BEng (Hons) in Transportation Systems Engineering

Full-time / Sandwich
Programme Code: 41081
2010/2011
DEFINITIVE PROGRAMME DOCUMENT

Department of Electrical Engineering
Bachelor of Engineering (Honours) in Transportation Systems Engineering

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</table>
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

Transportation has long since been a multi-disciplinary specialty and it is now indispensable in all populated cities around the world. In Hong Kong, reliable and efficient public transportation is crucial in our daily lives. Operations of electrified railways inevitably require engineers on traction, power supplies and control. On the other hand, road transportation relies heavily on engineering expertise of construction, urban planning, public transportation operation and systems integration. As a result, graduates of the Departments of Electrical Engineering and Civil & Structural Engineering have been in great demand from the highway engineering sector, railway and public transport operators, aircraft engineering services, and consultancy/contractor companies working for the transportation industry at large.

Given the huge number of forthcoming transportation projects in Hong Kong and its neighbouring regions in the next decade, there is an ever growing demand on the transportation engineering professionals. No undergraduate programme is yet available in Hong Kong to provide students with the basic knowledge, and to suitably gear them up to specialise in transportation with both relevant fundamental and advanced subjects and hence to prepare them for a rewarding career as engineers in this well sought-after profession.

The Departments of Electrical Engineering and Civil & Structural Engineering have forged very successful research and development collaborations with the Transportation Industry in Hong Kong and overseas. The precious experience and know-how attained down the years are the knowledge base we are ready to disseminate to our students who are the future of the industry.

This undergraduate programme on Transportation Systems Engineering is thus developed to fill the gap of the imminent need of professionals in the Hong Kong Transportation Industry by the unique combinations of the expertises in the Departments of Electrical Engineering and Civil & Structural Engineering. The programme is designed to make full use of the hugely versatile applications of electrical engineering and civil engineering and to further broaden the career opportunities of our students. The programme started its first cohort in the year of 2009/10.

2. Aims and Outcomes

2.1 Programme Philosophy

In the programme, the students are to acquire a solid understanding of the fundamentals in electrical engineering and civil engineering; and apply their knowledge and techniques on the relevant areas in transportation. The philosophy of the programme focuses on incorporation of the appropriate engineering knowledge into transportation in order to enhance the efficiency, reliability, safety and sustainability of the system infrastructure and services. The current practices in transportation, the latest technologies in transportation systems; and hence their integration to provide engineering solutions for practical problems constitute the main contents of this programme.

While engineers may change working activities and also employment during their careers, education to prepare students for working life, rather than their first jobs, is important. Emphasis is, therefore, placed on the understanding of fundamental concepts which will always be applicable and valid. Particular techniques which may have a shorter duration of applicability,
however, cannot be neglected. Applications change rapidly as technology evolves but the underlying theories remain.

Transportation always involves multi-disciplinary knowledge and techniques. 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. On the other hand, the students must become aware that ‘a good engineering solution’ is one which fulfils economic and financial criteria as well as the engineering design specifications. This necessitates the inclusion of the study of finance, accounting, management and ethical and social responsibilities with particular reference to transportation engineering activities, as well as the inter-relations between such activities and the society as a whole.

All engineers, and particularly those for whom English is a second language, must learn to express themselves clearly, whether in written reports or verbal presentations. This has led to the inclusion of English and communication subjects, as well as a teaching approach which involves seminars, discussions, in-class feedback, assessed presentations, demonstrations of project work and formal laboratory reports in the programme.

In this undergraduate programme, the students are required to take 99 academic credits and 11 training credits. The first year requires the students to go through subjects on the fundamentals of engineering in general, as well as introduction of accounting and economics. In the second year of study, the bolts-and-nuts knowledge of transportation systems is to be conveyed. When the students come to the final-year, they are ready to take on 4 core subjects of transportation systems and two elective subjects on advanced or specialised topics of transportation. The Individual Project in the final-year must be relevant to transportation systems engineering.

Students have 4 training credits of practical training during year-1 and another 4 in the summer following year-1 at the Industrial Centre to form an appreciation of applications of engineering technologies. They are then required to undertake at least 6 weeks of industrial attachment during the summer at the end of the second year of study, which gives them the opportunity to experience the local or overseas industrial working environment. A full year spent in industrial attachment for the sandwich students allows a deeper appreciation of Transportation Engineering in the industrial context.

2.2 Objectives and Outcomes

The programme objectives are given as below.

1. To provide students with a broad knowledge base of the fundamentals of transportation systems engineering and its current applications.

2. To prepare students for the professional development which requires problem-solving techniques, engineering judgements and lifelong learning.

3. To produce engineers with appreciation of their obligations to society in the local and international context.

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

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

A1. Apply fundamental principles of mathematics, science and engineering to identify, formulate and solve practical problems in the areas of transportation systems engineering and related disciplines.

A2. Design and conduct experiments with engineering 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 transportation systems engineering and related disciplines.

A4. Identify constraints, both technical considerations and business factors, which may influence engineering problems, systems or projects.

A5. Be able to keep abreast of developments in transportation systems 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**

B1. Communicate effectively via verbal, written, graphic and numeric media with proficiency in both English and Chinese.

B2. Be able to reason critically and develop alternative views or solutions.

B3. Work in multi-disciplinary teams with professional interpersonal skills

<table>
<thead>
<tr>
<th>Programme Objectives</th>
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<th>2</th>
<th>3</th>
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<td><strong>Programme Outcomes</strong></td>
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<tr>
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<td></td>
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</tr>
<tr>
<td>B2</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>✓</td>
<td>✓</td>
<td></td>
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</tbody>
</table>

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 in Appendix I.

PolyU aspires to develop all its students as all-round graduates with professional competence, and has identified a set of highly valued graduate attributes as the learning goals for students. While many of these graduate attributes can be developed through the curricular activities of this programme, some, including global outlook, interest in local and international affairs, communication and interpersonal skills, biliteracy and trilingualism, teamwork and leadership, are primarily addressed through the co-curricular activities offered by faculties, departments, and various teaching and learning support units of the University. Students are encouraged to make full use of such opportunities to develop these attributes.
3 General Information

3.1 Programme Title

Bachelor of Engineering (Honours) in Transportation Systems Engineering
運輸系統工程學(榮譽)工學士學位

3.2 Duration and Mode of Attendance

A student normally takes 3 years full-time with an option of an additional year for sandwich. The maximum period of registration is 6 years for the full-time mode of attendance; and 7 years for the sandwich mode.

3.3 Final Award

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

3.4 Implementation Date

September, 2009 (first cohort)

3.5 Minimum Entrance Requirements

For Entry with HKALE Qualifications

The General Minimum Entrance Requirements of the University and the following specific subject requirement(s) are to be satisfied:

<table>
<thead>
<tr>
<th>E in two of the following HKALE subjects: Physics, Engineering Science, Pure Mathematics, Applied Mathematics, Chemistry or Computer Studies</th>
<th>OR</th>
<th>E in one of the following HKALE subjects: Physics, Engineering Science, Pure Mathematics, Applied Mathematics, Chemistry or Computer Studies; and E in two of the following HKALE(AS-Level) subjects: Physics, Design &amp; Technology, Mathematics &amp; Statistics, Electronics, Applied Mathematics, Chemistry or Computer Applications (similar subjects at HKALE and HKALE(AS-Level) are mutually exclusive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C in HKCEE Mathematics or Additional Mathematics (only required for applicants without E in HKALE Applied Mathematics or Pure Mathematics, or HKALE(AS-Level) Applied Mathematics or Mathematics &amp; Statistics); and D in HKCEE Physics or Engineering Science (only required for applicants without E in HKALE Physics or Engineering Science, or HKALE(AS-Level) Physics or Design &amp; Technology)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 Major/Minor Option

In line with the University’s Regulations, students in this programme are offered the option of either pursuing the single-discipline degree programme (i.e. BEng (Hons) in Transportation Systems Engineering) or following the major/minor option. Usually, the student may choose to exercise this option at the second semester of the first year of the programme. The Major programme details are given in Appendix III.

For other students opting to study ‘Minor’ in Transportation Systems Engineering, they must take 18 credits of subjects within the curriculum, of which 9 credits must be of Level 3 or above.

3.7 Summer Training/Industrial Placement

Summer Training at the Industrial Centre and practical work experience in the industry are the vital components to attain the programme outcomes. The training/industrial placement is credit-bearing and compulsory in the programme, constituting the Work-Integrated Education activities as stipulated by the University. The required credits, structure and assessment of the Work-Integrated Education and Industrial Centre training are described in Sections 4.4 and 4.5.

3.8 Student Exchanges

Exchanges to Universities overseas for a semester or an academic year are possible through various exchange schemes organised by the PolyU 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

External accreditations by The Hong Kong Institution of Engineers (HKIE) and Chartered Institute of Logistics and Transport (CILT) as meeting the academic requirements for their Graduate Membership will be sought.

3.10 Summer Term Teaching

Usually, there will be no summer term teaching on Engineering subjects. Industrial Centre Training and Practical Training will take place during summers of the first two years.
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 evenings or Saturdays.

3.12 Mathematics Benchmark Test (MBT)

The following categories of students admitted to this programme will be requested to take a mandatory Mathematics Benchmark Test prior to the commencement of their studies:

1) JUPAS admittees who do not have a “pass” in A-level or AS-level Mathematics subject(s); and
2) Non-JUPAS admittees with the exception of those who are given credit-transfer for the subject AMA201.

Those who fail the MBT will be required to take a mandatory subject Foundation Mathematics (AMA106) in the first semester of the first year.

3.13 Foundation Mathematics (AMA106)

Students who are required to take Foundation Mathematics (AMA106) must pass the subject before taking other mathematics subjects in the curriculum. Foundation Mathematics AMA106 is thus a pre-requisite to AMA201 for students who do not pass the MBT, but it does not constitute part of the curriculum. As the subject is a non-credit bearing, the grade will NOT be counted towards the GPA or WGPA, but it will be recorded in the transcript of studies.

4 Curricula

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 4.1.1-4.1.3. The abbreviations used in these tables are:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF</td>
<td>Accounting and Finance</td>
</tr>
<tr>
<td>AMA</td>
<td>Applied Mathematics</td>
</tr>
<tr>
<td>CSE</td>
<td>Civil &amp; Structural Engineering</td>
</tr>
<tr>
<td>EE</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>ELC</td>
<td>English Language Centre</td>
</tr>
<tr>
<td>ENG</td>
<td>Engineering Faculty</td>
</tr>
<tr>
<td>GEC</td>
<td>General Education Centre</td>
</tr>
<tr>
<td>IC</td>
<td>Industrial Centre</td>
</tr>
<tr>
<td>LGT</td>
<td>Logistics &amp; Maritime Studies</td>
</tr>
<tr>
<td>ME</td>
<td>Mechanical Engineering</td>
</tr>
</tbody>
</table>

In general, a normal student must complete 40, 32 and 30 credits in Levels 2, 3 and 4 (or 5), respectively as shown in the typical progress patterns in Tables 4.2.1 to 4.2.3. In other words, a student must complete a total of 99 credits, in addition to the credits earned in IC training and
Summer Placement and the requirements on languages and co-curricula activities, before graduation.

For those students who opt for the “Major in Transportation Systems Engineering”, students are required to complete 81 credits in prescribed subjects, and 18 credits in a Minor programme, before they are qualified to graduate.

Subjects are referenced by a Departmental prefix (e.g. EE corresponds to Electrical Engineering) followed by a reference number. In the reference numbers, the first digit (i.e. 2, 3 or 4) indicates the level of the subject.

‘Electives’ are those subjects which are optional. Electives give students choices in composing their study programme.
## 4.1 Curricula for Various Levels

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Dept</th>
<th>Contact</th>
<th>Credits</th>
<th>GPA Weight (W)</th>
<th>Assessment Method</th>
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<tbody>
<tr>
<td>AMA106</td>
<td>Foundation Mathematics</td>
<td>AMA</td>
<td>42</td>
<td>0</td>
<td>0.0</td>
<td>40% 60%</td>
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<tr>
<td>AMA201</td>
<td>Mathematics I</td>
<td>AMA</td>
<td>42</td>
<td>3</td>
<td>0.2</td>
<td>40% 60%</td>
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<tr>
<td>AMA202</td>
<td>Mathematics II</td>
<td>AMA</td>
<td>42</td>
<td>3</td>
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<td>40% 60%</td>
</tr>
<tr>
<td>EE207</td>
<td>Engineering Electromagnetics</td>
<td>EE</td>
<td>28</td>
<td>6</td>
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<td>40% 60%</td>
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<tr>
<td>CSE291</td>
<td>Transportation Engineering Fundamentals</td>
<td>CSE</td>
<td>42</td>
<td>3</td>
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<td>40% 60%</td>
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<tr>
<td>CSE292</td>
<td>Transportation Operations and Management</td>
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<td>42</td>
<td>3</td>
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<td>40% 60%</td>
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<tr>
<td>ENG232</td>
<td>Engineering Science</td>
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<td>54</td>
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<tr>
<td>ENG236</td>
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<td>Basic Electricity and Electronics I</td>
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<td>ENG238</td>
<td>Basic Electricity and Electronics II</td>
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<tr>
<td>AF2601</td>
<td>Introduction to Economics</td>
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<td>42</td>
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<tr>
<td>AF2108</td>
<td>Financial Accounting</td>
<td>AF</td>
<td>42</td>
<td>2</td>
<td>0.2</td>
<td>50% 50%</td>
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<tr>
<td>ELC2501</td>
<td>University English I</td>
<td>ELC</td>
<td>28</td>
<td>2</td>
<td>0.2</td>
<td>100% 0%</td>
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<tr>
<td>ELC2502</td>
<td>University English II</td>
<td>ELC</td>
<td>28</td>
<td>2</td>
<td>0.2</td>
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<tr>
<td>*GEC2801</td>
<td>China Studies</td>
<td>GEC</td>
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<tr>
<td>**GEC2XXX</td>
<td>Broadening General Education Subject</td>
<td>GEC/other</td>
<td>28</td>
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<td></td>
<td>Def Subjects</td>
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<tr>
<td></td>
<td>IC Training</td>
<td>IC</td>
<td>120 hours</td>
<td>8 training credits</td>
<td>100% Assessed and graded</td>
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<tr>
<td></td>
<td>Engineering Communication and Fundamentals</td>
<td>IC</td>
<td>120 hours</td>
<td>8 training credits</td>
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<tr>
<td></td>
<td>IC Training for Transportation Systems Engineering</td>
<td>IC</td>
<td>4 weeks</td>
<td>8 training credits</td>
<td>100% Assessed and graded</td>
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</table>

* All students can take one of the China Studies subjects in lieu of GEC2801 to satisfy their China Studies category GE requirement. The China Studies subjects and their syllabi are available at: www.polyu.edu.hk/~gec/geprogramme/0910-ChiStudies.php

** Subject code depends on the actual subject to be taken.
## THE HONG KONG POLYTECHNIC UNIVERSITY
### BEng (Hons) in Transportation Systems Engineering

#### Level 3

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Dept.</th>
<th>Contact Hours</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Assessment Method</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<td>Lt/ Tu</td>
<td>Lab</td>
<td>Continuous</td>
<td>Examination</td>
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<td>EE3021</td>
<td>Electromechanical Energy Conversion</td>
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<td>36</td>
<td>12</td>
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<tr>
<td>EE3041</td>
<td>Power Transmission and Distribution</td>
<td>EE</td>
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<td>EE309</td>
<td>Control Systems and Signal Processing</td>
<td>EE</td>
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<td>CSE312</td>
<td>Transportation and Highway Engineering</td>
<td>CSE</td>
<td>34</td>
<td>8</td>
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<td>ELC3508</td>
<td>English for Effective Workplace</td>
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<tr>
<td>ENG307</td>
<td>Society and the Engineer</td>
<td>ENG</td>
<td>42</td>
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<tr>
<td>EE3502</td>
<td>Summer Practical Training</td>
<td>Industry</td>
<td>A minimum of 6 weeks (Full-time BEng (Hons) Students). Optional for Sandwich Students</td>
<td>3 Training credits</td>
<td>-</td>
<td>100% assessed on Pass/Fail basis</td>
</tr>
</tbody>
</table>

**Note:** The Department reserves the rights of NOT offering all electives in each year

---

**Table 4.1.2**

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THE HONG KONG POLYTECHNIC UNIVERSITY
BENG (HONS) IN TRANSPORTATION SYSTEMS ENGINEERING

### Levels 4 and 5

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<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Teaching Dept.</th>
<th>Contact Hours</th>
<th>Credits</th>
<th>GPA Weight (Wi)</th>
<th>Assessment Method</th>
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<td>36</td>
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### Table 4.1.3

Notes: The Department reserves the rights of NOT offering all electives in each year.

* site visits
### 4.2 Normal Progression Pattern

A student in the First Year is advised to take the following curriculum as indicated in Table 4.2.1 below and obtain a total of 33 credits on completion of first year.

#### Semester One

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<th>Course</th>
<th>Description</th>
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<td>Foundation Mathematics</td>
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<td>AMA201*</td>
<td>Mathematics I</td>
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<td>University English I (2 credits)</td>
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<td>ENG232</td>
<td>Engineering Science</td>
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<td>ENG236</td>
<td>Computer Programming (2 credits in semester 1)</td>
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<td>ENG237</td>
<td>Basic Electricity and Electronics I</td>
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<td>CSE291</td>
<td>Transportation Engineering Fundamentals</td>
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<th>Course</th>
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<th>Credits</th>
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<td>AMA202</td>
<td>Mathematics II</td>
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<td>ELC2502</td>
<td>University English II (2 credits)</td>
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<td>ENG236</td>
<td>Computer Programming (1 credit in semester 2)</td>
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<tr>
<td>ENG238</td>
<td>Basic Electricity and Electronics II</td>
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<td>GEC2801</td>
<td>Transportation Operations and Management</td>
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<td>GEC2XXX or equivalent</td>
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<tr>
<td></td>
<td>China Studies (2 credits)</td>
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<td>IC2601</td>
<td>Introduction to Economics</td>
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<td><strong>Total</strong></td>
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*refers to Section 6.11 (page 24, Graduation Requirement ‘h’) on the condition of taking AMA106 and AMA201.

#### Semester Two

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<td>IC2105</td>
<td>Engineering Communication and Fundamentals (Taken during year 1, 4 training credits)</td>
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</tr>
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<td>IC2113</td>
<td>IC Training for Transportation Systems Engineering (Taken in year 1 summer, 4 training credits)</td>
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</table>

A student in the Second Year is advised to take the following curriculum as indicated in Table 4.2.2 below and obtain 36 credits on completion of year 2.

#### Semester One

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<td>ELC3508</td>
<td>English for Effective Workplace Communication (2 credits)</td>
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<tr>
<td>EE207</td>
<td>Engineering Electromagnetics (2 credits)</td>
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<tr>
<td>EE3041</td>
<td>Power Transmission and Distribution</td>
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<tr>
<td>EE309</td>
<td>Control Systems and Signal Processing</td>
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<tr>
<td>CSE312</td>
<td>Transportation and Highway Engineering</td>
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<tr>
<td>CSE331</td>
<td>Air and Noise Pollution Studies</td>
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</tr>
<tr>
<td>AF2108</td>
<td>Financial Accounting</td>
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<td><strong>Total</strong></td>
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</table>

#### Semester Two

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<th>Description</th>
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<tr>
<td>EE3021</td>
<td>Electromechanical Energy Conversion</td>
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</tr>
<tr>
<td>EE310</td>
<td>Safety in Systems Engineering</td>
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</tr>
<tr>
<td>CSE390</td>
<td>Transportation Systems Analysis</td>
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</tr>
<tr>
<td>GEC2XXX</td>
<td>Broadening General Education Subject (2 credits)</td>
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</tr>
<tr>
<td></td>
<td>Choose one of the following core subjects</td>
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</tr>
<tr>
<td></td>
<td>EE3031 - Power Electronics and Drives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ME3301 - Applied Mechanics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose one of the following core subjects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AF3313 - Business Finance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LGT3019 - Economics of International Transport Logistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

#### Semester Three (Summer Period at the end of Year 2)

<table>
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<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EE3502</td>
<td>Summer Practical Training (6 weeks in summer)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3 training credits)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2.1

Table 4.2.2

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A student may opt for sandwich training after the second year of study and he or she is required to take the following training subject in Table 4.2.3 during the sandwich year.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE4001</td>
<td>External Industrial Training (Students are required to take a minimum of 44 weeks of training in industry) (22 training credits)</td>
</tr>
</tbody>
</table>

**Table 4.2.3**

A student is advised to take the following curriculum as indicated in Table 4.2.4 and obtain 30 credits in the final year. He/she must accumulate a total of 99 academic credits to qualify for graduation.

<table>
<thead>
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<th>Semester One</th>
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<tbody>
<tr>
<td>EE437</td>
<td>Intelligent Transportation Systems</td>
</tr>
<tr>
<td>CSE490</td>
<td>Transport Management and Highway Maintenance</td>
</tr>
<tr>
<td>ENG307</td>
<td>Society and the Engineer</td>
</tr>
<tr>
<td>EE4121</td>
<td>Individual Project (This is continued in semester 2. Total 9 credits for semesters 1 &amp; 2) Note: The Individual Project must be related to Transportation</td>
</tr>
</tbody>
</table>

**Electives**
- 1 Transportation Elective should be taken. (2 electives are to be taken in Year 3) 15 credits

<table>
<thead>
<tr>
<th>Semester Two</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>EE4121</td>
<td>Individual Project (This is a continuation from Semester 1. This subject is of 9 credits for both semesters 1 &amp; 2)</td>
</tr>
<tr>
<td>CSE407</td>
<td>Design of Transport Infrastructure</td>
</tr>
<tr>
<td>CSE408</td>
<td>Traffic Surveys and Transport Planning</td>
</tr>
</tbody>
</table>

**Electives**
- 1 Transportation Elective should be taken. (2 electives are to be taken in Year 3) 15 credits

**Table 4.2.4**

**Elective List**
- EE4041  Engineering Project Management
- EE405  Energy Utilisation and Management in Transportation
- EE406  Risk and Reliability Analysis on Asset Management
- EE435  Electrical Systems in Automobiles
- CSE508  Environmental Impact Assessment
- CSE535  Land Transport and Environment
- CSE561  Public Transport: Operations and Service Planning
- CSE562  Traffic Engineering and Control
- CSE575  Sustainable Development Strategy
- LGT5013  Transport Logistics in China
- ME4503  Aviation Systems
- ME4504  Aircraft Maintenance Engineering

Note: The Department reserves the rights of NOT offering all the electives at any one year.
4.3 Subject Support to the Programme Outcomes

Table 4.3 illustrates how the subjects support the Programme Outcomes through teaching, student practising and/or measurements.

