award classification are applicable to programmes with Major/Minor studies.

Where a student has a high GPA for his Major but a lower GPA for his Minor, he will not be 'penalised' in respect of his award classification, which is attached to the Major. On the other hand, if a student has a lower GPA for his Major than his GPA for the Minor, the Board of Examiners may consider giving the student a higher award classification than with reference to his Major GPA.