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>PROGRAMME OUTCOMES</th>
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<th>A2</th>
<th>A3</th>
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4.4 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 (EE3502) normally takes place during the summer at the end of Year Two. 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 PolyU is one of the main sources of placement opportunities for students locally and in the Mainland China as well as in 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 thePreferred Graduate Development Programme.
- Relevant placement as student helpers in PolyU administrative departments and the Industrial Centre.
- Assisting in PolyU 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 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.
- 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 and that they are employment worthy.

**4.5 IC Training**

Besides the WIE training components, the students are required to take 2 main modules of training at the IC, which is equivalent to 8 training credits. One module, IC2105, is scheduled during Year One semester-time, while the other module, IC2113, is to be taken in the summer at the end of Year One. The students will not pay any training fee, nor receive any stipend. The IC training is however not parts of WIE activities.

**4.6 Language Exit-Tests**

All students are required to sit for the Graduating Students’ Proficiency Assessments (GSLPAs) in both Chinese and English before graduation. Except for those who are given exemptions from attempting the GSLPAs, students who have not taken both of the GSLPAs shall not be eligible for graduation.

Students who have been waived of the Chinese language requirement during their admission to the University shall be given exemption from sitting for the Chinese GSLPA (both written Chinese and Putonghua). Nevertheless, they will NOT be precluded from sitting for the Chinese GSLPA if they wish to do so, but it will be entirely on a voluntary basis.

Chinese/English Language Enhancement Programmes (LEPs) will be prescribed to individual students by the Department of Chinese and Bilingual Studies (CBS) and/or English Language Centre (ELC) of the University upon their admissions. The students are expected and encouraged to complete the LEPs but non-completion does not affect the students’ eligibility for graduation.

All students are strongly encouraged to make full use of the facilities and services provided in the CBS and ELC to improve their language proficiency throughout the course of the programme.
4.7 Co-curricular Activities

In order to enhance the all-roundedness attribute of the students, all students are required to participate in a minimum of 6 hours of non-credit bearing co-curricular activity during their study period, which is a mandatory requirement of general education for graduation.

The co-curricular activities are non-credit bearing, and they aim at rendering additional values and helping students to broaden their horizons and inspiring them to actualize all-round development outside the classroom.

Activities like Complementary Studies Programme, Leadership and Competence for Success Programme, Physical Education Programmes, Personal Development Programmes, hall education programmes, pre-placement training or career training organised by the Student Affairs Office (SAO), seminars and lunch talks by prominent speakers, study tour, exchange activity offered or organised by Faculties, academic Departments or supporting units, cultural appreciation programme, and any other activities in a variety of forms that the Department consider essential as part of the overall requirement of general education will be counted as co-curricular activities. Students will be considered as having fulfilled the requirement if they have participated in these co-curricular activities.

However, summer attachments, internships, mentorship programmes, community service and Work-integrated Education activities forming part of the formal programme curricular will not be counted as co-curricular activities.

Students' participation in such activities will be recorded in the Co-curricular Achievement Transcript (CAT) administered by the SAO. Further information is available at the website: http://www.polyu.edu.hk/sao/cca/

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 fully supported by the General Office of the Department of Electrical Engineering. All enquiries regarding registration and general administration from students on the programme are referred to the General Office as the first contact point.

The Undergraduate Programme Committee, in which the Chairman is nominated by 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; whilst the Departmental Learning & 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 assistance on various fronts.
As this programme is jointly held by the Departments of Electrical Engineering and Civil & Structural Engineering, a Liaison Programme Committee is set up to ensure regular communications, close cooperation and consistent management between the two departments.

5.2 Class Tutors and Personal Tutors

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

As the ‘Year’ system does no longer exist with the credit-based system and the boundaries between years become vague, the Class Tutors are responsible for the general welfare of the students progressing through the 3 years of study according to the normal study pattern. A Class Tutor may thus look after students at different years of study. Students may seek helps from Class Tutors on general enquiry, subject selection and academic counselling at the respective years.

A Personal Tutor, usually an academic staff member, is assigned to each newly admitted student and the Personal Tutor will be with the student till his/her graduation. Personal Tutors provide continuous and individual counselling and help guide the students through various difficulties, if any, which might affect their studies. The scope of counselling may sometimes go beyond academic matters.

6. Admission, Registration and Assessment

The admission, registration and assessment arrangements described below are in accordance with the University policies and regulations for credit-based programmes which lead to an award of the University, except where the Senate decides otherwise.

6.1 Admission/Registration

Students are normally admitted into the programme via the joint admission scheme (JUPAS) on a yearly basis. Non-JUPAS applicants are also considered on their academic merits, as well as non-academic achievements.

6.2 Credit Transfer/Subject Exemption

Students may be allowed to have credit transferred or be exempted on subjects from recognised previous study. Credits transferred and subjects exempted normally do not carry grades. Decisions regarding granting or rejecting a subject credit transfer or exemption are entirely with the subject-offering departments. Students who have completed an approved student exchange programme may be granted a block transfer of the equivalent number of credits that have been successfully completed.

In cases that credit transfer is accompanied with grade, the actual grade as approved will be used in calculating the GPA/WGPA. The Department will not approve more than 27 credits normally
but special consideration will be given in certain cases, such as advanced-standing students, subject to the University’s guideline on maximum number of credits to be transferred (i.e. If the credits attained from previous study are from the PolyU, the total credit transferred should not exceed 67% of the required credits for the award. If the credits earned are from other institutions, the total credit transferred should not exceed 50%).

Subject exemption may be granted when it has clearly been identified that a student has a priori knowledge of a subject (in terms of content, academic level and achievement). In cases where exemption is given, no credits for that subject will be given and the student is required to take another subject assigned in lieu of the exempted subject.

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 transfer of credits; students should submit all applications for credit transfer at the point of admission, i.e. Year 1.

6.3 Subject Registration/Add-drop

Subject registration is carried out prior to the commencement of each semester. The timetables are then drawn up based on students’ choices. In cases of timetable clashes, students will be allowed to re-select a different subject. Students may add and drop subjects during the add/drop period scheduled for each semester.

Students are not allowed to drop subjects after the add/drop period. 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 department and will require the approval of both the subject lecturer and the Programme Leader or an academic staff nominated by the Department. Application for subject withdrawal must be submitted at least one month before the commencement of the examination period for approval. If approved, 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 the transcript of studies but will not be counted towards the calculation of GPA. A handling fee will be incurred by the University.

6.4 Zero Subject Enrolment/Deferment of Study

A student is not allowed to have zero subject registration in any semester without prior approval from the Department. Student failing to get prior approval for zero subject registration may be regarded as having withdrawn from the programme. All semesters in which the student is allowed to take zero subject enrolment will be counted towards the maximum period of registration. Students will be responsible for ensuring that they complete their studies within the maximum period of registration. A fee for retention of study place will be charged upon approval of zero subject enrolment.

Application for deferment of study is only considered under very extraordinary circumstances. Deferment periods will not be counted towards the maximum period of registration. No retention fee will be incurred.
6.5 General Assessment Regulations

The University’s General Assessment Regulations (GAR) applies to this Programme. The specific assessment regulations are set out here, having been developed within the framework of the GAR.

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

A ‘level’ in a credit-based programme indicates the intellectual demand placed upon students and may characterise each subject with respect to its recommended sequencing within that programme.

A ‘subject’ is defined as a discrete section of the programme which is assigned a separate assessment.

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

6.6 Principles of Assessment

The prime purpose of assessment is to enable students to demonstrate that they have met the aims and objectives of the Programme, in particular that they have fulfilled the requirement of each subject and have, at the end of their study, achieved the standard appropriate to the award. Appropriate methods of assessment will be employed to achieve this purpose.

Assessment will also serve as feedback to students. Students will be informed of their performance in the assessment so that they are aware of their progress and attainment.

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 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 VP(AD) and reported to the Senate.

6.7 Assessment Methods

Students’ performance in a subject is assessed by continuous assessment and/or examinations. When both methods are used, the weighting of each in the overall subject grade is clearly stated.

Continuous assessment may include tests, assignments, projects, laboratory work, field exercises, presentations and other forms of classroom participation. The contribution made by each student in continuous assessment involving a group effort is determined and assessed separately. Assessment methods and parameters of subjects are determined by the subject-offering Departments.

At the beginning of each semester, the subject lecturer will inform students of the details of the assessments methods and criteria to be used within the assessment framework as specified in this document.
6.8 Progression/Academic Probation/ Deregistration

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

(i) eligible for progression towards an award; or
(ii) eligible for an award; or
(iii) required to be deregistered from the programme.

If the Grade Point Average (GPA) of a student is below 2.0, he/she will be put on academic probation in the following semester. If the student is able to pull his/her GPA up to 2.0 or above at the end of the probation 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.

A student is referred to the Board of Examiners of the Programme with the probable consequence of being de-registered from the programme if he/she falls within one of the following categories:

a. the student’s GPA is lower than 2.0 for 3 consecutive semesters.
b. the student’s GPA is lower than 2.0 for 2 consecutive semesters and his Semester GPA in the second semester is also lower than 2.0.
c. the student has exceeded the maximum period of registration for the programme.

Notwithstanding the above, a student may be de-registered from the programme if his/her academic performance is so poor to the extent that the Board of Examiners deems that his/her prospect of attaining a GPA of 2.0 or above at the end of the programme is slim or the student is incapable of completing the programme at all.

6.9 Retaking Subjects

Normally, students are required to retake those subjects that they have failed (grade F). In addition to retaking a subject due to failure, students may retake any subject for the purpose of improving their grades without having to seek approval. 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 subject 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 in the previous attempt) 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.
6.10 Appeal Against Examination Results

A student may appeal against the decision of the Board of Examiners within 7 working days after the public announcement of the examination results. The appeal should be made to the Head of Department in writing. The Departmental Examination Officer will inform the student of the appeal results within 7 working days upon the receipt of all required information. Students may refer to the Student Handbook for more details on appeal procedures.

6.11 Grades, GPA and Award Classifications

Assessment grades are awarded on a criterion-referenced basis. A student’s overall performance in a subject is graded as follows:

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<th>Subject grade</th>
<th>Short description</th>
<th>Elaboration on subject grading description</th>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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</table>

Table 6.11.1 Descriptions of Grades

‘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.

Each grade is assigned a numerical value as indicated in Table 6.11.2. At the end of each semester, the GPA will be computed to indicate the student’s performance up to and including the last semester. Exempted, incomplete and ungraded subjects for which credit transfer has been approved without assigning a grade, and subjects from which a student has been allowed to withdraw (i.e. those with grade ‘W’) will be excluded from the GPA calculation. Subject which has been given a ‘S’ subject code i.e. absent from examination, will be included in the GPA calculation and will be counted as ‘zero’ grade point. IC training credits are included in the GPA calculation.

\[
GPA = \frac{\sum_i Subject\ Grade\ Point \times Subject\ Credit\ Value}{\sum_i Subject\ Credit\ Value}
\]
where \( i \) = number of all subjects taken by the student up to and including the latest semester. For subjects being re-taken, only the grade obtained in the final attempt will be included in the GPA calculation.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.5*</td>
<td>Exceptionally Outstanding</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
<td>Outstanding</td>
</tr>
<tr>
<td>B+</td>
<td>3.5</td>
<td>Very Good</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td>C+</td>
<td>2.5</td>
<td>Wholly Satisfactory</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>D+</td>
<td>1.5</td>
<td>Barely Satisfactory</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>Barely Adequate</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>Inadequate</td>
</tr>
<tr>
<td>I</td>
<td>N/A</td>
<td>Assessment to be completed</td>
</tr>
<tr>
<td>P</td>
<td>N/A</td>
<td>Pass on an ungraded subject</td>
</tr>
<tr>
<td>U</td>
<td>N/A</td>
<td>Fail on an ungraded subject</td>
</tr>
<tr>
<td>M</td>
<td>N/A</td>
<td>Pass with Merit</td>
</tr>
<tr>
<td>L</td>
<td>N/A</td>
<td>Subject to be continued in the following semester</td>
</tr>
<tr>
<td>S</td>
<td>0</td>
<td>Absent from assessment</td>
</tr>
<tr>
<td>W</td>
<td>N/A</td>
<td>Withdrawn from subject</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
<td>Exempted</td>
</tr>
<tr>
<td>T</td>
<td>N/A</td>
<td>Credit transfer</td>
</tr>
</tbody>
</table>

Table 6.11.2 Grade Point Average System

* The overall GPA will be capped at 4.0
* 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.

Subjects with the assigned codes I, P, L, U, M, W, Z, T will be omitted in the calculation of the GPA. A subject assigned code S will be taken as zero in the calculation.

In order to graduate, a student must achieve a minimum GPA of 2.0, in addition to satisfying the programme-specific graduation requirements, such as IC training, WIE and exit language test. The awards will be classified based upon the weighted GPA (WGPA).

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

where \( W_i \) = weighting of between 0 and 1, to be assigned according to the level of the subject and the weighted GPA is capped at 4.0.
In determining the classification of awards, the credits earned at Levels 2, 3 and 4 are weighted 0.2, 0.3 and 0.5 respectively. Level 5 credits are also weighted 0.5. Not all subjects taken are included in the computation of the weighted GPA (WGPA). Training subjects are excluded. A student is eligible for award if he/she satisfies all the conditions listed below:

a. Accumulation of the requisite number of credits for the award.
b. Satisfying all the ‘compulsory’ and ‘elective’ requirements.
c. Satisfying the WIE and IC Training requirements.
d. Satisfying the residential requirement for at least one-third of the credits required for the award to be completed under the current enrolment at the PolyU, unless professional bodies stipulate the otherwise.
e. Having a Grade Point Average (GPA) of 2.0 or above at the end of the programme.
f. Having participated in at least 6 hours of co-curricular activities.
g. Having sat for GSLPA in Chinese (unless exception given) and English.
h. A pass in Foundation Mathematics (AMA106). It is only applicable to admittees who do not have a "pass" in the A-level or AS-level Mathematics subject(s) and who have not been given credit transfer for the subject AMA201 stipulated in the curriculum. These students are required to take a mandatory Mathematics Benchmark Test (MBT) prior to the commencement of their studies. Those who pass the MBT are exempted from this graduation requirement and they follow the normal study pattern. Those who fail or do not attend the MBT are required to take a non-credit bearing subject AMA106 “Foundation Mathematics”, which is a pre-requisite for AMA201. A pass in AMA106 “Foundation Mathematics” is thus a graduation requirement for such students.
i. Having satisfied any additional graduation requirement as stipulated.

Table 6.11.3 shows the guidelines for the classifications; these are meant to be guidelines for reference only, the Board of Examiners shall exercise its judgement in coming to its conclusions as to the award for each student, and where appropriate, may use other relevant information.

<table>
<thead>
<tr>
<th>Honours degrees</th>
<th>GPA or Weighted GPA</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>3.7⁺ - 4</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>3.2⁺ - 3.7⁻</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>2.3⁺ - 3.2⁻</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>2.0 - 2.3⁻</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>

Table 6.11.3 Degree Classification Guidelines

A Pass-without-Honours degree award will be recommended only under exceptional circumstances. When a student has demonstrated a level of attainment which is below the ‘essential minimum’ required for graduation with Honours from the programme but when he/she has nonetheless covered the prescribed work of the programme in an adequate fashion, while failing to show sufficient evidence of the intellectual capability expected of Honours degree graduates. For example, if a student in an Honours degree programme has a GPA of 2.0 or more,
but his WGPA is less than 2.0, he/she may be considered for a Pass-without-Honours classification.

Any subjects passed after the graduation requirement has been met or subjects taken on top of the prescribed credit requirements for award shall not be taken into account in the grade point calculation for award classification. If a student passes more elective subjects (or optional subjects) than the requirement for graduation in or before the semester within which he/she becomes eligible for award, the elective subjects with higher contribution (with the exception of the additional subjects taken out of interest and not for satisfying the award requirements) shall be counted in the grade point average calculation for award classification (i.e. the passed subjects with lower contribution will be excluded from the grade point calculation), irrespective of when the excessive elective subjects are enrolled.

6.12 Aegrotat Award

If a student is unable to complete the requirement of the programme for the award due to very serious illness, or other very special circumstances which are beyond his/her control, and considered by the Board of Examiners as legitimate, the Faculty 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/her 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.

6.13 Compulsory Graduation

A student must graduate as soon as the criteria for graduation in the programme are satisfied. That is, a student will be allowed to register for more credits than needed only if adequate credits for graduation have not yet been accrued. This requirement has been stipulated in order to ensure the most efficient use of the PolyU resources.
Appendix I

Subject Description Forms
<table>
<thead>
<tr>
<th>Subjects</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF2108 Financial Accounting</td>
<td>AI – 1</td>
</tr>
<tr>
<td>AF2601 Introduction to Economics</td>
<td>AI – 2</td>
</tr>
<tr>
<td>AF3313 Business Finance</td>
<td>AI – 3</td>
</tr>
<tr>
<td>AMA106 Foundation Mathematics</td>
<td>AI – 4</td>
</tr>
<tr>
<td>AMA201 Mathematics I</td>
<td>AI – 5</td>
</tr>
<tr>
<td>AMA202 Mathematics II</td>
<td>AI – 6</td>
</tr>
<tr>
<td>CSE291 Transportation Engineering Fundamentals</td>
<td>AI – 7</td>
</tr>
<tr>
<td>CSE292 Transportation Operations and Management</td>
<td>AI – 8</td>
</tr>
<tr>
<td>CSE312 Transportation and Highway Engineering</td>
<td>AI – 9</td>
</tr>
<tr>
<td>CSE331 Air and Noise Pollution Studies</td>
<td>AI – 11</td>
</tr>
<tr>
<td>CSE390 Transportation Systems Analysis</td>
<td>AI – 13</td>
</tr>
<tr>
<td>CSE407 Design of Transport Infrastructure</td>
<td>AI – 14</td>
</tr>
<tr>
<td>CSE408 Traffic Surveys and Transport Planning</td>
<td>AI – 16</td>
</tr>
<tr>
<td>CSE490 Transport Management &amp; Highway Maintenance</td>
<td>AI – 18</td>
</tr>
<tr>
<td>CSE508 Environmental Impact Assessment</td>
<td>AI – 19</td>
</tr>
<tr>
<td>CSE535 Land Transport and Environment</td>
<td>AI – 20</td>
</tr>
<tr>
<td>CSE561 Public Transport : Operations and Service Planning</td>
<td>AI – 21</td>
</tr>
<tr>
<td>CSE562 Traffic Engineering and Control</td>
<td>AI – 23</td>
</tr>
<tr>
<td>CSE575 Sustainable Development Strategy</td>
<td>AI – 24</td>
</tr>
<tr>
<td>EE207 Engineering Electromagnetics</td>
<td>AI – 25</td>
</tr>
<tr>
<td>EE3021 Electromechanical Energy Conversion</td>
<td>AI – 26</td>
</tr>
<tr>
<td>EE3031 Power Electronics and Drives</td>
<td>AI – 27</td>
</tr>
<tr>
<td>EE3041 Power Transmission and Distribution</td>
<td>AI – 28</td>
</tr>
<tr>
<td>EE309 Control Systems and Signal Processing</td>
<td>AI – 29</td>
</tr>
<tr>
<td>EE310 Safety in Systems Engineering</td>
<td>AI – 30</td>
</tr>
<tr>
<td>EE3502 Summer Practical Training</td>
<td>AI – 31</td>
</tr>
<tr>
<td>EE4001 External Industrial Training</td>
<td>AI – 32</td>
</tr>
<tr>
<td>EE4041 Engineering Project Management</td>
<td>AI – 33</td>
</tr>
<tr>
<td>EE405 Energy Utilisation and Management in Transportation</td>
<td>AI – 34</td>
</tr>
<tr>
<td>EE406 Risk and Reliability Analysis on Asset Management</td>
<td>AI – 35</td>
</tr>
<tr>
<td>EE4121 Individual Project</td>
<td>AI – 36</td>
</tr>
<tr>
<td>EE435 Electrical Systems in Automobiles</td>
<td>AI – 39</td>
</tr>
<tr>
<td>EE437 Intelligent Transportation Systems</td>
<td>AI – 40</td>
</tr>
<tr>
<td>ELC2501 University English I</td>
<td>AI – 41</td>
</tr>
<tr>
<td>ELC2502 University English II</td>
<td>AI – 42</td>
</tr>
<tr>
<td>ELC3508 English for Effective Workplace Communication</td>
<td>AI – 43</td>
</tr>
<tr>
<td>ENG232 Engineering Science</td>
<td>AI – 44</td>
</tr>
<tr>
<td>ENG236 Computer Programming</td>
<td>AI – 45</td>
</tr>
<tr>
<td>ENG237 Basic Electricity and Electronics I</td>
<td>AI – 46</td>
</tr>
<tr>
<td>ENG238 Basic Electricity and Electronics II</td>
<td>AI – 47</td>
</tr>
<tr>
<td>ENG307 Society and the Engineer</td>
<td>AI – 48</td>
</tr>
<tr>
<td>IC2105 Engineering Communication and Fundamentals</td>
<td>AI – 49</td>
</tr>
<tr>
<td>IC2113 IC Training I (TSE)</td>
<td>AI – 51</td>
</tr>
<tr>
<td>LGT3019 Economics of International Transport Logistics</td>
<td>AI – 53</td>
</tr>
<tr>
<td>LGT5013 Transport Logistics in China</td>
<td>AI – 54</td>
</tr>
<tr>
<td>ME3301 Applied Mechanics</td>
<td>AI – 55</td>
</tr>
<tr>
<td>ME4503 Aviation Systems</td>
<td>AI – 56</td>
</tr>
<tr>
<td>ME4504 Aircraft Maintenance Engineering</td>
<td>AI – 58</td>
</tr>
</tbody>
</table>
Subject Description Form

**Subject Code**
AF2108

**Subject Title**
Financial Accounting

**Credit Value**
3

**Level**
2

**Pre-requisite / Co-requisite / Exclusion**
None

**Role and Purposes**
This subject contributes to the achievement of BBA Outcomes by enabling students to analyze financial reports (Outcome 9), apply accounting conceptual framework in the business problems analysis (Outcome 7) and process a foundation of financial accounting skills and knowledge, on which to base the process of continuous professional development (Outcome 13). It also contributes to the development of information technology skill (Outcome 6) and ethical reasoning (Outcome 5).

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

a. Explain the role and importance of accounting information in assisting decision-making in a business context.

b. Apply the financial accounting conceptual framework in the recording, processing, summarizing and reporting phases of the accounting cycle.

c. Evaluate the assumptions, principles and conventions underlying financial accounting processes.

d. Identify and resolve accounting related ethical issues as they arise.

e. Apply appropriate analytical tools for the interpretation of financial statements.

**Subject Synopsis/Indicative Syllabus**
The Business and Accounting Environment

Different types of businesses, their common objectives and basic features. The need for accounting as a basis for decision making. Ethical considerations in financial reporting.

The Financial Accounting Framework

Accounting equation and double entry bookkeeping system. Differences between cash and accrual bases of accounting. Preparation of journals, ledger accounts, trial balance and basic financial statements. Prepayments and accruals. Valuation of accounts receivables, inventory and fixed assets. Quality of earnings and earnings management. Internal control of cash through bank reconciliation statement.

Accounting Principles and Concepts

Fundamental accounting concepts and other accounting principles that underlie the preparation of financial statements.

Company Accounting


Analysis and Interpretation of Financial Statement

Need for analysis and interpretation of financial statements. Interpretation techniques including ratio analysis and statement of cash flow. Calculation and interpretation of basic financial ratios. Limitations of ratio analysis.

**Teaching/Learning Methodology**
A two hour lecture will be conducted each week to initiate students into the ideas, concepts and techniques of the topics in the syllabus, which is then reinforced by a one hour tutorial designed to consolidate and develop students’ knowledge through discussion and practical problem solving. Students will be assigned and assessed with a group project which simulates the maintenance of a set of accounting records for a company.

**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>Continuous Assessment</td>
<td>50%</td>
<td>a □ b □ c □ d □ e □</td>
</tr>
<tr>
<td>1. Project Assignment</td>
<td>10%</td>
<td>□</td>
</tr>
<tr>
<td>2. Tests (close book)</td>
<td>40%</td>
<td>□ □ □</td>
</tr>
<tr>
<td>Final Examination (closed book)</td>
<td>50%</td>
<td>□ □ □ □</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>□ □ □ □ □</td>
</tr>
</tbody>
</table>

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

**Student Study Effort Expected**

- **Class contact:**
  - Lectures: 28 Hrs.
  - Tutorials: 14 Hrs.

- **Other student study effort:**
  - Weekly preparation and review (3 hour X 12 weeks): 36 Hrs.
  - Assignments (3 hours X 12 topics) and project (10 hours): 46 Hrs.

- **Total student study effort:** 124 Hrs.

**Reading List and References**

**Recommended Textbook**

**Recommended References**


Subject Description Form

Subject Code: AF2601
Subject Title: Introduction to Economics
Credit Value: 3
Level: 2
Pre-requisite / Co-requisite / Exclusion: Nil

Role and Purposes
This subject contributes to the achievement of the BBA Outcomes by enabling students to analyze business situations and problems (Outcome 7) by applying conceptual frameworks drawn from Economics, and identify and analyze the means (Outcome 10) by which value is created in goods and services and delivered to users. It also identifies and analyzes (Outcome 12) those aspects of the domestic and global business environment that set the 'parameter of choice' within which business organizations set objectives and take actions.

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

a. Appraise the issues involved in the allocation of scarce resources for individual economic agents and the economy as a whole.
b. Conduct economic analysis of the behaviour of firms and markets.
c. Evaluate the issues relating to the macroeconomy and analyze the effectiveness of government economic policy.
d. Apply relevant economic knowledge to enhance their understanding of other business subjects.

Subject Synopsis/ Indicative Syllabus

The Scope of Economic Analysis

Demand, Supply and the Price Mechanism

Market Structure

National Income Accounting and Determination

Fiscal Policy and Monetary Policy

The International Economy
International exchange and gains from trade. The foreign exchange market and alternative exchange rate systems.

Teaching/Learning Methodology
Lectures focus on the introduction and explanation of key economic concepts, with specific reference to current economic issues wherever appropriate.
Tutorials provide students with the opportunity to deepen their understanding of the concepts taught in lectures and to apply the theories to the analysis of real-life economic issues. The activities in tutorials include student presentations and discussions of problem sets and 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 (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>50%</td>
<td>a □ b □ c □ d □</td>
</tr>
<tr>
<td>1. Presentation</td>
<td>15%</td>
<td>√ □ √ □ √ □ √</td>
</tr>
<tr>
<td>2. Written report</td>
<td>10%</td>
<td>√ □ √ □ √ □</td>
</tr>
<tr>
<td>3. Attendance and participation in class</td>
<td>5%</td>
<td>√ □ √ □ √ □</td>
</tr>
<tr>
<td>4. Mid-term test</td>
<td>20%</td>
<td>√ □ √ □ √ □</td>
</tr>
<tr>
<td>Final Examination</td>
<td>50%</td>
<td>√ □ √ □ √ □</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

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

Student Study Effort Expected

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

Other student study effort:

| Self study and homework preparation | 42 Hrs. |

Total student study effort 84 Hrs.

Reading List and References

Recommended Textbook

References
**Subject Description Form**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AF3313</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject Title</strong></td>
<td>Business Finance</td>
</tr>
<tr>
<td><strong>Credit Value</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Pre-requisite / Co-requisite / Exclusion</strong></td>
<td>Pre-requisite: Financial Accounting (AF2108) or equivalent</td>
</tr>
</tbody>
</table>

**Role and Purposes**

This subject contributes to the achievement of the BBA Outcomes by enabling students to develop strong **analytical skills** and **critical thinking** (Outcome 4), and apply financial methods to analyze business problems (Outcome 7) and apply basic financial theories, analyze financial reports and understand the operations of financial markets (Outcome 9) and present and communicate in English effectively (Outcome 1 and Outcome 2).

**Subject Learning Outcomes**

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

- a. Identify the major responsibilities of financial managers;
- b. Apply different investment appraisal techniques and evaluate the limitations;
- c. Apply the portfolio theory to construct a diversified portfolio;
- d. Determine the corporate cost of capital and
- e. Analyze the key characteristics of working capital and its individual elements.

**Subject Synopsis/ Indicative Syllabus**

- **Introduction**
  - Corporate Goal. The Agency Problem and Control of the Corporation

- **Valuation of Securities**
  - Time value of money. Valuation of Stocks and bonds.

- **Investment Appraisal Techniques and the Limitations**

- **Risk Analysis, Real Options and Capital Budgeting**
  - Decision trees, Real Options. Sensitivity Analysis. Scenario Analysis. Break-even Analysis

- **Portfolio Theory**

- **Cost of Capital**

- **Net Working Capital Management**
  - Short-term Finance and Planning. Cash Management. Credit Management

---

**Teaching/Learning Methodology**

The mass lectures cover the basic concepts and theories. Tutorial sessions allow students to discuss the lectures and present the applications of financial methods in smaller groups.

**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>40%</td>
<td>a (\checkmark) b (\checkmark) c (\checkmark) d (\checkmark) e (\checkmark)</td>
</tr>
<tr>
<td>1. Participation (Tutorial sessions)</td>
<td>5%</td>
<td>(\checkmark) (\checkmark) (\checkmark) (\checkmark) (\checkmark)</td>
</tr>
<tr>
<td>2. Midterm Test</td>
<td>20%</td>
<td>(\checkmark) (\checkmark) (\checkmark) (\checkmark) (\checkmark)</td>
</tr>
<tr>
<td>3. Individual Written Assignment</td>
<td>15%</td>
<td>(\checkmark) (\checkmark) (\checkmark) (\checkmark) (\checkmark)</td>
</tr>
<tr>
<td>Final Examination</td>
<td>60%</td>
<td>(\checkmark) (\checkmark) (\checkmark) (\checkmark) (\checkmark)</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>(\checkmark) (\checkmark) (\checkmark) (\checkmark) (\checkmark)</td>
</tr>
</tbody>
</table>

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

**Student Study Effort Expected**

- **Class contact:**
  - Lectures: 28 Hrs.
  - Tutorials: 14 Hrs.

- **Other student study effort:**
  - Assigned tutorial questions: 14 Hrs.
  - Individual written assignment: 8 Hrs.

- **Total student study effort:** 64 Hrs.

**Reading List and References**

### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AMA106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Foundation Mathematics</td>
</tr>
<tr>
<td>Credit Value</td>
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</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 is a subject to provide students with a solid foundation in Mathematics. The emphasis will be on the application of mathematical methods to solving basic mathematical problems.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able to:
1. solve problems using the concept of functions and inverse functions;
2. apply the basic operations of matrices and calculate the determinant;
3. apply mathematical reasoning to analyse essential features of different mathematical problems such as differentiation and integration;
4. apply appropriate mathematical techniques to model and solve problems in science and engineering;
5. extend their knowledge of mathematical techniques and adapt known solutions in different situations.

**Subject Synopsis/Indicative Syllabus**

- **Basic concepts**
  - Functions and inverse functions; Elementary functions, Trigonometric functions.

- **Differential Calculus**
  - Limits and continuity (intuitive approach); Derivatives; Techniques of differentiation; Mean Value Theorem; Higher derivatives; Maxima and minima; Curve sketching.

- **Integral Calculus**
  - Indefinite integrals; Techniques of integration; Definite integrals. Fundamental Theorem of Calculus; Taylor’s Theorem; Applications in geometry, physics and engineering.

- **Matrix Algebra**
  - Introduction to matrices and determinants.

**Teaching/Learning Methodology**

The subject will be delivered mainly through lectures, tutorials and presentation. The lectures aim to provide students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. Tutorials and presentations will be held to develop students’ ability of logical thinking and effective communication.

---

### 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>a. Assignment and Mid-term Test</td>
<td>40%</td>
</tr>
<tr>
<td>b. Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>

Total 100%

Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester.

Questions used in assignments, tests and examinations are set to test students’ ability with regard to any one of the intended learning outcomes.

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

### 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 and Student Presentation</td>
<td>14 Hrs.</td>
</tr>
</tbody>
</table>

Other student study effort:

| • Assignment                | 20 Hrs. |
| • Self-study                | 58 Hrs. |

Total student study effort 120 Hrs.

### Reading List and References

- **Textbook**

- **References**
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>AMA201</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Mathematics I</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</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
To introduce students the fundamentals of basic engineering mathematics. Emphasis will be on the basic theory as well as application of mathematical methods to solving engineering problems.

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

Subject Synopsis/Indicative Syllabus

Algebra of complex number:
Complex numbers; Geometric representation; n-th roots of complex numbers.

Linear algebra:
Matrices and determinants; Vector space; Elementary algebra of matrices; Eigenvalues and eigenvectors; Normalization and orthogonality.

Ordinary differential equations:
First and second order linear ordinary differential equations; Laplace transforms; Convolution theorem; Fourier transforms.

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 the understanding and application of mathematical concepts and techniques. Tutorials will mainly be used to develop students’ problem solving ability.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods</th>
<th>% weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Continuous Assessment</td>
<td>40%</td>
</tr>
<tr>
<td>b. Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Continuous Assessment comprises of assignments, in class quizzes, online quizzes and a mid-term test. A 3-hour examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess the student’s 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.

Student Study Effort Expected

Class contact:
- Lecture: 28 Hrs.
- Tutorial: 14 Hrs.
- Mid-term test and Examination: 5 Hrs.

Other student study effort:
- Assignments and self-study: 73 Hrs.

Total student study effort: 120 Hrs.

Reading List and References

Textbook:

References:
Subject Description Form

Subject Code: AMA202

Subject Title: Mathematics II

Credit Value: 3

Level: 2

Pre-requisite / Co-requisite / Exclusion: Pre-requisite: Mathematics I (AMA201)

Objectives: This subject aims to introduce students to the differential and integral calculus of functions of several variables, vector field theory and partial differential equations of mathematical physics. Emphasis will be on the basic theory as well as application of mathematical methods to solving engineering problems.

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

Subject Synopsis / Indicative Syllabus:

Calculus and functions of several variables:
- Infinite series; Power series; Taylor series; Fourier series; Partial differentiation; Maxima and minima; Lagrange multiplier.

Partial differential equations:
- Formulation of partial differential equations; Method of separation of variables; Initial and boundary value problems.

Vector Calculus:
- Vectors; Scalar and vector products; Gradient, divergence and curl operators; Multiple integrals; Line, surface and volume integrals; Green’s theorem, divergence theorem and Stokes' theorem.

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

Assessment Methods 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 (Please tick as appropriate)</th>
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</thead>
<tbody>
<tr>
<td>a. Continuous Assessment</td>
<td>40%</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>b. Examination</td>
<td>60%</td>
<td>1 2 3 4 5</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. A 3-hour examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess the student’s 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.

Student Study Effort Expected:

- Class contact:
  - Lecture: 28 Hrs.
  - Tutorial: 14 Hrs.
  - Mid-term test and Examination: 5 Hrs.

- Other student study effort:
  - Assignments and self-study: 73 Hrs.

Total student study effort: 120 Hrs.

Reading List and References:

Textbook:

References:
**Subject Description Form**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE291</th>
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</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Transportation Engineering Fundamentals</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</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 introduce the fundamental concepts of transportation engineering and transport economics.
2. To enable students to appreciate the operation of real-life transportation systems and the related engineering, economical and environmental issues.
3. To equip the students with the basic techniques on system analysis and economic evaluation.
4. 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. Identify the key issues in transportation systems.
- b. Appreciate the problems and suggest original solutions to real-life transport problems.
- c. Conduct simple engineering design, basic system analysis and economic evaluation.
- d. Be ready to study transportation-related subjects on higher level.

**Subject Synopsis/Indicative Syllabus**

1. Transportation systems: Introduction to transportation engineering, transportation system engineering, transport problems and solutions in Hong Kong, sustainability of transportation systems, transportation in social, economics, environmental and political roles.
2. The technology of transportation: Transport modes and operational characteristics, transport technology and development, technology applications in transport and logistics industry.
3. Traffic engineering fundamentals: Elements of traffic engineering, speed-flow-density relationships, level of service concept.
4. Transport economics: Principles of transport economics; demand and cost for transport, from economics to transport policy, effects of transport pricing policies.
5. Transportation system analysis: Systems approach planning and engineering; travel choice behaviours and demand modelling, transportation network analysis, decision analysis and economic evaluation of transportation projects.

**Teaching/Learning Methodology**

The key concepts and techniques covered in this subject are discussed in lecture. To strengthen understanding and provide opportunities for students to appreciate what they have learnt, students will have chances to do presentations, discussions, and hands-on exercises both in the lectures and the tutorials. Furthermore, individual assignments consisting of essays and numerical problems let students demonstrate their level of understanding and create evidence of learning.

**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. Assignments and in-class exercise</td>
<td>25</td>
<td>a, b, c, d</td>
</tr>
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<td>2. Midterm test</td>
<td>15</td>
<td>a, b, c, d</td>
</tr>
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<td>3. Final examination</td>
<td>60</td>
<td>a, b, c, d</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a, b, c, d</td>
</tr>
</tbody>
</table>

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.

**Student Study Effort Expected**

- Class contact:
  - Lectures: 35 Hrs.
  - Tutorials: 7 Hrs.

- Other student study effort:
  - Reading and Studying: 42 Hrs.
  - Completion of Assignments and class presentations: 16 Hrs.

Total student study effort: 100 Hrs.

**Reading List and References**

**Textbooks:**
- M.G.H. Bell and Y. Iida, Transportation Network Analysis, J. Wiley, 1997

**Reference books:**
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE292</th>
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</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Transportation Operations and Management</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>2</td>
</tr>
<tr>
<td>Pre-requisite / Co-requisite/ Exclusion</td>
<td>CSE291 Transportation Engineering Fundamentals</td>
</tr>
</tbody>
</table>

### Objectives
1. To provide the students with the knowledge of operations in various transportation systems.
2. To introduce the engineering problems arising from the operations of transportation systems.
3. To discuss the characteristics and performance evaluation of transportation operations and management measures.
4. To understand the inter-modal transportation connections, transfers and competitions.

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

- a. Discriminate the basic characteristics of various transportation systems.
- b. Demonstrate understanding of the fundamentals of transportation operations and management.
- c. Conduct simple design on traffic signal and transit schedules.
- d. Select appropriate operations and management strategy based on different conditions and constraints.
- e. Be ready to take further subjects on individual transportation systems at higher levels.

### Subject Synopsis/ Indicative Syllabus
1. **Introduction**: Management of vehicle flows and fleets, traffic stream properties and their measurement, queuing theories, flow control and fleet scheduling.
2. **Asset and facility design**: Design of transportation assets and facilities based on operational capacity, site constraints, and safety considerations.
3. **Road transportation**: Traffic flow and demand, traffic lights, vehicle detection, traffic control and coordination; traffic management measures.
4. **Urban transit and railway transportation**: Transit operations and service scheduling, elements of transit line capacity, capacity computations, system approach to transit line capacity, capacities of different transit modes, measures for increase of transit speed, vehicle design and performance characteristics. Train services, system capacity; rolling stocks and electrification; signalling and communication.
5. **Air transportation**: Nature of civil aviation and structure of the airline industry; aircraft characteristics and performance; navigation and traffic control; airport planning and design.
6. **Transportation terminals**: Characteristics of terminals (sea ports, air-yards, airports, parking lots); methodologies study terminal operations and management of congestion. (chronographs, input-output diagrams, pricing, simulation).

### Teaching/Learning Methodology
The key concepts and techniques covered in this subject are discussed in lecture. To strengthen understanding and provide opportunities for students to appreciate what they have learnt, students will have chances to do presentations, discussions, and hands-on exercise both in the lectures and the tutorials. Furthermore, individual assignments consisting of essays and numerical problems let students demonstrate their level of understanding and create evidence of learning.

### 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. Assignments and in-class exercise</td>
<td>25</td>
<td>a, b, c, d, e</td>
</tr>
<tr>
<td>2. Midterm test</td>
<td>15</td>
<td>a, b, c, d, e</td>
</tr>
<tr>
<td>3. Final examination</td>
<td>60</td>
<td>a, b, c, d, e</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

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.

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

The students will be assessed with three components: written assignments and in-class exercise, a midterm test and a final exam. The written assignments will consist of both numerical and descriptive problems, and the in-class exercise includes discussions and presentations. They are aimed at measuring students' attainment of the intended learning outcomes in different aspects. The numerical problems target the ability in conducting transportation system design. The essay problems and the in-class presentations and discussions provide opportunities for students to develop deeper understanding to operations and management of various transportation modes, demonstrate students' ability to think critically in the selection of operations and management strategy and to enhance their effective communication skills. These are appropriate in achieving intended learning outcomes (a), (b), (c), (d), and (e). The midterm test and the final exam are conducted at different times in the semester to consolidate students' knowledge in lectures, tutorials, and other class activities. They are appropriate in assessing intended learning outcomes (a), (b), (c), (d), and (e).

### Student Study Effort Expected

**Class contact:**
- Lectures: 35 Hrs.
- Tutorials: 7 Hrs.

**Other student study effort:**
- Reading and Studying: 42 Hrs.
- Completing of assignments and class presentations: 16 Hrs.

**Total student study effort**: 100 Hrs.

### Reading List and References

- Roger P. Roess, Elena S. Prassas, William R. McShane, Traffic Engineering, Prentice Hall, 2004
## Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE312</th>
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</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Transportation and Highway Engineering</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite / Co-requisite / Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Objectives

1. To promote a basic appreciation of the nature of transportation engineering;
2. To introduce students to those engineering activities essential to the planning and design of highway and transportation systems;
3. To enable students to acquire basic principles of highway planning and engineering;
4. To train students with basic techniques in highway design and pavement material studies;
5. To enable students to make engineering judgment on highway planning and design.

### Intended Learning Outcomes

Upon completion of the subject, students will be:

- Able to apply the fundamentals of applied physics and principles of engineering design to carry out geometric design of highway alignments and mix design of pavement materials;
- Able to exercise professional judgement and engineering sense in the design and evaluation of alternative highway alignment schemes in view of the complex site environment;
- Able to analyze and interpret laboratory data for optimal design of highway pavement materials;
- Able to explain the design of highway alignments and pavement materials logically and lucidly;
- Able to understand the limitations of the site constraints and to recognize the assumptions and principles adopted in the highway design so as to develop alternative highway design schemes and optimal mix for pavement materials;
- Able to appreciate the shortcomings of current highway design practice and the need for further research on design methods for highway alignments and pavement materials.

### Subject Synopsis/Indicative Syllabus

1. **Introduction to Transportation and Highway Engineering (1 week)**
   - The scope of transportation engineering. Transportation in society; economic, social and environmental factors. Transportation modes. Urban transportation problems; aspects of transport planning studies and traffic management.

2. **Highway Planning (2 weeks)**

3. **Geometric Design (4 weeks)**

4. **Highway Construction (2 weeks)**
   - Application of the principles of soil mechanics to subgrade compaction and testing. California Bearing Ratio Test of subgrade. Highway materials and construction control. Soil stabilization.

5. **Road Structures and Components (2 weeks)**

6. **Highway Materials (3 weeks)**

7. **Laboratory (3 weeks)**
   - Basic highway material testing procedures; Marshall test, California Bearing Ratio test. Binder tests.

This course will be augmented by appropriate films and/or site visits in Hong Kong.

### Teaching/Learning Methodology

Fundamental knowledge will be covered in lectures. Tutorials will provide opportunities for discussion of lecture materials and will also be conducted in the form of example class and problem-solving session to supplement understanding from lectures. Laboratory work will help students appreciate the basic principles and familiarize themselves with basic instruments.
### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weight</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Assignments and Lab Reports</td>
<td>20%</td>
<td>√ a, b, c, d, e, f</td>
</tr>
<tr>
<td>(2) Mid-term Test(s)</td>
<td>10%</td>
<td>√ a, b, e, f</td>
</tr>
<tr>
<td>(3) Final Examination</td>
<td>70%</td>
<td>√ a, b, e, f</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

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.

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

The students will be assessed with three components, i.e., the laboratory session and assignment, a mid-term test and a final examination at the end of the semester. The students will be required to attend laboratory sessions and submit group laboratory reports. These laboratory sessions will enable students to acquire basic laboratory techniques and report writing. The works in the laboratory sessions are closely related to practicing highway engineering requirements. Students will have to exert engineering judgments to complete the laboratory sessions. The laboratory sessions together with the report writing are best to achieve intended learning outcomes a), c), d) and f). The mid-term test will emphasize on assessing students’ basic concept and current practices of highway engineering. It is appropriate to achieve intended learning outcomes a), b) and e). The final examination will consolidate students’ learning in lectures and tutorials. It is most appropriate to achieve the intended learning outcomes a), b), c) and f).

### Student Study Effort Expected

- **Class contact:**
  - Lectures/Tutorials: 34 Hrs.
  - Laboratory Sessions: 8 Hrs.

- Other student study effort:
  - Reading and studying: 60 Hrs.
  - Completion of Assignments/Lab Reports: 26 Hrs.

- **Total student study effort:** 128 Hrs.

### Reading List and References

**Essential Textbooks**


**Reference Textbooks**

### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE331</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Air and Noise Pollution Studies</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>Nil</td>
</tr>
</tbody>
</table>

#### Objectives

To provide basic knowledge about the causes, impact and control of air and noise pollution.

#### Intended Learning Outcomes

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

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

- a. Have the basic knowledge of contemporary air and noise pollution, including chemistry and/or physics involved, commonly used methods for monitoring, prediction, and assessment;
- b. Have general understanding of commonly used control technologies for reducing air and noise pollution;
- c. Able to work as an entry-level staff in the air and noise pollution profession;
- d. Obtain sufficient knowledge and skills which will facilitate the students to further study the subject independently.

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

- a. Have the basic ability to analyze data and issue in a logical way;
- b. Develop the ability in critical thinking and analysis;
- c. Develop senses to link local environmental issues to sustainable development of global society and able to contribute to discussion of environmental/social issues logically.

#### Subject Synopsis/Indicative Syllabus

**Air Pollution Studies**

1. **Chemical and physical characteristics of the atmosphere**
   Sources and sink of main air pollutants in the atmosphere; meteorological parameters affecting the concentrations of air pollutants.

2. **Measurement and analysis of ambient air pollutants**
   Methods and techniques for the measurement and analysis of ambient gaseous pollutants, particulate pollutants, and odor pollutants in the environment.

3. **Source sampling and pollution analysis**
   Source sampling criteria, method of measurement and analysis for gaseous pollutants, particulate pollutants, and odor pollutants from the sources.

4. **Air pollution dispersion modeling**
   Application of Gaussian Dispersion Models, transport of air pollutants and atmospheric stability, wind profile, factors affecting pollution dispersion in the atmosphere.

**Noise Pollution Studies**

1. **Environmental Noise Prediction**
   Geometric spreading of sound from simple sources. Outdoor sound propagation. Effects of meteorological conditions - sound refraction and sound ray equations, air absorption. Sound radiation near boundary, ground absorption, ground/facade reflection. Sound diffraction around obstacles.

2. **Noise Assessment**
   Need for noise impact assessment. Basic principles - baseline study, noise prediction, monitoring and evaluation. Background noise survey - instrumentation, approach and data analysis. Assessment criteria - local and international codes.

3. **Road Traffic Noise**

4. **Railbound Traffic Noise**

5. **Construction Noise**

6. **Laboratory Works**
   (a) Noise Barrier
   (b) Industrial Noise Measurement
Teaching/Learning Methodology

In lectures students will be presented with an overview of the nature of air and noise pollution. They will also be taught the knowledge required to predict and assess air and noise pollution impact and to make recommendations for solution. The lecture will be keynote in nature, and students will be encouraged to read pre-assigned references. Laboratory sessions will involve familiarization with the relevant basic measuring instruments. Tutorials will be used to discuss readings, assignments and laboratory reports.

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, in-class problems and lab report</td>
<td>30</td>
<td>√  √  √  √</td>
</tr>
<tr>
<td>2. Final examination</td>
<td>70</td>
<td>√  √  √  √</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
<td></td>
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</tbody>
</table>

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.

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

Homework – To help students further understand what they learnt in the lectures.

Quiz – To test if students have grasped the underlying ideas.

In-class problem – During class periods, students will sometimes be asked to work a problem in a group or individually. These problems are designed to help students learn to utilize the concepts discussed in the reading material and covered in the quiz.

Lab experiment – It will provide students first-hand experience in understanding the sources, analysis and control of air pollutants and noise. Students are required to carry out experiments under the supervision of lecturers and lab technicians.

Final examination - The exam tests student’s ability to utilize the concepts covered in this course.

Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>28 Hrs.</td>
</tr>
<tr>
<td>Tutorials</td>
<td>8 Hrs.</td>
</tr>
<tr>
<td>Laboratory</td>
<td>6 Hrs.</td>
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<table>
<thead>
<tr>
<th>Other student study effort:</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>24 Hrs.</td>
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<tr>
<td>Self Study</td>
<td>60 Hrs.</td>
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| Total student study effort  | 126 Hrs.   |

Reading List and References


**Subject Description Form**

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<tr>
<th>Subject Code</th>
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<tbody>
<tr>
<td>Subject Title</td>
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<td>Credit Value</td>
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<td>Level</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite</td>
<td>AMA201 Mathematics I</td>
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**Objectives**

1. To familiarise students with the essential numerical techniques and operations research methods which are applicable in most engineering problems.
2. To enable students to relate the previously acquired mathematical theories to practical problems.
3. To provide students with a solid bridge between mathematical theories and real-life transportation systems.
4. To enable students to analyse the advantages and limitations of the commonly adopted numerical techniques and operations research methods.
5. 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. Apply numerical techniques on transportation system analysis and realise error sources.

b. Perform simple data analysis on field data.

c. Make use of operational research techniques for transportation system design and optimisation under various constraints.

**Subject Synopsis/Indicative Syllabus**

1. **Probability & statistics**: Random variables, probability distributions, sample distributions and means, Central Limit Theorem, Bayesian Theorem, significance and hypothesis testing.

2. **Operations research**: Linear programming, simple Simplex algorithms, sensitivity analysis, shortest path and maximum flow problems, integer programming, combinatorial optimisation problems, branch and bound algorithm, applications in transportation.

3. **Modelling in transportation**: Use of field data and data gathering techniques, sources of errors, considerations of sample size, experiment design for demand forecasting and transportation operations analysis; analysis techniques.

**Teaching/Learning Methodology**

Most of the concepts will first be introduced in lectures. Tutorials provide opportunities for students to enhance understanding through practicing on calculation exercises and have chance to discuss with the lecturers to clarify misunderstanding. Lab sessions would introduce students to computer programs that are useful in dealing with real-size problems.

**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. Assignments</td>
<td>10</td>
</tr>
<tr>
<td>2. Lab reports</td>
<td>10</td>
</tr>
<tr>
<td>3. Midterm test</td>
<td>20</td>
</tr>
<tr>
<td>4. Final exam</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
</tr>
</tbody>
</table>

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.

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

Students will be assessed by four methods: written assignments, lab reports, midterm test, and final exam. Students will demonstrate their knowledge and numerical techniques related to transportation engineering problems in the written assignments. Assignments are appropriate to achieve intended learning outcomes (a) and (c). Through laboratory sessions, students will learn various useful programs and showcase their knowledge acquired through lab reports, and is targeted at intended learning outcome (b). The midterm test will focus on the numerical techniques and numerical methods required in this subject and will address intended learning outcomes (a) and (b). The final exam scheduled at the end of the semester consolidates the lectures, tutorials, and lab sessions and will address intended learning outcomes (a), (b), and (c).

**Student Study Effort Expected**

- Class contact: Lectures 30 Hrs.
- Tutorials 6 Hrs.
- Laboratory 6 Hrs.

Other student study effort:

- Reading and Studying 42 Hrs.
- Completing of assignments, class presentations and lab reports 16 Hrs.

Total student study effort 100 Hrs.

**Reading List and References**

**Textbooks**

- E.R. Champion, Numerical methods for engineering applications, Marcel Dekker, 1993
- F.S. Hillier, Introduction to operations research, McGraw Hill, 2005
- M.G.H. Bell and Y. Iida, Transportation Network Analysis, J. Wiley, 1997

**Reference books**

- S. Barnett, Some Modern Applications of Mathematics, Ellis Horwood, 1995
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Level</th>
<th>Pre-requisite / Corequisite / Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE407</td>
<td>Design of Transport Infrastructure</td>
<td>3</td>
<td>4</td>
<td>For CSE Students: CSE304 Transportation and Highway Engineering or CSE312 Transportation and Highway Engineering For TSE Students (41081): CSE291 Transportation Engineering Fundamentals, and CSE292 Transportation Operations and Management, and CSE312 Transportation and Highway Engineering</td>
</tr>
</tbody>
</table>

### Objectives

1. To enable students to acquire basic knowledge of design principles for transport infrastructure development;
2. To enable students to design major transport infrastructures including road drainage, road pavement, road junctions, railways and airport runways;
3. To enable students to assess engineering judgment on alternative transport infrastructure designs.

### Intended Learning Outcomes

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

- Have the basic knowledge of the design principles of transport infrastructure including roads, railways and airport runways as well as the skills to plan and design transport elements such as roads, railway and airport layouts and structures;
- Be familiar with the common design computer packages as well as manual calculations for road drainage, junctions and pavement designs as well as rail track alignment and drainage and able to utilise professional judgment in design parameters;
- Able to carry out and evaluate proper material tests for road pavements as well as tests on railway civil element requirements;
- Able to formulate and design cost-effective transport infrastructure.

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

- Able to work in groups and share responsibility in the required group works;
- Able to understand the current transport infrastructure development issues and contribute to discussion on these contemporary issues.

### Subject Synopsis/Indicative Syllabus

1. Introduction (2 weeks)
2. Highway Drainage (2 weeks)
   - General considerations. Types of drainage structures. Design and construction of surface drainage and sub-surface drainage. Effects on pavement support. Filter layer design.
3. Pavements (2 weeks)
4. Junction Design (2 weeks)
   - Design of signal controlled junctions. Co-ordination of traffic signal and pedestrian systems.
5. Railway Design (3 weeks)
6. Airport Design (3 weeks)
   - Airport planning and layout design.
7. Project and Laboratory (4 weeks)
   - Laboratory work will include: skid-resistance; pavement condition studies; junction studies; and railway studies.
   - Field data collection exercises will be undertaken and case studies will augment this course.

### Teaching/Learning Methodology

- Fundamental knowledge will be covered in lectures. Tutorials will provide opportunities for discussion of lecture materials; examples and problem-solving discussion sessions will supplement the lectures. Laboratory work will help students appreciate the basic principles and familiarize themselves with real-world problems.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>Intended Subject Learning Outcomes to be Assessed</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Assignment</td>
<td>a, b, c, d, e, f, g</td>
<td>20%</td>
</tr>
<tr>
<td>Laboratory Reports</td>
<td>a, b, c, d, e, f, g</td>
<td>20%</td>
</tr>
<tr>
<td>Examination</td>
<td>a, b, c, d, e, f, g</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

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

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

The project assignment will involve assessment of a large transport infrastructure proposal. Students will be asked to appreciate the design, consideration and alternative designs for more transport issues in a group presentation argument. Their arguments will be based on theoretical and presentation the client will select. Students will have to submit group reports which will be based on the paper presentation. The client will select...
intended learning outcomes except c.

There will be 4 laboratory sessions and students will be required to submit 2 individual reports and 2 group reports. This laboratory will enable students to acquire laboratory techniques and skill of laboratory report writing. Students will be asked to comment on the laboratory results. The assessment will be based on the laboratory reports and this element will achieve the intended learning outcomes b, c, e and f.

The examination will help students consolidate knowledge learnt in lectures and tutorials and thus achieving intended learning outcomes a, b, d and g.

Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
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<tbody>
<tr>
<td>Lectures/Tutorials</td>
<td>34 Hrs.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>8 Hrs.</td>
</tr>
</tbody>
</table>

Other student study effort:

| Completion of project assignment/Lab reports          | 26 Hrs. |
| Reading and studying                                  | 60 Hrs. |

Total student study effort 128 Hrs.

Reading List and References

Textbooks:


J. Watson, Highway Construction and Maintenance, 1991


Reference books:

Transaction, Hong Kong Institution of Engineers

Asia Engineer, The Journal of Hong Kong Institution of Engineers

Transport and Road Research Laboratory (TRRL) Reports

Airport Railway News, Mass Transit Railway Corporation

Publications of New Airport Projects Co-ordination Office, Hong Kong Government
<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE408</th>
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</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Traffic Surveys and Transport Planning</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

- **For CSE Students:**
  - CSE304 Transportation and Highway Engineering or
  - CSE312 Transportation and Highway Engineering and

- **For TSE Students (41081):**
  - CSE291 Transportation Engineering Fundamentals, and
  - CSE312 Transportation and Highway Engineering, and
  - CSE390 Transportation Systems Analysis

### Objectives

1. To expose students to the various techniques of traffic survey and transport modelling;
2. To develop an understanding of the nature and extent of urban transportation planning processes; and
3. To enable students to conduct traffic surveys and modelling traffic impacts for urban transportation planning purposes.

### Intended Learning Outcomes

Upon completion of the subject, students will be:

- **a.** Able to design and conduct traffic surveys for assessment of the impacts due to transport improvement projects and/or other travel demand management measures;
- **b.** Able to systematically analyze and interpret data from traffic and traveller surveys for strategic transport planning and travel demand forecasting;
- **c.** Able to utilize the four-steps modelling techniques for forecasting the future travel demand and analyzing the effects of transport infrastructure facilities on a transport system;
- **d.** Able to marshal logically the facts for illustrating the impacts of the traffic congestion and illustrate the feasible solutions lucidly through demand and capacity analysis, and economic analysis of congestion externality;
- **e.** Able to understand the traffic restraints and practical difficulties so as to come up with engineering feasible solutions and management measures for solving the specific transportation problems at a particular study area;
- **f.** Able to identify the merits and limitations of current approach in data collection and transport modelling for strategic planning purposes.

### Subject Synopsis / Indicative Syllabus

1. **Traffic Surveys and Analysis (4 weeks)**
   - Traffic characteristics and census. Volume studies; speed studies; travel time and delay studies. Capacity analysis; parking studies.

2. **Transportation Planning Process (2 weeks)**

3. **Planning for Public Transport (1 week)**

### Subject Synopsis / Indicative Syllabus

1. **Traffic Surveys and Analysis (4 weeks)**
   - Four-steps modelling approach; trip generation and attraction analysis, trip classification, multiple regression analysis, category analysis, Bayesian update of trip rate. Trip distribution; the Furness method; the gravity model. Modal split; Aggregated demand model; Disaggregated demand model; Stated Preference Survey. Traffic assignment analysis; User equilibrium, System optimal assignment, network assignment techniques.

2. **Traffic Demand Management and Road Pricing (2 weeks)**
   - Traffic restraint and road pricing. Economic analysis of congestion externality. Barriers to implementation of travel demand management measures. Best practices of urban road pricing schemes.

3. **Project and Laboratory**
   - Laboratory and tutorial on this course will include: traffic counts; speed studies; parking surveys; network building; transport modelling; trip distribution; traffic assignment.
   - Case studies and field work will support exercises in the application of transportation system models.

### 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 be exposed to the interdependence between theories and practice in transport planning. Students will therefore be required to undertake survey design and data collection on sites so as 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. Occasionally, professionals from government or industry will be invited to give lectures on current issues of Hong Kong transport planning.
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. Assignments and Lab Reports</td>
<td>20</td>
<td>a √ b √ c √ d √ e √ f √</td>
</tr>
<tr>
<td>2. Mid-term Test(s)</td>
<td>10</td>
<td>√ a √ b √ c √ d √</td>
</tr>
<tr>
<td>3. Final Examination</td>
<td>70</td>
<td>√ a √ b √ c √ d √ e √ √</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
<td></td>
</tr>
</tbody>
</table>

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.

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

The students will be assessed with three components, i.e., the laboratory session and assignment, a mid-term test and a final examination at the end of the semester. The students will be required to attend laboratory sessions and submit group laboratory reports. These laboratory sessions will enable students to acquire basic laboratory techniques and report writing. The works in the laboratory sessions are closely related to practicing highway engineering requirements. Students will have to exert engineering judgments to complete the laboratory sessions. The laboratory sessions together with the report writing are best to achieve intended learning outcomes a), b), c) and d). The mid-term test will emphasize on assessing students’ basic concept and current practices of highway engineering. It is appropriate to achieve intended learning outcomes b), c) and d). The final examination will consolidate students’ learning in lectures and tutorials. It is most appropriate to achieve the intended learning outcomes b), c), d), e) and f).

Student Study Effort Expected

Class contact:
- Lectures/Tutorials: 35 Hrs.
- Laboratory Sessions: 7 Hrs.

Other student study effort:
- Reading and studying: 60 Hrs.
- Completion of Assignments/Lab Reports: 26 Hrs.

Total student study effort: 128 Hrs.

Reading List and References

**Essential Textbooks**


**Reference Textbooks**

Subject Description Form

Subject Code  CSE490
Subject Title  Transport Management & Highway Maintenance
Credit Value  3
Level  4
Pre-requisite / Co-requisite/ Exclusion  Nil

Objectives

The objective of the subject is to provide an overall understanding of the transport management concerning the movement of people and goods; the structure and management of transport organisation; road traffic, highway management and maintenance.

Intended Learning Outcomes

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

a. Able to understand the transport system and the operation of various transport organisations;

b. Able to identify the functions of various traffic management techniques and their applications;

c. Able to understand the formulation and application of pavement management system;

d. Able to classify major pavement defects and the application of various pavement maintenance techniques.

Subject Synopsis/ Indicative Syllabus

1. The Transport System (2 weeks): The function of transport, the elements of transport system, the system concept as applied to transport and distribution.

2. The Structure and Management of Transport Organisation (2 weeks): The pattern of ownership and scale of operation; organisation structures; management function and practices; policy formulation and planning of strategies.

3. Road Traffic Management (3 weeks): Highway classification; parking control; principles of junction control and area traffic control; corridor control; traffic surveillance and regulations.

4. Pavement Management System (3 weeks): Maintenance Assessment Rating and Costing for Highway (MARCH); pavement maintenance and rehabilitation strategy; pavement performance prediction; economic analysis and network optimisation.

5. Highway Maintenance (4 weeks): Basic road maintenance operations, wet skid resistance, design and use of pavement surface treatments, structural maintenance of road pavements. Use of deflection measurements, overlay design methods for flexible and concrete pavements.

Teaching/Learning Methodology

The underlying principles and techniques relating to transport management and highway maintenance will be dealt with in lectures. However, it is important that the students be exposed to the interdependence between theories and practice. Students will therefore be required to undertake data collection and visualize road maintenance work on sites so as to understand the associated techniques in practice. Individual assignments will consist of the formulation of traffic management scheme and the establishment of road maintenance proposal. Occasionally, professionals from government or industry will be invited to give lectures on currently conducted transport management schemes and road maintenance projects in Hong Kong.

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) Assignments/site visit reports</td>
<td>10 (%)</td>
</tr>
<tr>
<td>(2) Two Tests</td>
<td>20 (%)</td>
</tr>
<tr>
<td>(3) Final Examination</td>
<td>70 (%)</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
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</tbody>
</table>

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.

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

The students will be assessed with three components, i.e., the assignments/reports, two tests and a final examination at the end of the semester. The students will be required to attend site visits and submit site visit reports. These site visits will enable students to visualise real pavement maintenance projects and to have an insight into the latest development of pavement engineering/maintenance technology in Hong Kong. Writing up site reports will enhance students' ability on reporting and writing technique. The two tests will emphasize on assessing students' basic concept and current practices of transport management & highway maintenance. It is appropriate to achieve intended learning outcomes of (a), (b), (c) and (d). The final examination will consolidate students' learning in lectures and tutorials. It is most appropriate to achieve the intended learning outcomes (a), (b), (c) and (d).

Student Study Effort Expected

Class contact:
- Lectures/Tutorials: 36 Hrs.

Other student study effort:
- Site visits: 6 Hrs.
- Reading and studying: 60 Hrs.
- Completion of Assignments/Reports: 26 Hrs.

Total student study effort: 128 Hrs.

Reading List and References

Essential Textbooks

Reference Textbooks
- Research & Development Division, MARCH 2 Inspection Training Guides for Works Supervisors, Highways Department (1988).

Reference Journals
- Bus and Coach Management
- Highways & Transportation (IHT Journal)
- Management Today (BIM Journal)
- Transportation research record
- Transport (ICT Journal)
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Environmental Impact Assessment</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:
Engineering or applied science undergraduate background.

**Objectives**

To provide students with an overview and understanding of the principles and current practices of environmental impact assessment (EIA). In particular, emphasis will be placed on environmental impact assessment studies relevant to Hong Kong.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able:

a. to conduct EIA studies in a team;

b. to perform environmental monitoring work within the EIA cycle;

c. to critically comment EIA reports and other related documents;

d. to be able to analyse complex environmental issues and to seek the best possible practical solutions for large infrastructural development project; and

e. to understand the relationship among project EIA, Strategic Environmental Assessment (SEA) and sustainable development.

**Subject Synopsis/Indicative Syllabus**

**Keyword syllabus:**

i) Development of Environmental Impact Assessment

   Historical review. Environmental assessment development in the world and Hong Kong.

ii) Scope and Objectives of Environmental Impact Assessment

   Environmental considerations: land use, planning, development and management. EIA aims and objectives. Environmental assessment and sustainable development.

iii) Methodology and Assessment Techniques


iv) Monitoring and Baseline Studies

   Environmental effects. Baseline studies requirements. Special field studies. Environmental monitoring and audit.

   Air, water, ecological, socioeconomic, visual, risk impact assessments. Environmental quality and regulatory requirements. Mitigation and control measures.

v) Environmental Impact Statement

   Role of Environmental Impact Statement, Statement Scope & Content.

**Teaching/Learning Methodology**

The subject teaching will include the following elements:

a. Lectures – to introduce the basic concepts and assessment methods;

b. Tutorials – to answer student questions in the learning processes;

c. Group discussion and presentations – to let students play different roles in the EIA process;

d. Reading materials and video presentations – to give students examples in local EIA case studies;

e. Seminars on EIA practices by invited speakers from government agencies and professional environmental consultants; and

f. Course work and term project (individual cases study) on EIA 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>50%</td>
<td>√ a. √ b. √ c. √ d. √ e.</td>
</tr>
<tr>
<td>2. Written Examination</td>
<td>50%</td>
<td>√ a. √ b. √ c. √ d. √ e.</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
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</tbody>
</table>

Written examination is evaluated by final examination.

**Reading List and References**

The following texts provide the majority of the basic materials to be covered in lectures. Students will need to study other publications including case studies.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Title</th>
<th>Credit Value</th>
<th>Pre-requisite / Corequisite</th>
<th>Indicative Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE535</td>
<td>Land Transport and Environment</td>
<td>5</td>
<td>Advanced Level or equivalent in Mathematics or Physics</td>
<td>i) Introduction of land transport infrastructure development and planning procedure; ii) Land use pattern continuous; iii) Transport pollution Assessment; Environmental impact Assessment (EIA) Ordinance terms of reference of EIA Environment Acidification, Assessment of land use pattern continuous; iv) Pollution control measures</td>
</tr>
</tbody>
</table>
experiences with computer programs.

Subject Description Form

Vehicle Scheduling

vii) Service Reliability

Variability of concern to passengers and operator; the bunching phenomenon; improving reliability; passenger waiting time; vehicle running time; AVI (automatic vehicle location) systems-feasibility and benefits.

vi) Timetabling (Revised) Design

Current practices, establishing objective functions, creating routes and transfers, demand assignment and initial frequency determination, optimal criteria and best solutions with flexibility for decision makers.

v) Design & Evaluation of Public Transport Priority Measures

Important elements in providing preference to public transport priority schemes: Design and evaluation; applications of information technologies in public transport.

viii) Transit Network (Routes) Design

Recent developments, production functions and marginal analysis, sensitivity analysis, resource allocation and transportation problems.

ix) Systems Analysis

ii) Data Collection Methods

Manual and integrated data collection techniques: automatic vehicle location, vehicle collection, vehicle monitoring, sampling considerations, operations survey, passenger load counts, boarding and alighting counts, on-board surveys, and on-site case studies.

b) Public Transport Operations and Service Planning

Current planning and operation approaches, including transit network building and demand assignment, design and evaluation of public transport improvement measures.

a. To understand the public transport planning inputs and data required for transit line headway determination and timetable development;

b. To compare between traditional operations and service planning, including scheduling procedures, systems analysis approaches, which are now beginning to be applied for improvements of public transport problems.

c. To deal with and find solutions for persistent and realistic public transport problems.

i) Overall Framework

Public transport operations and service planning process; problem decomposition; tradeoffs between services; standard versus mini-service; vehicle size models; public transport planning studies.

Subject Synopsis/Indicative Syllabus

Experience with computer programs.

Keywords

a) Continuous Assessment 40%

b) Written Examination 60%

c) Total 100%
Continuous assessment will be based on coursework and case study discussions. Written examination is evaluated by final examination.

<table>
<thead>
<tr>
<th><strong>Reading List and References</strong></th>
<th><strong>Textbooks</strong></th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Conference Proceedings and Symposia</strong></td>
</tr>
<tr>
<td></td>
<td>Proceedings of the HKSTS Conferences - Hong Kong Society for Transportation Studies <a href="http://www.hksts.org">www.hksts.org</a></td>
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<tr>
<td></td>
<td><strong>Journals</strong></td>
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<tr>
<td></td>
<td>Accident Analysis and Prevention</td>
</tr>
<tr>
<td></td>
<td>Bus and Coach Management</td>
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<td>Journal of Advanced Transportation</td>
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<td></td>
<td>Journal of the Transportation Research Board</td>
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<td>Journal of Transportation Engineering, the American Society of Civil Engineers</td>
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<tr>
<td></td>
<td>The journal – Public Transport: Planning and Operations</td>
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<tr>
<td></td>
<td>Traffic Engineering and Control</td>
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<td></td>
<td>Transportmetrica (<a href="http://www.transportmetrica.org/">http://www.transportmetrica.org/</a>)</td>
</tr>
<tr>
<td></td>
<td>Transportation Research</td>
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<td></td>
<td>Transportation Science</td>
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<tr>
<td></td>
<td><strong>Reports</strong></td>
</tr>
<tr>
<td></td>
<td>Technical reports by the Traffic and Transport Survey Division, Hong Kong Government</td>
</tr>
<tr>
<td></td>
<td>Transportation Research Records, Transportation Research Board</td>
</tr>
<tr>
<td></td>
<td>Transport Planning and Design Manual, Hong Kong Transport Department</td>
</tr>
<tr>
<td></td>
<td>TRRL reports, Transport and Road Research Laboratory</td>
</tr>
</tbody>
</table>
Subject Code: CSE562

Subject Title: Traffic Engineering and Control

Credit Value: 3

Level: 5

Pre-requisite / Co-requisite / Exclusion:
Recommended background knowledge:
It is expected that students will have a fundamental understanding of mathematics and physics consistent with undergraduate level study in civil engineering.

Objectives:
To provide knowledge of fundamental traffic flow characteristics and associated analytical methods in the planning, design, and control of transport systems.

Intended Learning Outcomes:
Upon completion of the subject, students will be able:
a. to visualize the applications of theories and practical concepts on topics of the traffic engineering and control;
b. to apply the theories and practical measures on solving the encountered traffic problems;
c. to convey the ideas and proposed traffic control schemes to others with the support of logical concepts and survey data; and
d. to work independently and collaborate with others with minimal supervision.

Subject Synopsis/Indicative Syllabus:
Keyword Syllabus:
i) Traffic Engineering Fundamentals
Elements of traffic engineering; the road user, the vehicle, the road and geometric design; speed-flow-density relationship; traffic steam and capacity; level of service concept.

ii) Traffic Studies and Analysis
Volume studies; speed studies; travel time and delay studies; capacity analysis; parking studies; data collection technique.

iii) Traffic Management Techniques
Urban transportation problems; comprehensive traffic management; one way system, access control, ban turns, parking control; bus priority measures; pedestrian measures.

iv) Junction Design and Control
Types of all-grade junction; design of signal controlled junctions, priority junctions and rotary junctions; co-ordination of traffic signal systems.

v) Traffic Safety and Control Devices
Street lighting; function and design; traffic signs types and siting; carriageway marking; accident studies; safety measures.

vi) Analytical Methods
Traffic flow; volume speed flow relationship; headway and Gap Distributions; fitting distribution to mathematical functions; traffic simulation; microscopic and macroscopic models; traffic Flow Theory; car following theory, queuing theory; practical applications of traffic flow theories.

vii) Field/Laboratory Work

Teaching/Learning Methodology:
Lectures will cover the general traffic engineering models, traffic theories, traffic control methods and applications;
Assignments, such as traffic signal control, junction design or traffic modeling will be given to students. Students need to conduct the traffic survey, data analysis and model formulation.

Presentations and discussions in tutorials provide students a ground for polishing their presentation and communication skills.

Assessment Methods in Alignment with Intended Learning Outcomes:

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weightings</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Assessment</td>
<td>30%</td>
<td>√</td>
</tr>
<tr>
<td>2. Written Examination</td>
<td>70%</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 courseworks and case study discussions
Written examination is evaluated by final examination.

Reading List and References:


### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>CSE575</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Sustainable Development Strategy</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Pre-requisite</td>
<td>Nil</td>
</tr>
<tr>
<td>Corequisite/Exclusion</td>
<td></td>
</tr>
</tbody>
</table>

#### Objectives
- To provide students with an overview and understanding of the current issues in the planning for sustainable development. This will equip students with a sound knowledge to appreciate the methods of sustainable development and environmental planning.
- Upon completion of the subject, students will be able to:
  1. **To understand the fundamentals of sustainable development strategy;**
  2. **To identify diverse problems arising from changing constraints that influence sustainable development, such as economic, environmental, and social considerations;**
  3. **To apply concepts and knowledge to real life application, such as energy planning.**
  4. **To assess and discuss the ethical and social implications of actions and proposals;**
  5. **To cope with the challenges and developments in future sustainability.**

#### Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Category</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A</td>
<td>Professional/academic knowledge and skills</td>
</tr>
<tr>
<td>a.</td>
<td>Professional/academic knowledge and skills</td>
</tr>
<tr>
<td>b.</td>
<td>Professional/academic knowledge and skills</td>
</tr>
<tr>
<td>c.</td>
<td>Professional/academic knowledge and skills</td>
</tr>
<tr>
<td>d.</td>
<td>Professional/academic knowledge and skills</td>
</tr>
<tr>
<td>e.</td>
<td>Professional/academic knowledge and skills</td>
</tr>
</tbody>
</table>

| Category B | Attributes for all-roundedness |
| a. | Communicate logically and lucidly through seminars and presentations; |
| b. | Work effectively with others in team work, and take responsibility for an agreed area of a shared activity |
| c. | Work independently; |
| d. | Recognize the need for, and developed an ability to engage in life-long learning; |
| e. | Develop critical thinking, creative thinking, and systematic thinking in perceiving, understanding and solving practical problems. |

#### Specific assessment methods and grading schemes

<table>
<thead>
<tr>
<th>Method</th>
<th>Intended Learning Outcomes</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>teaching and learning outcomes</td>
<td>a</td>
</tr>
<tr>
<td>b.</td>
<td>teaching and learning outcomes</td>
<td>b</td>
</tr>
<tr>
<td>c.</td>
<td>teaching and learning outcomes</td>
<td>c</td>
</tr>
<tr>
<td>d.</td>
<td>teaching and learning outcomes</td>
<td>d</td>
</tr>
<tr>
<td>e.</td>
<td>teaching and learning outcomes</td>
<td>e</td>
</tr>
</tbody>
</table>

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

- Lectures
- Case studies
- Demonstrations
- Project
- Assignment
- Exam

#### Assessment Methods

- **Lectures:** 30 Hrs.
- **Case Study and demonstration:** 12 Hrs.
- **Project:** 30 Hrs.
- **Assignment:** 20 Hrs.
- **Exam:** 50 Hrs.

#### Intended subject learning outcomes to be assessed

<table>
<thead>
<tr>
<th>Methods in methods/tasks</th>
<th>weightings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching/Learning</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Examination

- Students must attain at least grade D in coursework and final examination to be able to attain a passing grade in the overall result.

#### Subject Synopsis/Indicative Syllabus

1. **Sustainable Development Strategies**
   - Concepts of sustainable development; Agenda 21; themes; long-term approaches to sustainable development
   - Sustainable Development Strategies
   - Environmental problems and issues in Hong Kong

2. **and overseas.**

3. **The Planning System in Hong Kong**
   - The planning hierarchy: stakeholders of sustainable development
   - Communications for effective participation
   - Principles and framework for strategy development

4. **New industries, renewable energy, sustainable transport concepts; financial basis for strategies; monitoring and evaluation of strategies.**

5. **Nature and Countryside Conservation**
   - Conservation measures for wetland and marine parks: cases of regional and local conflicts

6. **Online resources centre of the Sustainable Development Division, HKSAR Government**

#### Reading List and References

- Works effectively and efficiently in team work, and take responsibility for an agreed area of a shared activity
- Develops critical thinking, creative thinking, and systematic thinking in perceiving, understanding and solving practical problems.
Subject Description Form

Subject Code: EE207
Subject Title: Engineering Electromagnetics
Credit Value: 2
Level: 2
Pre-requisite/Co-requisite/Exclusion: Nil

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:

a. Be able to apply mathematical techniques to formulate the fundamental field equations and to analyse electromagnetic phenomena related to electrical engineering systems.

b. Select the most appropriate laws/theorems/solution techniques for electromagnetic field analysis.

c. Be able to apply electromagnetic theory to the design of practical electromagnetic devices and components.

d. Have had hands-on experience in electromagnetic measurements and be able to compare/appreciate different kinds of field plotting mechanisms.

e. Appreciate the engineering applications of electromagnetic theory.

f. Appreciate the importance of electromagnetics from a historical perspective.

g. Interpret the physical meaning and phenomena behind mathematical equations and computed results.

Subject Synopsis/Indicative Syllabus:


Laboratory Experiments:
Field plotting using the Electrolytic tank.

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 to have an in-depth understanding of the fundamentals of electromagnetic and apply the fundamental theory and knowledge learned to practice.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>a b c d e f g</td>
</tr>
<tr>
<td>Tutorials</td>
<td>√ √ √ √</td>
</tr>
<tr>
<td>Experiments</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. Examination</td>
<td>60%</td>
<td>a b c d e f g</td>
</tr>
<tr>
<td>2. Test</td>
<td>25%</td>
<td>√ √ √ √</td>
</tr>
<tr>
<td>3. Laboratory</td>
<td>10%</td>
<td>a b c d e f g</td>
</tr>
<tr>
<td>4. Home work or in-class exercises</td>
<td>5%</td>
<td>√ √ √</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>a b c d e f g</td>
</tr>
</tbody>
</table>

The outcomes on mathematical techniques, basic concepts and theories are assessed by the usual means of examination and test whilst those on hands-on experience in electromagnetic measurements, engineering applications are evaluated by the experiments and reports.

Student Study Effort Expected:

Class contact:
- Lecture/Tutorial: 28 Hrs.
- Laboratory: 6 Hrs.

Other student study effort:
- Laboratory preparation/report: 10 Hrs.
- Self-study: 24 Hrs.

Total student study effort: 68 Hrs.

Reading List and References:

Reference books:
# Subject Description Form

**Subject Code**: EE3021  
**Subject Title**: Electromechanical Energy Conversion  
**Credit Value**: 3  
**Level**: 3  
**Pre-requisite/Co-requisite/Exclusion**: Nil  

## 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
Delivery of the subject is mainly through formal lectures and complemented by tutorials. Excel programmes are used to clarify concepts of electric machines learnt and for conducting “what-if” analysis. Laboratory work provides student hands-on experience in operation and control of practical machines, while report-writing enables students to practice written and graphic presentation skills.

<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>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Laboratory work</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. Examination</td>
<td>60%</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>2. Tests</td>
<td>20%</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>3. Laboratory work and reports</td>
<td>15%</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>4. Assignment</td>
<td>5%</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</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**:
- Lecture/Tutorial: 36 Hrs.
- Laboratory: 12 Hrs.
- Other student study effort:
  - Revision, self-study, and assignment: 48 Hrs.
  - Write-up of laboratory reports: 6 Hrs.
- **Total student study effort**: 102 Hrs.

## Reading List and References
**Reference books**:
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE3031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Power Electronics and Drives</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite/ Co-requisite/ Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

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 analyze 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.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment method/tasks</th>
<th>% weighing</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>c</td>
</tr>
<tr>
<td>2. Class tests</td>
<td>30%</td>
<td>c</td>
</tr>
<tr>
<td>3. Laboratory performance &amp; reports</td>
<td>10%</td>
<td>b, c</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

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

- **Lecture/Tutorial**: 36 Hrs.
- **Laboratory**: 12 Hrs.
- **Self-study**: 42 Hrs.

Total student study effort: 102 Hrs.

Reading List and References

Subject Description Form

Subject Code: EE3041

Subject Title: Power Transmission and Distribution

Credit Value: 3

Level: 3

Pre-requisite/Co-requisite/Exclusion: Nil

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:
1. Have acquired the fundamental knowledge and analytical techniques on electrical power systems.
2. Be able to identify, analyze, and solve technical problems to power system design, planning, and operation, making use of mathematics and engineering techniques.
3. Be able to work in teams when conducting laboratory investigations.
4. 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.

Teaching/Learning Methodology

<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>√</td>
</tr>
<tr>
<td>Experiments</td>
<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 |
---------------------------------|-------------|-----------------------------------------------|
1. Examination                  | 60%         | a b c d                                        |
2. Class Test                   | 25%         | √                                              |
3. Laboratory Performance & Report | 15%     | √                                              |
Total                           | 100%        |                                                |

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

<table>
<thead>
<tr>
<th>Class contact</th>
<th>36 Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td>12 Hrs.</td>
</tr>
</tbody>
</table>

Other student study effort:
- Laboratory preparation/report | 12 Hrs.
- Self-study | 42 Hrs.

Total student study effort | 102 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:
<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Experiments</th>
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</thead>
<tbody>
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<td>Specific assessment methods</td>
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<td>Marks</td>
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<td>✔️</td>
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<tr>
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<th>Lectures</th>
<th>Tutorials</th>
<th>Experiments</th>
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</thead>
<tbody>
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<td>Specific assessment methods</td>
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<td>Marks</td>
<td>✔️</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Subject Code</td>
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<td>Subject Title</td>
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<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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<tr>
<td>Effort Expected</td>
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<tr>
<td>Student Study Effort</td>
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</table>

<table>
<thead>
<tr>
<th>Intended Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of the subject, students will be able to:</td>
</tr>
<tr>
<td>1. Model a realistic plant with time domain and frequency domain analysis techniques;</td>
</tr>
<tr>
<td>2. Design and implement control systems using classical and modern techniques;</td>
</tr>
<tr>
<td>3. Analyze the performance of control systems using Bode diagrams and root locus methods;</td>
</tr>
<tr>
<td>4. Apply the principles of control system design to real-world engineering problems;</td>
</tr>
<tr>
<td>5. Communicate results of their analyses and designs clearly and effectively.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intended Subject Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To introduce the principles and techniques for system modeling and analysis so as to enable</td>
</tr>
<tr>
<td>2. To introduce the principles and techniques used in the analysis and design of feedback control</td>
</tr>
<tr>
<td>3. To introduce the constraints in practical signal measurement, system modeling and controller</td>
</tr>
<tr>
<td>4. To provide the foundation on signal processing algorithms for the later subjects; and</td>
</tr>
<tr>
<td>5. To develop in-depth applications of concepts and design techniques in digital control, filtering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reading List and References</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Laboratory Experiments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to control system analysis:</td>
</tr>
<tr>
<td>2. Frequency domain analysis of linear systems:</td>
</tr>
<tr>
<td>3. Stability and transient analysis:</td>
</tr>
<tr>
<td>4. Lab report:</td>
</tr>
<tr>
<td>5. Laboratory report:</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject Synopsis/Indicative Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to control system analysis:</td>
</tr>
<tr>
<td>2. Frequency domain analysis of linear systems:</td>
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</tr>
<tr>
<td>4. Lab report:</td>
</tr>
<tr>
<td>5. Laboratory report:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab Report:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to control system analysis:</td>
</tr>
<tr>
<td>2. Frequency domain analysis of linear systems:</td>
</tr>
<tr>
<td>3. Stability and transient analysis:</td>
</tr>
<tr>
<td>4. Lab report:</td>
</tr>
<tr>
<td>5. Laboratory report:</td>
</tr>
</tbody>
</table>
### Lectures and Tutorials
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Guest lectures/industrial seminars on selected topics will be given throughout the semester to help students’ knowledge in real-life safety issues and to attain comprehensive understanding with critical and analytical thinking. Interactive sessions are introduced to encourage better preparation and hence understanding of the subject. Student group and industrial visits are designed to supplement the learning materials with more practical understanding so that the students are encouraged to take extra readings and to look for relevant information.

### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code: E1310</td>
<td>3</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td>Subject Title: Safety in Systems Engineering</td>
<td>3</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td>Credit Value: 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-requisite/ Corequisite/ Exclusion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. To introduce students to the importance of safety analysis from the system level;</td>
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</tr>
<tr>
<td>2. To familiarise students with the techniques of safety analysis and system management in system reliability;</td>
<td></td>
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<tr>
<td>3. To introduce students to the standards and professional organisations and authorities in safety and assurance practices;</td>
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<tr>
<td>4. To provide students with the difficulties and applications of safety management in transportation systems.</td>
<td></td>
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</tr>
</tbody>
</table>

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

a. Be able to conduct simple safety analysis for an engineering system on the system level; |
b. Select the most appropriate techniques for safety analysis and management; |
c. Understand and follow the safety audit and standard requirements set by the corresponding professional organisations and authorities; |
d. Be able to work in a team environment effectively and efficiently to solve case studies involving realistic scenarios relating to safety issues; |
e. Be able to interpret system assurance reports and to appreciate the values of safety management in system reliability; |
f. Develop communication skills by reports and presentations to demonstrate the findings of the study.

### Assessment Methodology

<table>
<thead>
<tr>
<th>Assessment Methodology</th>
<th>Specific Assessment methods/tasks</th>
<th>% Intended Subject Learning Outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exam</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>2. Class test</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>3. Presentations</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>4. Final report</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

The assessment methods include an examination, a class test, presentations and a final report. The examination assesses the technical competence of students in safety in systems and presentation skills. Presentations assess students’ ability to apply the theories learned in class to practical projects and to communicate the results effectively.

### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Effort Expected</th>
<th>Indicative Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Safety analysis techniques: Fault tree analysis, event tree analysis, hazard analysis, reliability block diagrams.</td>
</tr>
<tr>
<td>2.</td>
<td>Reliability and risk analysis: Hazard identification and analysis, quantitative risk analysis, fault tree analysis, probability and combinatorial methods.</td>
</tr>
<tr>
<td>5.</td>
<td>Safety committee: System assurance programmes, system safety reports and audit.</td>
</tr>
<tr>
<td>7.</td>
<td>Safety in new technologies: Risk analysis and management, safety and system assurance programmes.</td>
</tr>
</tbody>
</table>

### Reading List and References

- 2. B.S. Dhillon, Reliability, Quality and Safety for Engineers, CRC Press, 2005

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### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EE3502</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Summer Practical Training</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3 training credits (not counted towards GPA)</td>
</tr>
<tr>
<td>Level</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

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

#### Intended Learning Outcomes
Upon completion of the subject, students will be able to:
- Develop and deliver a learning portfolio for presenting learning experiences and outcomes.
- Demonstrate the awareness of the practical contexts in engineering.
- Appreciate the work of others in an industrial/engineering working.
- Develop a resourceful and speculative approach in making contacts and sourcing information.
- Demonstrate good working practices to show a developing maturity and sense of responsibility.

### Subject Synopsis/Indicative Syllabus

#### INDICATIVE CONTENT
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 with at least 2 weeks (1 credit) of valid WIE activities as recognized by the University. Students are required to indicate the expected training experiences prior to the commencement of their placements, as well as to submit a learning portfolio to report on the learning outcomes and achievements.

Accordingly, the following learning support activities will be coordinated.

1. **Orientation**
   - **Objective**: 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:
     - Basic skills in undertaking practical training
     - Planning and scheduling for successful completion of assessment instruments
     - Information on searching national/international work-base employment, attachments etc.

2. **Progress Monitoring**
   - **Objective**: During the practical training, students should maintain a weekly training journal to identify their progress of their training. The weekly journal may include:
     - **Location**: Summarise where practical training took place and where the work team fits into the overall host organisation.
     - **Responsibilities**: Describe the actual responsibilities. Explain the role in terms of the mission of the immediate work team.
     - **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.
     - **Outcome**: Describe the placement experiences and major achievements with concrete examples.

3. **Learning Evaluation**
   - **Objective**: After returning from the practical training, students are required to submit a learning portfolio about the work term experience. It provides an opportunity for the student to reflect upon the training gained at the work site. The framework of the portfolio includes:
     - **Collection**: Students collect relevant artifacts produced for the employer during the work term and/or from company interviews etc.
     - **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 what 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.

#### Examples of valid WIE activity
- Full-time placement in a suitable organization as part of a sandwich programme.
- Summer placement in a suitable organization participating in the Preferred Graduate Development Programme.
- Any other placement in any suitable external organization for a specified period of time.
- Relevant placement as student helpers in PolyU administrative departments and the Industrial Centre.
- Assisting in PolyU 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 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.

The student works on his final-year degree project which involves an industrial partner or external client. The student may not be placed in the company but make frequent visits to ensure that the project will meet the specifications required by the company/client.

#### 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.

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

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

<table>
<thead>
<tr>
<th>Specific assessment methods/tools</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learning Portfolio</td>
<td>80%</td>
<td>a b c d e</td>
</tr>
<tr>
<td>2. Placement Questionnaire</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
</table>

The outcomes on this subject are assessed by means of student learning portfolios as well as questionnaire to industrial supervisors.

<table>
<thead>
<tr>
<th>Student Study Effort Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class contact:</td>
</tr>
<tr>
<td>Other student study effort:</td>
</tr>
<tr>
<td>• Industrial Placement</td>
</tr>
</tbody>
</table>

#### Reading List and References
Nil
After returning from practical training, students are required to submit a learning portfolio about their work experience. It provides an opportunity for the student to reflect upon their learning gained at the workplace and to consolidate their learning to facilitate future learning, such as in their capstone projects.

### Learning Evaluation

- **Orientation**: Assisting students in understanding the assessment components, such as the learning portfolio, reflective practice, and feedback mechanisms.
- **Selection**: Students reflect on their workplace experiences and select what they wish to include in their learning portfolio.
- **Reflection**: Students articulate their thinking about each piece in their portfolio and reflect 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 insightful about their future learning, such as formulate the objectives of their Final Year Project.
- **Evaluation**: Reflecting on the learning portfolio to identify areas for improvement and future learning.
- **Study**: Students analyze the learning outcomes and effects.
- **Analysis**: Students reflect on their learning experiences and outcomes, and draw connections to future learning.

### Examples of Valid WIE Activity

- Summer placement in a suitable organization participating in the Preferred Graduate Development Programme.
- Any other placement in any suitable external organization for a specified period of time.
- Relevant placement as student helpers in PolyU administrative departments and the Industrial Centre.
- Relevant placement as a student helped by PolyU administrative departments.
- Relevant placement as an external organization for a specified period of time.

### Credit Value

- **Subject Code**: EE4001
- **Level**: Nil
- **Pre-requisite/Co-requisite/Exclusion**: Nil
- **Credit Value**: 22 training credits
- **Objectives**: Students should:
  1. Develop and deliver a learning portfolio for presenting learning experiences and outcomes.
  2. Demonstrate awareness of the practical contexts in engineering.
  3. Appreciate the work of others in an industrial/engineering work.
  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.

### Intended Learning Outcomes

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

### 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 44 weeks (22 credits) industrial placement. A training tutor will then be allocated. Preferably, students should be trained under Scheme A, which involves industrial training programmes that are approved by the Hong Kong Institution of Engineers. In order to cater for the needs of different industries, schools and industries, certain programmes will also be arranged by the training tutor during the training period. The training tutor will provide training support to the student, in line with the training programme, and will also provide guidance on the training portfolio. The training tutor will ensure that the training portfolio meets the requirements of the training programme. The training tutor will also provide feedback to the student on the training portfolio.

### Teaching/Learning Methodology

#### Teaching Methodology

- **Teaching Methods:**
  - Class lectures
  - Laboratory sessions
  - Group discussions
  - Individual assignments
  - Group projects
  - Guest lectures
  - Case studies
  - Field trips
  - Online resources

#### Learning Methodology

- **Learning Methods:**
  - Active learning
  - Collaborative learning
  - Reflective learning
  - Problem-based learning
  - Skill-based learning

### Assessment

- **Assessment Methods:**
  - Assignments
  - Exams
  - Presentations
  - Group projects
  - Portfolios

### Reading List and References

- **Main Text:**
  - Reference 1
  - Reference 2
  - Reference 3

- **Supplementary Materials:**
  - Reference 4
  - Reference 5

### Skills and Knowledge

- **Skills:**
  - Communication skills
  - Teamwork
  - Problem-solving
  - Time management

- **Knowledge:**
  - Basic engineering principles
  - Industry-specific knowledge
  - Cultural and ethical considerations

### Learning Support Activities

- **Tutor:** The training tutor will provide training support to the student, in line with the training programme, and will also provide guidance on the training portfolio. The training tutor will ensure that the training portfolio meets the requirements of the training programme.

- **Assessment:** The training tutor will provide feedback to the student on the training portfolio and ensure that the training portfolio meets the requirements of the training programme.

### Subject Synopsis/Indicative Syllabus

This subject provides students with an opportunity to enhance their professional skills and knowledge. It prepares students for their future careers by providing them with an understanding of the practical aspects of engineering. Through practical training, students gain practical experience and develop skills that are essential for their professional development. The subject also provides students with an opportunity to reflect on their learning experiences and outcomes, and draw connections between work experience and university-based learning.
# Subject Description Form

## Subject Code
EE4041

## Subject Title
Engineering Project Management

## Credit Value
3

## Level
4

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

## Objectives
1. To introduce the concept of modern engineering project management to students.
2. To integrate theory and practical knowledge of engineering project development & execution to students.
3. To apply the principle of engineering project management to practical examples.

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

a. Understand engineering project management, development & execution stages.
b. Analyse engineering project management skills.
c. Be aware of new technologies development trends and environmental impacts of engineering projects.

## Subject Synopsis/Indicative Syllabus
1. **Engineering project definitions and stages:** Characteristics of engineering projects. Life cycle models. Strategic and tactical issues. Factors affecting the success of project management.
3. **Project screening and selection:** Check list and scoring models. Benefit-cost analysis. Cost effectiveness analysis.

## Teaching/Learning Methodology
Lectures and tutorials are the primary means of conveying the basic concepts and theories. Practical applications are given through case studies and mini-project, in which the students are encouraged to develop critical and analytical thinking to solve problems.

## Assessment Methods in
Specific assessment | % | Intended subject learning outcomes
--- | --- | ---
Lectures | ✓ | ✓ | ✓
Tutorials | ✓ | ✓ | ✓
Mini-project | ✓ |  

## Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>methods/tasks</th>
<th>weighting</th>
<th>be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Examination</td>
<td>60%</td>
<td>✓</td>
</tr>
<tr>
<td>2. Class test</td>
<td>20%</td>
<td>✓</td>
</tr>
<tr>
<td>3. Mini-project and report</td>
<td>20%</td>
<td>✓</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

The usual means of examination and test are adopted to evaluate the concepts and theories. The important components of integrating theories into problems and applying knowledge in case studies are assessed by mini-projects and group-project reports.

## Student Study Effort Expected

- **Class contact:**
  - Lecture/Tutorial: 42 Hrs.
- **Other study effort:**
  - Self-study: 50 Hrs.
  - Mini-project and report: 10 Hrs.

**Total student study effort:** 102 Hrs.

## Reading List and References

**Reference books:**

### Subject Description Form

**Subject Code**: EE405

**Subject Title**: Energy Utilisation and Management in Transportation

**Credit Value**: 3

**Level**: 4

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

Pre-requisite: CSE291 & EE3021

### Objectives

1. To enable students to understand energy conversion and utilization process used in transportation systems.
2. To provide students with a solid knowledge on concepts of energy management and techniques in improving energy efficiency of transportation systems.
3. To enable students to analyse the efficiency of energy conversion processes.
4. To prepare students to analyse environmental impacts from transportation systems and understand ways for improvements.

### Intended Learning Outcomes

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

- **a.** Identify the applications of various common types of energy conversion and utilization technologies used in different modes of transportation.
- **b.** Identify underlying principles of energy management and different engineering measures in improving energy efficiency in transportation systems.
- **c.** Apply basic reasoning to analyse impacts of environment from the utilization of energy in transportation systems.

### Subject Synopsis/Indicative Syllabus

1. **Energy utilisation**: Basics of alternators, converters, auxiliary power unit (APU) for automobiles, trains and aircrafts; analysis of energy utilization in motor vehicles and train units on a fuel-to-wheel basis; rolling stock energy consumption and regeneration; relationship between passenger flow and energy consumption.
2. **Energy management**: Concept of energy management; comparisons of fuel-to-wheel energy efficiency in different modes of transportation; integrated transport planning for energy efficiency; energy efficiency measures in transportation sector; energy management systems in gasoline, diesel, hybrid and electric cars; energy management in "peak-hour syndrome"; electricity buffering; use of battery energy storage systems (BESS) in mass transportation; charging station, contingency for power failure; backup supplies.
3. **Environmental aspects**: Environmental impacts of energy utilization of transportation systems; basic principle of emission control of automobiles.
4. **Hydrogen economy**: Concept of Hydrogen Economy and applications of hydrogen as fuel for transportation systems; types of automobile hydrogen engines and its principle of operation; types of fuel cells and its applications in automobiles.
5. **Renewable fuels for automobiles**: Bio-diesels, solar cars, solar aircraft.

### Reading List and References


### Reference books:

Subject Description Form

Subject Code  | EE406
---|---
Subject Title  | Risk and Reliability Analysis on Asset Management
Credit Value  | 3
Level  | 4
Pre-requisite/Co-requisite/Exclusion  | Pre-requisite: CSE291

Objectives
1. To provide the concepts and techniques on risk management and reliability analysis on engineering systems
2. To apply reliability analysis and system assurance analysis on engineering systems including transportation systems
3. To relate maintenance activities to system assurance and reliability management

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

a. Able to perform basic reliability analysis on engineering systems including asset on transportation systems
b. Able to demonstrate fundamental understanding on concepts of system assurance
   c. Able to recognize the relationship between maintenance and reliability

Subject Synopsis/Indicative Syllabus
1. Basics: Facilities and assets in transportation systems; statistical modelling and numerical optimization methods and their applications to managing systems on transportation facilities and assets; integrated treatment of quantitative and analytical methods
2. Reliability analysis: Fault tree analysis, failure mode effects and criticality analysis (FMECA), reliability growth models, Weibull analysis, reliability block diagram, reliability apportionment and prediction, reliability mathematics
3. System assurance analysis: Hazard & operability study, event tree analysis, cause-consequence analysis, preliminary hazard analysis, operation & support hazard analysis, cost benefit analysis, qualitative and quantitative risk analyses
4. Maintenance: Reliability-centred maintenance, condition-based monitoring maintenance; scheduling and reliability impact

Teaching/Learning Methodology
The concept of risk management, reliability analysis and system assurance analysis will be presented through lectures and tutorials with reference to real-life applications on transportation systems. Students will be required to form groups to work through cases covering practices on reliability analysis, system assurance analysis and maintenance issues in transportation systems. 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.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>a b c</td>
</tr>
<tr>
<td>Case Studies and Presentation</td>
<td>a b c</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>a b c</td>
</tr>
<tr>
<td>2. In-class Test</td>
<td>20%</td>
<td>a</td>
</tr>
<tr>
<td>3. Cases study &amp; presentation</td>
<td>20%</td>
<td>a b c</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

The outcomes on the concepts of analysis are assessed by the usual means of examination and test whilst those on analytical skills, problem-solving techniques and presentation of findings, as well as technical reporting and teamwork, are evaluated by the case study exercise.

Student Study Effort Expected

Class contact:
- Lecture/Tutorial 36 Hrs.
- Presentation 6 Hrs.

Other student study effort:
- Case study and report 12 Hrs.
- Self-study 48 Hrs.

Total student study effort 102 Hrs.

Reading List and References

Textbooks:
3. B.S. Dhillon, Engineering maintainability: how to design for reliability and easy maintenance, Gulf Publishing, 1999

Reference books:
Subject Description Form

Subject Code  EE4121
Subject Title  Individual Project
Credit Value  9
Level  4

Pre-requisite/ Co-requisite/ Exclusion
Pre-requisite: EE3111 (for Prog. 41070) or EE3141 (for Prog. 41080) and Subject to the approval of the Project Coordinator

Objectives
1. The project accounts for more than 30% of the total assessment in Level 4 and it provides an opportunity for students to apply specialised professional engineering knowledge independently in the creative design, implementation, monitoring and evaluation of an engineering project. To achieve this goal, students are required to identify key engineering problems, to solve them and to communicate the findings in oral and written report format. The project is included in the Programme to cover some major professional and all-rounded learning outcomes and the assessment should provide evidences on how well students have achieved those outcomes.

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

a. To apply specialized knowledge independently.
b. To identify key engineering problems, to solve them and to communicate what is achieved orally and in a written report.
c. To develop a project which is creative, rich in intellectual content and sufficiently challenging.
d. To monitor the progress of project from concept to final implementation and testing, through problem definition and the selection of alternative solutions.
e. To synthesize and apply their knowledge and analytical skills gained in various engineering domains.
f. To build self-confidence, demonstrate independence, and develop professionalism by successfully completing the project in a competent manner.

Subject Synopsis/ Indicative Syllabus

Choice of Project
Projects are expected to be proposed by the students. They may also be proposed by academic members of staff, or jointly by student and staff. Industrial experience and staff research and consultancy activities are fertile ground for ideas. Project proposals must include an objective, describe the method of approach, describe any innovative features, and provide an estimate of cost. The suitability of a proposal may be judged by factors such as its intellectual level, relevance to the aims of the Programme, practicality in terms of time, funding and availability of resources.

Project Plan
At the beginning of the project, students are required to submit a clear project plan (formal project proposal). The plan should not be too long but should cover such matters as:

- problem statement
- brief literature research
- initial problem identification
- preliminary suggestion on methodology
- division outline of hardware and software
- preliminary time schedule
- cost estimate

Interim Progress Report
Between the first and second semester in Year 3, the students have started their projects for a few months and they need to submit an Interim Progress Report to summarise their progress to date. This gives the supervisor a more formal opportunity than at discussions to indicate his assessment of student progress and to eliminate discrepancies if necessary. Problem cases are brought to the notice of the subject coordinator by supervisors.

Final Project Report
A good project schedule includes adequate time for preparing a report of the appropriate standard. One hardcopy copy and two CDs are submitted, before the examination period. These will be given to the Assessment Panel (see Assessment below) for understanding of the student’s work and for assessment purposes. To ensure that the project reports are prepared properly and of appropriate standard, students must first submit a draft of the report to the supervisor for comments before final submission.

At the end of the 2nd semester, each project is assessed by an Assessment Panel of three members, including a Chairman, an independent examiner and the project Supervisor. The Chairman and the independent examiner should have sufficient knowledge of the subject area, so as to form an independent opinion of the technical merit of the project and to independently assess achievements.

The Project Supervisor will provide information on student’s progress, originality, initiative and ability to work independently. The Supervisor will also be in a position to contribute views on the student’s technical achievement. All members of the Assessment Panel will read the project report before the assessment meeting. The Assessment Panel will reach their decision after:

- listening to the student’s presentation,
- examining him orally on his work, and
- seeing a demonstration of the project’s outcome.

In assessing the project, the panel will consider, normally with equal weight, the following aspects:

a. Intellectual achievement;
b. Depth of understanding of the topic and the relevant allied topics;
c. Quantity and quality of work done, including design and construction of equipment, experimentation, mathematical models, program writing, verification;
d. Presentation including the written report, seminar presentation and response to questions.

The Chairman will ensure that all aspects of the study are thoroughly discussed by the Panel before arriving at a consensus on an overall grade to be awarded to the project. In arriving at their decision, the Panel will bear in mind their experiences in respect of the achievements in other projects in the Department in the current and previous years.

If no consensus arises as to the overall grade to be awarded to the project, each panel
member (i.e. the Chairman, the project supervisor and the independent examiner) will independently award grades to the project on an assessment form with written justification for their grades. A grade from the Assessment Panel will then be derived by averaging (with the same weight) the conversion marks for the grades 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

If a student decides to carry the project which he/she developed in subject EE3111 (for Prog. 41070) or EE3141 (for Prog. 41080), he/she should give details on updated materials in every section in this formal project proposal, as compared with his previously submitted work in EE3111 or EE3141.

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 project duration. Two hardcopies are required. The length of the proposal should be limited to 15 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 students are advised to form a framework for the report first, 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 appendixes.
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 the 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.

<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>✓ ✓</td>
</tr>
<tr>
<td>2. Interim progress report</td>
<td>15%</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>3. Final report</td>
<td>50%</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>4. Presentation and demonstration</td>
<td>30%</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>✓ ✓ ✓ ✓</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: 5 Hrs.
  - Individual Discussions with supervisor: ~15 Hrs.

Other student study effort:

- information search, self study, execution of the ~240 Hrs.
Subject Description Form

Subject Code: EE435

Subject Title: Electrical Systems in Automobiles

Credit Value: 3

Level: 4

Pre-requisite/Co-requisite/Exclusion: Nil

Objectives
1. To familiarise students with the basic knowledge of power distribution in automotive systems.
2. To enable students to understand the operation of electrical and electronic part and components in vehicles.
3. To enable students to learn the reliability and diagnosis of the electrical system of the vehicle.
4. 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. Have the ability to acquire a good understanding of electrical distribution of vehicle.
b. Be able to understand and analyse the electrical system, part and components of a vehicle.
c. Understand the correlation of the electrical components of a vehicle and be able to develop the skill of design.
d. Have a global view on recent development on power electronics for automotive engineering.
e. Be perceptive of applications of electrical systems for other conventional vehicle, electrical vehicle and hybrid electrical vehicle.
f. Be able to present the understanding of the basic requirements of electrical engineering to automotive environment.
g. Appreciate the need to develop a good combination of theoretical background and practical engineering sense in order to cope with problems in their pursuit of an engineering career.

Subject Synopsis/Indicative Syllabus

1. **Power distributions in vehicles**: Electrical distribution systems in cars, wiring and power bus topology, battery system, wires and connector design, groundings and current protections.
2. **Electro-mechanical devices**: Ignition systems, cranking systems, motion control for electrical auxiliary system, electric power steering, lighting systems, heating and air-conditioning systems, active suspension.
3. **Electronic systems and control**: Basic electronic control systems, computerized engine control, control network protocols, starter and alternator, entertainment systems, dashboard instrumentation and signalling circuits.
4. **Test and reliability**: Automotive electronics reliability, electrical transients and protection, diagnosis & services for electrical systems.

Laboratory Experiments:
Each student is required to attend laboratory section which covers the above selected areas. Written report is needed.

Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Practical experiences on power system for automobiles are given through Laboratory. 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>Lectures</td>
<td>a b c d e f g</td>
</tr>
<tr>
<td>Tutorials</td>
<td>√ √ √ √ √ √ √</td>
</tr>
<tr>
<td>Experiments</td>
<td>√ √ √ √ √ √ √</td>
</tr>
</tbody>
</table>

Assessment Methods in Alignment with Intended Learning Outcomes

1. **Examination**: 60%  
2. **Class Test**: 20%  
3. **Laboratory performance & reports**: 20%

Total 100%

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 system and parts design, as well as technical reporting and teamwork, are evaluated by experiments, mini-project and the reports.

Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th>Effort Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture/Tutorial</td>
<td>36 Hrs.</td>
</tr>
<tr>
<td>Laboratory/Case study</td>
<td>12 Hrs.</td>
</tr>
</tbody>
</table>

Other student study effort:

| Laboratory preparation/report | 12 Hrs. |
| Self-study | 42 Hrs. |

Total student study effort: 102 Hrs.

Reading List and References

Textbooks:
1. A. Emadi, “Handbook of automotive power electronics and motor drives, Taylor & Francis, 2005

Reference books:
1. J.D. Halderman, Automotive electricity and electronics; Upper Saddle River, N.J.: Pearson/Prentice Hall, 2005
Subject Description Form

Subject Code: EE437
Subject Title: Intelligent Transportation Systems
Credit Value: 3
Level: 4
Pre-requisite/Co-requisite/Exclusion: Pre-requisite: CSE291

Objectives
1. To introduce the intelligent techniques and their applications in transportation systems
2. To provide a sound understanding of the problems in transportation operations which require intelligence of various characteristics
3. To enable evaluation of appropriate methodologies and be aware of the design and implementation issues of advanced techniques.

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

a. Illustrate understanding of underlying principles of intelligent techniques
b. Explain the need of intelligent techniques in transportation systems
c. Identify the basic design concerns of intelligent transportation systems

Subject Synopsis/Indicative Syllabus
1. Intelligent systems: Expert systems, fuzzy logic systems, artificial neural networks, evolutionary computations, multi-agent systems.
2. Transportation applications: Advanced surveillance, navigation, communication, and computer technology; monitoring, analysis, evaluation, and prediction of transportation system performance and behavior; intervention strategies, feasibility studies, human factors, man-machine interfaces, institutional issues.
3. Design and implementation: Selection of methodologies, data collection and processing, control, communication and computation, decision systems, simulation, real-time systems.
4. Intelligent vehicle technologies: The car for the future, intelligent vehicle sensor technologies, micro-controllers and micro-electronic technology, vehicle optical sensor, radio frequency technologies for vehicle information systems, global positioning technology, intelligent vehicle detection and control technologies.

Teaching/Learning Methodology
The basic principles, intelligent techniques and design issues are discussed in lectures. Students are encouraged to keep abreast with the latest technologies by analysing an up-to-date intelligent transportation system through the mini-project.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>a √ b √ c √</td>
</tr>
<tr>
<td>Mini-projects</td>
<td>a √ b √ c</td>
</tr>
<tr>
<td>Presentations</td>
<td>a √ b √</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>√ a √ b √</td>
</tr>
<tr>
<td>2. Test</td>
<td>10%</td>
<td>√ a √ c</td>
</tr>
<tr>
<td>3. Mini-project</td>
<td>20%</td>
<td>√ a √ b</td>
</tr>
<tr>
<td>4. Presentation</td>
<td>10%</td>
<td>√ a √ c</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Examination allows assessment on outcomes covering principles, techniques and design, supplemented by the class test. Mini-project and presentation enable students to explore the latest technologies through survey and analysis, and facilitate evaluation of outcomes on techniques and design.

Student Study Effort Expected
Class contact: Lecture/Tutorial 42 Hrs.
Mini-project 25 Hrs.
Self-study 35 Hrs.
Total student study effort 102 Hrs.

Reading List and References
Reference books:
2. J.M. Sussman, Perspectives on Intelligent Transportation Systems (ITS), Springer, 2005
6. Artificial Intelligence and Intelligent Transportation Systems, National Academy Press, 2001
8. IEEE Transactions on Intelligent Transportation Systems, Institute of Electrical and Electronics Engineers
Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>ELC2501</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>University English I</td>
</tr>
<tr>
<td>Credit Value</td>
<td>2</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 aims to help students to study effectively in the University's English medium learning environment and, more specifically, to improve and develop their English language proficiency within a framework of academic contexts. In striving to achieve the two interrelated objectives, attention will be given to developing the core competencies the University has identified as vital to the development of effective life-long learning strategies and skills.

Syllabus

Subject Synopsis/Indicative Syllabus
This syllabus is indicative. The balance of the components, and the corresponding weighting accorded to each, will be based on the specific needs of the students.

1. **Written academic communication**
   - Identifying and employing functions common in written academic discourse; note-taking from reading and listening inputs; understanding and applying principles of academic text structure; developing paraphrasing, summarising and referencing skills; improving editing and proofreading skills; achieving appropriate tone and style in academic writing.

2. **Spoken academic communication**
   - Recognising the purposes of, and differences between, spoken and written communication in English in academic contexts; identifying and practising the verbal and non-verbal interaction strategies in oral presentations; explaining and presenting ideas that require the development and application of logical thinking.

3. **Reading and listening in academic contexts**
   - Understanding the content and structure of information delivered orally and in print; reading and listening for different purposes e.g. as input to tasks, and for developing specific reading or listening skills; using a dictionary to obtain lexical, phonological and orthographical information.

4. **Language development**
   - Improving and extending relevant features of students' grammar, vocabulary and pronunciation.

Teaching/Learning Methodology
The subject is designed to introduce students to the communication skills, both oral and written, that they may need to function effectively in academic contexts.

The study method is primarily seminar-based. Activities include teacher input as well as individual and group work involving drafting and evaluating texts, mini-presentations and discussions. Students will be referred to information on the internet and the ELC’s Centre for Independent Language Learning.

Learning materials developed by the English Language Centre are used throughout this course. Additional reference materials will be recommended as required.

<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>(Continuous assessment)</td>
</tr>
<tr>
<td>1. Short academic text</td>
</tr>
<tr>
<td>2. Team oral presentation</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

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

Students’ oral and writing skills are evaluated through assessment tasks related to the learning outcomes. Students are assessed on the accuracy and the appropriacy of the language used in fulfilling the assessment tasks, as well as the selection and organisation of ideas.

Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Seminars</td>
</tr>
</tbody>
</table>

Other student study effort:

- Classwork-related and project-related preparation and self-access work | 56 Hrs. |

Total student study effort | 84 Hrs. |

Reading List and References

Coursebook
- English Language Centre. (2009). *University English I.* Hong Kong: The Hong Kong Polytechnic University.

Recommended readings
# Subject Description Form

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject Code</strong></td>
<td>ELC2502</td>
</tr>
<tr>
<td><strong>Subject Title</strong></td>
<td>University English II</td>
</tr>
<tr>
<td><strong>Credit Value</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Pre-requisite / Co-requisite/ Exclusion</strong></td>
<td>ELC2501 University English I Nil Nil</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>To further develop those English language skills required by students to study effectively in the University’s English medium learning environment.</td>
</tr>
<tr>
<td><strong>Intended Learning Outcomes</strong></td>
<td>Upon completion of the subject, students will be able to communicate effectively in an academic context through: a. participating actively in academic discussions b. writing academic argumentative essays To achieve the above outcomes, students are expected to use language and text structure appropriate to the context and to critically select relevant information to develop a thesis and arguments in a text.</td>
</tr>
<tr>
<td><strong>Subject Synopsis/Indicative Syllabus</strong></td>
<td>This syllabus is indicative. The balance of the components, and the corresponding weighting, will be based on the specific needs of the students. <strong>Written Academic Communication</strong> - Understanding and applying principles of the text structure of persuasive and argumentative academic texts; further developing paraphrasing, summarising and referencing skills; improving editing and proofreading skills; achieving appropriate tone and style in academic writing. <strong>Spoken Academic Communication</strong> - Identifying and practising the verbal and non-verbal interaction strategies in academic discussions; explaining and presenting ideas that require the development and application of creative and critical thinking. <strong>Reading and Listening in Academic Contexts</strong> - Understanding the content and structure of ideas delivered orally and in print; distinguishing between 'fact' and 'opinion'. <strong>Language Development</strong> - Further improving and extending relevant features of grammar, vocabulary and pronunciation.</td>
</tr>
<tr>
<td><strong>Teaching/Learning Methodology</strong></td>
<td>The subject is designed to introduce students to the communication skills, both oral and written, that they may need to function effectively in academic contexts. The study method is primarily seminar-based. Activities include teacher input as well as individual and group work involving drafting and evaluating texts, mini-presentations and discussions. Students will be referred to information on the internet and the ELC’s Centre for Independent Language Learning. Learning materials developed by the English Language Centre are used throughout this course. Additional reference materials will be recommended as required.</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 (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Seminar discussion</td>
<td>40%</td>
<td>✓</td>
</tr>
<tr>
<td>2. Discursive essay</td>
<td>60%</td>
<td>✓</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:

Students’ oral and writing skills are evaluated through assessment tasks related to the learning outcomes. Students are assessed on the accuracy and the appropriacy of the language used in fulfilling the assessment tasks, as well as the selection and organisation of ideas.

## Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seminars</strong></td>
<td>28 Hrs.</td>
</tr>
<tr>
<td><strong>Classwork-related and project-related preparation and self-access work</strong></td>
<td>56 Hrs.</td>
</tr>
<tr>
<td><strong>Total student study effort</strong></td>
<td><strong>84 Hrs.</strong></td>
</tr>
</tbody>
</table>

## Reading List and References

**Coursebook**

English Language Centre. (2009). *University English II*. Hong Kong: The Hong Kong Polytechnic University.

**Recommended readings**


Subject Description Form

Subject Code: ELC3508

Subject Title: English for Effective Workplace Communication

Credit Value: 2

Level: 3

Pre-requisite / Co-requisite/ Exclusion: ELC2501 University I & ELC2502 University English II

Objectives:
This subject aims to develop the English language skills required by students to communicate effectively in their future professional careers.

Intended Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in workplace contexts through:

a. interacting professionally in a job interview;
b. writing appropriate correspondence related to engineering professions; and

c. writing logical and coherent reports.

To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, present ideas systematically and logically, and provide support for stance and opinion.

Subject Synopsis/Indicative Syllabus:
This content is indicative. The balance of the components, and the corresponding weighting, will be based on the specific needs of the students.

1. Job interviews and work-related discussions
Practising the specific verbal and non-verbal skills required when communicating with potential employers in job-seeking interviews.

2. Workplace correspondence
Selecting and using relevant content; organising ideas and information; maintaining appropriate tone, distance and level of formality; achieving coherence and cohesion; adopting an appropriate style, format, structure and layout.

3. Workplace reports
Selecting and using relevant content; organising ideas and information; describing tables and graphs; discussing and analysing data; adopting an appropriate style, format, structure and layout.

4. Language appropriacy
Using context-sensitive language in spoken and written English.

5. Language development
Improving and extending relevant features of grammar, vocabulary and pronunciation.

Teaching/Learning Methodology:
The subject is designed to introduce students to the communication skills, both oral and written, that they may need to function effectively in their future professions.

The study method is primarily seminar-based. Activities include teacher input as well as individual and group work involving drafting and evaluating texts, mini-presentations, discussions and simulations. Students will be referred to information on the Internet and the ELC’s Centre for Independent Language Learning.

Student Study Effort Expected:
Class contact:
- Seminars 28 Hrs.

Other student study effort:
- Classwork-related and project-related preparation and self-access work 56 Hrs.

Total student study effort 84 Hrs.

Reading List and References:
Coursebook
English Language Centre. (2009). ELC 3508 English for Effective Workplace Communication. Hong Kong: The Hong Kong Polytechnic University.

Recommended readings

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. Job interview</td>
<td>40%</td>
<td>a ☑ b c</td>
</tr>
<tr>
<td>2. Email and report writing</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:
Students’ oral and writing skills are evaluated through assessment tasks related to the learning outcomes. Students are assessed on the accuracy and the appropriacy of the language used in fulfilling the assessment tasks, as well as the selection and organisation of ideas.

Learning materials developed by the English Language Centre are used throughout this course. Additional reference materials will be recommended as required.
## Subject Description Form

**Subject Code**: ENG232  
**Subject Title**: Engineering Science  
**Subject Synopsis/Indicative Syllabus**

### Engineering Science

- **Basic Concepts and Laws of Energy Conversion**: Thermodynamic states, variables and systems; Basic Concepts and Laws of Energy Conversion; Heat pump, ideal gas basics; One cycle and the internal combustion engine; Biphasic cycle and the gas turbine cycle.
- **Reversibility of Energy Exchange**: Energy balance for a flow process, including heat and work analysis; Rankine cycle and the steam engine; Refrigeration and heat pump; Ideal gas basics; One cycle and the internal combustion engine; Biphasic cycle and the gas turbine cycle.
- **Thermodynamic properties of H2O**: Work, heat, and internal energy; Conservation of mass and energy; Reversibility of energy exchange; Energy balance for a flow process, including heat and work analysis.
- **Reversibility of Energy Exchange**: Energy balance for a flow process, including heat and work analysis; Rankine cycle and the steam engine; Refrigeration and heat pump; Ideal gas basics; One cycle and the internal combustion engine; Biphasic cycle and the gas turbine cycle.
- **Ideal gas basics**: Otto cycle and the internal combustion engine; Brayton cycle and the gas turbine cycle.

### Teaching/Learning Methodology

- **Lectures**: 42 Hrs.
- **Tutorials**: 12 Hrs.
- **Laboratory Works**: 4 Hrs.
- **Performing Assignments**: 36 Hrs.

### Student Study Effort

Total student study effort: 126 Hrs.

### References


### Assessment Methods in Alignment with Intended Learning Outcomes

- **Continuous Assessment**: 42 Hrs.
- **Tests**: 20 Hrs.
- **Assignments (including project reports)**: 30 Hrs.
- **Written Examinations**: 60 Hrs.

### Subject Synopsis/Indicative Syllabus

**Materials Science and Engineering**

- Atomic Structure and Properties of Materials: Atomic structure; Bonding; Electronic and optical properties of materials; Electrical and Optical Properties of Materials: N-type and P-type semiconductors; P/N junction; Light interactions with materials; Light emitting diode (LED) and optical detection.
- Thermodynamic Properties of Materials: Concept of energy and entropy; Heat transfer and energy balance; Heat transfer and energy balance; Heat transfer and energy balance.
- Phase Diagrams and Phase Transformations: Mechanical Properties of Materials: Concept of stress and strain; Stress-strain behavior; Elastic and plastic deformation; Fracture and fatigue.
- Manufacturing Technology of Materials: Role of materials in manufacturing; Relationship between manufacturing processes and material properties; Process Selection and Economic Design: Cost consideration in manufacturing and environmentally conscious design; Selection of materials and manufacturing processes; Green manufacturing and environmentally conscious design.
- Energy and Environmental Impacts: Role of materials in manufacturing; Relationship between manufacturing processes and material properties; Process Selection and Economic Design: Cost consideration in manufacturing and environmentally conscious design; Selection of materials and manufacturing processes; Green manufacturing and environmentally conscious design.

### Student Study Effort

Total student study effort: 126 Hrs.
To enhance the students’ problem solving skill in a given programming environment, open-book programming tests are arranged regularly. The learning outcomes a, b, c, d and e can be evaluated at different checkpoints.

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 specifications. Apart from meeting the learning outcomes a-e, the students have to practice solving problems using systematic approaches in a team. The learning outcome f should be reflected from the mini-project result.

### Assessment Methods

<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>✓</td>
</tr>
<tr>
<td>2. Short-quiz tests</td>
<td>10</td>
<td>✓</td>
</tr>
<tr>
<td>3. Closed-book tests</td>
<td>20</td>
<td>✓</td>
</tr>
<tr>
<td>4. Programming tests</td>
<td>30</td>
<td>✓</td>
</tr>
<tr>
<td>5. Mini-project</td>
<td>30</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:
The short-quiz and closed-book tests serve for assessing the understanding of fundamental concepts. The in-class exercises and programming tests are conducted within the programming environment to help students familiarize with it. The problems to be solved by the students are typically presented as practical engineering problems. Through conducting the mini-project that lasts for several weeks, students would be able to experience how to solve problems by using systematic approaches in a team.

### Student Study Effort Expected

- **Class contact:** 65 Hrs.
  - Lecture: 27 Hrs.
  - Tutorial: 26 Hrs.
  - Test/Quiz: 11 Hrs.
  - Mini-project presentation: 1 Hrs.
- **Homework:** 17 Hrs.
- **Self-studying:** 52 Hrs.
- **Other student study effort:** 81 Hrs.
- **Total student study effort:** 146 Hrs.

### Reading List and References

### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>ENG237</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Basic Electricity and Electronics I</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>2</td>
</tr>
</tbody>
</table>

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

Nil/Nil/Nil

#### Objectives

1. Introduce the fundamental concepts of operation of electric circuits applicable to all engineering students.
2. Develop the ability on 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:

- a) acquire a good understanding of the electric circuit operating principles;
- b) solve simple problems in electric circuits;
- c) use suitable instrumentation to carry out experimental investigations to validate the theoretical investigations.

#### Subject Synopsis/Indicative Syllabus

1. **DC Circuits**

2. **Circuit Analysis and First Order Transients**

3. **Mutual Inductance and Transformer**
   - Basic coupled inductance equations. 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.

4. **Steady-state Analysis of AC Circuits**

5. **Load Line Analysis and Diode Circuits**
   - I-V characteristics of general nonlinear components. Diode as specific case. Low voltage case: DC solution based on load line construction. High voltage case: netif circuits, clipping and clamping circuits.

6. **Digital Logic Circuits**

7. **Instrumentation and Measurement**
   - Choice of measurement method; Analogue and digital instruments; Bridges; Measurement uncertainties.

#### Reading List and References

**Textbooks:**

**References:**
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
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<tbody>
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</table>

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

ENG237 (Basic Electricity and Electronics I)

**Objectives**

To introduce students to an extended aspect of basic electricity and electronics applicable to engineering students. Several classes of electronic devices and circuits will be covered, including bipolar junction transistor (BJT) and amplifiers, metal-oxide-semiconductor field-effect transistor (MOSFET) and amplifiers, and operational amplifiers. An introduction to electrical machines will be given.

**Intended Learning Outcomes**

Upon satisfactory completion of the subject, the students are expected to:

- a) describe the fundamental aspects of diodes, bipolar junction transistor (BJT) and amplifiers, metal-oxide-semiconductor field-effect transistor (MOSFET) and amplifiers, and operational amplifiers.
- b) describe the fundamental aspects of electrical machines.

**Subject Synopsis/ Indicative Syllabus**

1. **Diode Fundamentals**
   - Semiconductor basics, P-N junction basics. Input, output and transfer characteristics of practical diodes. Biasing through load line concept. (3 hours)

2. **Transistors and Biasing Circuits**
   - Bipolar junction transistor (BJT). DC biasing and analysis of BJT circuits. Metal-oxide-semiconductor field-effect transistor (MOSFET). DC biasing and analysis of MOSFET circuits. Load line and graphical large-signal analysis. Transistor amplification concept. (6 hours)

3. **Transistor Amplifiers and Small-signal Concepts**
   - Basic BJT and MOSFET amplifier configurations: common emitter and common source configurations. Small-signal models and parameters. Concept of transconductance. Voltage gain. Input and output impedances. Introduction to loading effect. (9 hours)

4. **Operational Amplifiers**
   - Ideal operational amplifier. Defining characteristics (i.e., infinite gain and infinite input resistance). Basic op-amp circuits: inverting amplifier, non-inverting amplifier, summing amplifier, difference amplifier, integrating amplifier and differentiating amplifier. Specific op-amp circuits: instrumentation amplifier, current-to-voltage converter, voltage-to-current converter. Design applications. (9 hours)

5. **Frequency Domain Analysis**
   - Transfer functions from ac circuits in terms of joω. Introduction to frequency domain, from jω to z. G满了al s-domain transfer functions. Simple first-order 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. (6 hours)

6. **Fundamentals of Electrical Machines**
   - Electromagnetics. Transformer analysis using magnetic circuit models. DC motors and generators. (9 hours)

### Teaching/Learning Methodology

Lectures are the primary means of conveying the fundamental knowledge to understand the concepts pertaining to the fundamental aspects of electrical and electronic principles. Tutorials with problem-based questions are given, and the students are expected to solve those problems and to know the basic approaches to solving the problems. Students will be required to form groups to work on laboratories which will give them a hands-on experience in the devices, circuits and machines that are taught in the lectures.

### 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>
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<tbody>
<tr>
<td>1. Examination</td>
<td>60</td>
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<td>2. Test</td>
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<td>3. Laboratory</td>
<td>16</td>
<td>√ a √ b √ c √ d √ e</td>
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<tr>
<td>Total</td>
<td>100 %</td>
<td>√ a √ b √ c √ d √ e</td>
</tr>
</tbody>
</table>

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

The assessment methods include an end-of-subject examination (60%), two tests (12% each), and four laboratory works (8% for formal report and 8% for logbook). The examination and continuous assessments (two tests and four laboratory works) cover intended subject learning outcomes a) and b). The examination is a three-hour, closed-book examination and the two tests are closed book and 1.5 hours each. A logbook with four laboratory recordings and a formal report on one particular laboratory work will be assessed.

### Student Study Effort Expected

- **Class contact:**
  - Lecture: 42 Hrs.
  - Tutorial (13 hrs) and laboratory (11 hrs): 24 Hrs.
- **Other student study effort:**
  - Self study: 33 Hrs.
  - Report writing for laboratory: 6 Hrs.
- **Total student study effort:** 105 Hrs.

### Reading List and References


### References

Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Society and the Engineer</td>
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<tr>
<td>Credit Value</td>
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<td>Level</td>
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</tr>
<tr>
<td>Pre-requisite / Co-requisite / Exclusion</td>
<td>Nil/Nil/Nil</td>
</tr>
</tbody>
</table>

Objectives

This subject is designed for engineering students as a complementary subject about the role of the professional engineer in practice and their responsibilities towards the profession, colleagues, employers, clients and the public. The objectives of the subject are to enable students to:

1. Appreciate the historical context of modern technology and the nature of the process whereby technology develops and its relationship between technology and environment and the implied social costs and benefits.
2. Understand the social, political, legal and economic responsibility and accountability of a profession in engineering and the organizational activities of professional engineering institutions.
3. Be aware of the short-term and long-term effects on the use of technology relating to safety and health aspects.
4. Observe the professional conduct, the legal and more constraints relating to various engineering aspects.

Intended Learning Outcomes

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

(a) Identify and evaluate the effects on the use of technology relating to social, culture, economic, legal, health and safety, environment and welfare of the society.

(b) Explain the importance of professional training of institutions, professional conduct, ethics and responsibilities in various engineering activities (local and overseas). Particularly the Washington Accord.

(c) Work in a team setting to discuss the specific project of the eight dimensions on project issues related to engineers and present the findings.

Subject Synopsis/Indicative Syllabus

Syllabus: Impact of technology on society: Innovation and creativity, the history and the trend of technology on the social and culture on society. Environmental protection and related issues. Role of the engineer in energy conservation, ecological balance and sustainable development. The outlook of Hong Kong's industry, its supporting organizations and impact on development from the China Markets. Industrial health and safety including the work of the Labour Department and the Occupational Health and Safety Council and the legal dimension such as contract law and industrial legislation. The Professional Institutions: both local and overseas. Washington Accord and the qualification and criteria of professional engineers. Professional ethics, bribery and corruption including the work of the ICAC. Social responsibilities of engineers.

Teaching/Learning Methodology

In class, there will be short lectures to provide essential knowledge and information on the relationship between society and the engineer under a range of dimensions. There will be discussions, case studies, seminars to engage student's in-depth analysis of the relationship. Students will form into groups and throughout the course, students will work on engineering cases by completing the following learning activities:

1. Case analysis; students will base on the case analysis, and provide weekly summary report on the relationship of dimensions to the project.
2. The final report will be the Case portfolio which includes:
   - Presentation slides;
   - Feedback critique;
   - Weekly summary report and
   - Reflection.

Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
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</thead>
<tbody>
<tr>
<td>a Group weekly learning activities (40%)</td>
<td>✓</td>
</tr>
<tr>
<td>b Final presentation (individual presentation) (30%)</td>
<td>✓</td>
</tr>
<tr>
<td>c Group report and individual reflection report (10%)</td>
<td>✓</td>
</tr>
<tr>
<td>d Total</td>
<td>100%</td>
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</table>

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

Continuous Assessment: 60 % Examination: 40%

Student Study Effort Expected

Class contact:

- Lectures and Review: 30 Hrs.
- Tutorial and Presentation: 12 Hrs.

Other student study effort:

- Research and Preparation: 60 Hrs.
- Report writing: 14 Hrs.

Total student study effort: 116 Hrs.

Reading List and References

Reference books:


Reading material:

- Engineering journals:
  - Engineering and Technology by The Institution of Engineers and Technology
  - Times
  - Far East Economics

- Current newspaper:
  - South China Morning Post
  - China Daily
  - Ming Pao Daily
Subject Description Form

<table>
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<tr>
<td>Subject Title</td>
<td>Engineering Communication and Fundamentals</td>
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<tr>
<td>Credit Value</td>
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<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 use it as a medium in technical communication and documentation with CAD application, modeling 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.

d. explain basic occupational health and industrial safety requirements for engineering practice.

Subject Synopsis/ Indicative Syllabus
1. **Engineering Drawing & CAD (TM8050 - 48 hours)**
   1.1. Fundamentals of Engineering Drawing and CAD (39 hours)
   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.

   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 & simulation, generation of 2D drawings from 3D parts and assemblies; drawing annotation including dimensioning, tolerancing, surface finishing, and part list.

   1.2. Electrical Drawing (3 hours)
   Wiring diagram and wiring table for electronic and electrical installation, functional representation of circuit, system block diagram, electrical & electronic device symbols and layout, architectural wiring diagram with reference to the architectural symbols for electrical drawings in Hong Kong and international standards.

   1.3. Electronic Design Automation (6 hours)
   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.

2. **Basic Scientific Computing (TM3012 - 27 hours)**
   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.

   2.2. Basic plotting, formatting graph, 2D and 3D plots, annotations, contour, mesh and surface plots, colormap.

   2.3. M-file programming & debugging: scripts, functions, logic operations, flow control, and graphic user interfaces.

3. **Basic Mechatronic Practice (TM0510 - 30 hours)**
   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. **Industrial Safety (TM2009 - 15 hours)**


   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 Methods in Alignment with Intended Learning Outcomes**

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Weighting (%)</th>
<th>Intended Learning Outcomes Assessed</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>1. Assignment/Project</td>
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<td>✓</td>
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<td>2. Test/Quiz</td>
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<td>✓</td>
</tr>
<tr>
<td>3. Report/Log Sheet</td>
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<td>✓</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
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</tbody>
</table>

The assignments/projects are designed to facilitate students to reflect and apply the knowledge periodically throughout the training.

Tests are designed to facilitate students to review the breadth and depth of their understanding on specific topics.

Report writing 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**

- **Class Contact**
  - Tutorial: 13 Hrs.

- **Other Study Effort**
  - Coursework & Report: 8 Hrs.

- **Total Study Effort**: 128 Hrs.

**Reading List and Reference Software List:**

1. AutoCAD from Autodesk Inc.
2. SolidWorks from Dassault Systèmes Solidworks Corp.
3. MATLAB from The Mathworks Inc.
4. PADS from Mentor Graphics Inc.

**References**

1. BS8888 Technical Product Specification (TPS) Specification
7. IEEE Standard 315 / ANSI Y32.2 / CSA Z99 Graphic Symbols for Electrical and Electronics Diagrams
8. IEC 61082 Preparation of Documents used in Electrotechnology

**Reference Books:**

Training material, manual and articles published by Industrial Centre.
**Subject Description Form**

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<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.

2) This subject covers a wide range of fundamental electrical engineering application technology that includes electrical installation practice, lighting and electrical system design, LV switchboard and power monitoring, integral building system and basic electronic practice.

3) To provide the students with knowledge of principles and techniques in some site practices to enable them to appreciate the builder's work associated with pavement and highway construction.

**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 and control system in buildings on the basis of recognize the engineering standards, regulations and practices;

d) identify good practices and workmanship in structural concrete & steelwork; describe actual work sequences and methods in area of structural concrete & steelwork; explain the technology impact on equipment, materials and work methods to keep abreast of technology development and construction engineering practices in association with highway construction; and

e) identify and relate relevant fundamental engineering theories and principles of site formation and anchorage practice to extend their knowledge and understanding in pavement construction and in highway construction;

**Subject Synopsis/Indicative Syllabus**

- **Lighting and Electrical System Design (TM0367)**
  - Interior lighting design and calculation; daylight illumination consideration; lumens and reflectors; T5, T8 and T11 lamps; energy conservation.
  - 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.

- **Electrical Installation, Basic Automation and Basic Electronic Practice (TM0372)**
  - 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.
  - Introduction of programmable controller systems, sensors, actuators, drives, timers, counters, ladder logic programming and testing.
  - Identification of electronic circuit components, soldering and de-soldering, Dry film process, Etching process.

- **Structural Concrete & Steel Work (TM1213)**
  - Structural Concrete
    - Recognize concrete types and materials; perform concrete mixing, placing, compaction and site quality control tests works; Understand Reinforcement types, sizes, detailing, cutting, bending and fixing steel bars in a timber formwork; Detect cover and size of steel bars in reinforced concrete structures.
    - Design and construction of a simple precast concrete element.
  
  - Structural Steelwork
    - Recognize common structural steel sections used in construction industry; steelwork properties, cutting, drilling of steelwork members; understand connection methods of steel members. Use of steelwork and associated practical problems in temporary work; corrosion protection of steelwork.

- **Site Formation and Anchoring Practice (TM1232)**
  - Site Formation Practice
    - Sand Replacement Method
    - Vane Shear Test
    - Speedy Moisture Content Test
    - Sieve Analysis
    - Probe Test
    - Proctor Test
    - Ground Penetration Radar Survey
    - CCTV Survey in underground pipe systems
    - Cable Locator Survey
  
  - Anchoring Technology Practice
    - Fixing and anchoring systems commonly used in highway projects, e.g. mechanical and chemical anchor bolts and anchor strength tester

**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.
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. Report writing 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>120 Hrs.</th>
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</thead>
<tbody>
<tr>
<td>Workshops / In-class practice</td>
<td>120 Hrs.</td>
</tr>
<tr>
<td>Coursework including report, assignment and reading</td>
<td>16 Hrs.</td>
</tr>
<tr>
<td>Total Study Effort</td>
<td>136 Hrs.</td>
</tr>
</tbody>
</table>

### Reading List and References

1. Training materials, manual and articles published by the Industrial Centre.
4. BS1377 (1990), “Methods of Test for Soils for Civil Engineering Purposes. General requirements and sample preparation”, BSI
Subject Description Form

Subject Title: Economics of International Transport Logistics

Subject Code: LGT3019

Number of Credits: 3

Hours Assigned: Lecture 28 hours  Seminar 14 hours

Pre-requisite: Nil

Co-requisite: Nil

Exclusion: Nil

Objectives:

This subject provides students with fundamental concepts in economics and how these might be applied to international air and maritime industries. It provides students with knowledge of appropriate sources of information and data in the maritime sector as well as developments in the air transport industry.

Student Learning Outcomes:

1. To develop an ability to build economic models to analyse the behaviors of different shipping markets.
2. To install an understanding of the interaction between economic, operational and technological aspects of the different maritime industries.
3. To establish an awareness of the range of perspectives which may be adopted, theoretically, legally and practically towards the air transport system.
4. To analyse market data and forecast the trend in different shipping markets.

Studying this subject will also help develop students’ critical thinking, and oral and written communication skills.

Syllabus:

1. **Maritime section**: Fundamental economic theory and applications; Economic development, patterns of trade and maritime transport; Function of maritime transport; Demand for maritime transport: elasticity of demand; Supply of maritime transport: elasticity of supply; Shipping market and cycle; Charter market; Liner shipping market: conferences, consortia, alliances and pools; Shipping costs; Pricing mechanism in maritime transport: liner tariffs and tramp market freight rates; Economics of scale in shipping; Optimum ship size and optimum speed of ships; Shipping market analysis; Maritime policy and regulation.

2. **Air Transport section**: Aircraft characteristics; Physical characteristics of airports and liaison with airport authorities; Air transport in national, regional and local patterns and networks; Size and scale problems; Route selection and principles of timetable production, load factors and frequency; The interrelationship between passenger and freight transport; Marketing policy, strategy and analysis in airline industry; Role of IATA in relation to marketing; Elasticity of demand for airline operations; Bidding procedures and bilateral operating agreements; Types of airport terminal, general layout, organisational structure; Performance indicators, measures of overall cost performance, political control, pressure groups and public attitude; international developments in business, trade and tourism affection air transport.

Teaching/Learning Approach:

In the lectures the general principles of the syllabus topic will be presented and developed, together with guidance on further reading and activities. Lectures may also be used for the presentation and discussion of leading cases.

In the seminars, students will develop and apply the general principles of the topic in student-centred activities, including role-plays, student presentations and discussions.

Method of Assessment:

Overall assessment: 0.50 × End of Subject Examination + 0.50 × Continuous Assessment

Indicative Readings:

Recommended Textbooks


References

1. Bannister, Chan, Mak, Ng and Bennett (1998), Managing Human Resources in Hong Kong – A Practical Approach, 2nd ed., Pitman
9. Kelly Monaghan (1992), Air Courier Bargains, Intrepid Traveler
11. Michael J. Knoes (1993), Aircraft Basic Science, Glencoe
15. Stephen Holloway (1992), Air Finance: Aircraft Acquisition Finance and Airline Credit Analysis, Pitman

Subject to change

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Subject Description Form

Subject Code: LGT5013
Subject Title: Transport Logistics in China
Credit Value: 3
Pre-requisites: Students are expected to understand Putonghua and to read simplified Chinese Characters
Exclusions: Nil

Teaching/Learning Approach
Lecture: 28 hours
Seminars / Tutorials: 14 hours
Total: 42 hours

Assessment
COURSEWORK: (Assignments) 50%
EXAMINATION: 50%

Minimum Pass Grade
COURSEWORK: (Assignments) D
EXAMINATION: D

Objectives
To provide within an operational and business environment:
(a) an advanced understanding of the principles and complexities of the freight industry in China;
the advanced skills necessary to implement various mode of freight transport management within
a logistics company environment;
proactive skills to achieve and sustain advantage in a rapidly changing business/freight
operational environment in China.

Learning Outcomes
Students completing this subject will be able to:
1. Describe the logistics operation of sea, land and air transports in China.
2. Examine the Chinese policy in international trade and transport and the economic relationship
between China and Hong Kong.
3. Apply the Chinese transport and customs law.
4. Develop the ability to assess and evaluate the different logistics environments in China and
Hong Kong.

Keyword Syllabus
(a) Organisation and Principal Characteristics of Transport Logistics in China; Logistics
operation of Air Transport; Logistics operation of Sea/Inland waterway Transport; Logistics
operation of Rail Transport; Logistics operation of Road Transport;
(b) Overview of China Trade and its impact on logistics; Commercial Transport Policy; Human
Resource Management in China; Trading practice and related government organisations in China;
(c) Customs ordinances and trade regulations; Legal framework for transport and logistics in
China;
(d) Transport Economics. Demand and supply for freight transportation services, market structure
and organization, government intervention, as well as strategic infrastructure investment in
different Chinese transport sectors (air, rail, road, and sea/inland waterway);

Readings & References
Blauwens, Gust; Peter De Baere, Eddy van de Voorde (2006), Transport economics
Antwerpen : De Boeck.


Anming Zhang et al. (2004), Air cargo in mainland China and Hong Kong / Anming


Ports, cities, and global supply chains. Edited by James Wang et al., Aldershot, England :


中国物流百强案例 / 牛鱼龙主编重庆市 : 重庆大学出版社, 2007

中國物流行業發展分析預測報告 [electronic resource] (2009)

中國海關 [electronic resource] 北京 : 中國學術期刊(光盤版)電子雜誌社


Subject to change

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**Subject Code:** ME3301  
**Subject Title:** Applied Mechanics  
**Credit Value:** 3  
**Level:** 3  
**Pre-requisite/Co-requisite/Exclusion:** Pre-requisite: AMA201 Mathematics I or equivalent

### Objectives
1. To develop an understanding of static equilibrium and Newton’s laws of motion.
2. To apply static equilibrium and Newton’s Laws for solving engineering systems.
3. To promote effective mathematical and graphical communication skills.

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

- a. Understand the basics of applied mechanics.
- b. Solve for forces and moments on a simple structure.
- c. Formulate and solve equivalent force/couple systems.
- d. Communicate effectively with the support of mathematical and graphical skills.

### Subject Synopsis/Indicative Syllabus


### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Lecture</th>
<th>Tutorial</th>
<th>Experiment</th>
</tr>
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<tbody>
<tr>
<td><strong>Teaching/Learning Methodology Outcomes</strong></td>
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<td></td>
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</tr>
<tr>
<td>a</td>
<td>Lecture</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>b</td>
<td>Tutorial</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>c</td>
<td>Experiment</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>1. Assignment</td>
<td>20%</td>
<td>20%</td>
<td>60%</td>
</tr>
<tr>
<td>2. Test</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Examination</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Assessment Methods in Alignment with Intended Learning Outcomes

- **Overall Assessment:**
  - Examination: 60% (Final Subject Examination + 0.4 x Continuous Assessment)

### Reading List and References
### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>ME4503</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Aviation Systems</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: AMA296 Mathematics II or AMA294 Mathematics II</td>
</tr>
</tbody>
</table>

#### Objectives

1. To provide an overview of aviation systems to a student that has an interest in the development of careers in aviation.
2. To develop students’ understanding of the aviation industry, which comprises various supporting unit systems, operating within one framework to achieve the global objectives of air transport safety and security and the unit-system objectives of operational efficiency and cost-effectiveness.
3. To develop students’ understanding of the up-to-date operational concepts, technology applications and practices.

**Intended Learning Outcomes**

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

- a. Explain the relationship among major aviation systems and to identify future directions of the industry, taking account of national and global events within and outside the industry.
- b. Demonstrate an understanding of air traffic management, flight standards and airworthiness services provided by regulatory bodies.
- c. Understand the management operations of an international airline.
- d. Understand the logistics issues to be considered in the future development of the Hong Kong International Airport.
- e. Explain the key role and future plan of the Government Flying Service.
- f. Identify the quality assurance procedures adopted in aircraft maintenance organizations within Hong Kong and China.
- g. Identify the environmental impacts of aviation-related activities.
- h. Analyze the activities of various local aviation organizations in the promotion of an aviation culture in Hong Kong.

#### Subject Synopsis/Indicative Syllabus

<table>
<thead>
<tr>
<th>Subject Synopsis/Indicative Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aviation Systems</strong> - An overview of the relationship among major aviation systems such as civil aviation authorities, airlines, airports and aviation organizations.</td>
</tr>
<tr>
<td><strong>Civil Aviation Administration</strong> - Air service agreements. Air traffic management. Search and rescue. Provision of ground and flight operations support. Flight standards. Aviation safety and accident investigation.</td>
</tr>
<tr>
<td><strong>Airport Management</strong> - Organization structure of the Hong Kong Airport Authority. Passenger and air cargo terminal operations. Provisions for general aviation activities.</td>
</tr>
<tr>
<td><strong>Aviation and the Environment</strong> - Aircraft noise and abatement policy. Air pollution and fuel usage.</td>
</tr>
</tbody>
</table>

#### Teaching/Learning Methodology

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>a b c d e f g h</td>
</tr>
<tr>
<td>Tutorials</td>
<td>√ √ √ √ √ √ √ √</td>
</tr>
<tr>
<td>Mini-project</td>
<td>√ √ √ √ √ √ √ √</td>
</tr>
<tr>
<td>Industrial field visit and special seminar</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 (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assignment</td>
<td>30 %</td>
<td>a b c d e f g h</td>
</tr>
</tbody>
</table>
| 2. Group mini-project (including presentation and report) | 50 %        | √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ …
Subject Description Form

Subject Code: ME4504
Subject Title: Aircraft Maintenance Engineering
Credit Value: 3
Level: 4
Pre-requisite/Co-requisite/Exclusion: Pre-requisite: AMA296 Mathematics II or AMA294 Mathematics II

Objectives:
1. To teach students the fundamental principles of reliability and maintenance engineering.
2. To teach students practical knowledge of mandatory airworthiness requirements and aircraft maintenance.

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

a. Demonstrate a good understanding of aircraft equipment failures and model random failures with statistical distributions.
b. Improve aircraft system reliability through multiple redundancy.
c. Explain major types of aircraft maintenance activities.
d. Demonstrate the ability to deal with component failure interactions.
e. Explain the characteristics of major risk evaluation methods and the application of human factors in aircraft maintenance.
f. Understand the need for aircraft maintenance programme management.

Subject Synopsis/Indicative Syllabus:

- **Failure Interactions** - Markov Analysis. Reliability with standby systems. Standby redundancy.
- **Case Studies (Typical examples)** - UA Flight 2311, AA Flight 191, etc.

Teaching/Learning Methodology:
Lectures are used to deliver the fundamental knowledge in relation to reliability engineering and aircraft maintenance (outcomes a to f).
Tutorials are used to illustrate the application of fundamental knowledge to practical situations (outcomes a to f).
Project or case study is used to allow students to deepen their knowledge on a specific topic through search of information, analysis of data and report writing (outcomes e and f).

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Outcomes</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tutorial</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Project/case study</td>
<td></td>
<td>✓</td>
<td>✓</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/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assignment</td>
<td>15%</td>
<td>a ✓ b ✓ c ✓ d ✓ e ✓ f ✓</td>
</tr>
<tr>
<td>2. Project / Case study report and Presentation</td>
<td>15%</td>
<td>a ✓ b ✓ c ✓ d ✓ e ✓ f ✓</td>
</tr>
<tr>
<td>3. Test</td>
<td>20%</td>
<td>a ✓ b ✓ c ✓ d ✓ e ✓ f ✓</td>
</tr>
<tr>
<td>4. Examination</td>
<td>50%</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>

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

Overall Assessment: 0.5 x End of Subject Examination + 0.5 x Continuous Assessment

Examination is adopted to assess students on the overall understanding and the ability of applying the concepts. It is supplemented by the assignments and test(s), which provide timely feedback to both lecturers and students on various topics of the syllabus. Written report and oral presentation on a specific project or case study is used to assess the students’ knowledge in contemporary aircraft maintenance engineering.

Student Study Effort Expected:

<table>
<thead>
<tr>
<th>Class contact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture: 38 Hrs</td>
</tr>
<tr>
<td>Tutorial: 4 Hrs</td>
</tr>
</tbody>
</table>

Other student study effort:

<table>
<thead>
<tr>
<th>Course work: Assignment Project/case study Self-study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment: 12 Hrs</td>
</tr>
<tr>
<td>Project/case study: 12 Hrs</td>
</tr>
<tr>
<td>Self-study: 42 Hrs</td>
</tr>
</tbody>
</table>

Total student study effort: 108 Hrs

Reading List and References:
1. HKAR66, CAD, Hong Kong.
2. CAD 418 Condition Monitored Maintenance: an Explanatory Handbook, 1997, Civil Aviation Department, Hong Kong.
Appendix II

Foundation Year
1. Introduction

Foundation programme is offered to non-local students, mostly from Mainland China, as a preparatory study, in order to prepare them for their intended proper 3-year undergraduate programmes. The programme is a one-year study and each student is required to complete a total of 32 credits. The graduates directly enter the first year of studies of their chosen undergraduate programmes.

From September 2005, the foundation study has been merged into the programmes offered by individual departments who became the hosts. The foundation year then formed an integrated part of a 4-year undergraduate degree curriculum. Students in the foundation year with the Department are regarded as the year 1 students of the 4-year BEng (Hons) programme.

2. Programme Structure

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

Final Award
The award is a Bachelor degree with honours in Transportation Systems Engineering.

Programme
The students will complete 10 subjects, 30 credits, as well as 2 credits on the subjects of Foundation Year Seminars, in the first year, i.e. a total of 32 credits. Of the 10 core subjects, there are 5 compulsory subjects (common to all non-local students) and another 5 subjects stipulated by the Department. The typical foundation year study is as follows:

<table>
<thead>
<tr>
<th>Semester One</th>
<th>Semester Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG1001</td>
<td>Compulsory subjects</td>
</tr>
<tr>
<td>APSS184</td>
<td>Foundation Year Seminar II</td>
</tr>
<tr>
<td>ELC1004</td>
<td>Foundation Mathematics II for Science and Engineering</td>
</tr>
<tr>
<td>AMA103</td>
<td>English for University Studies II</td>
</tr>
<tr>
<td>AP101</td>
<td>Logic: Qualitative and Quantitative</td>
</tr>
<tr>
<td>COMP100</td>
<td>College Physics II</td>
</tr>
<tr>
<td>ENG1002</td>
<td>One of the following subjects</td>
</tr>
<tr>
<td>AMA104</td>
<td>Elementary Cantonese</td>
</tr>
<tr>
<td>ELC1005</td>
<td>Extended Writing Skills</td>
</tr>
<tr>
<td>AMA105</td>
<td>CBS2050</td>
</tr>
<tr>
<td>AP102</td>
<td>ELC1003</td>
</tr>
</tbody>
</table>
In the subsequent three years, they follow the identical study pattern in the 3-year programme as described in the main content of this document. As a result, the students should finish a total of 131 credits, as well as fulfilling the training and language requirements, when they graduate.

*Foundation-year Mentor*

The students in the foundation year are full members of the Departments. A departmental foundation-year mentor will be assigned to them. The class representative will be a member of the Student-Staff Consultative Committee.

3. **Registration & Assessment**

The same set of regulations on registration and assessment, as stipulated in the Section 6, applies.

While the graduation requires the completion of 131 credits and the GPA calculation includes the results of all subjects throughout the four years, the WGPA calculation, which leads to award classification, excludes all subjects in the foundation-year. In other words, the award classification only considers the students’ performance on the subjects taken in the normal 3-year programme.
Appendix III

Major Programme
With the growing demand of graduates having broad educational qualifications, in addition to those with specialised skills, the University is introducing degree programmes combining “Major” and “Minor” disciplines. In response to this, the Department of Electrical Engineering offers a Major in Transportation Systems Engineering option for students.

Students taking this option must obtain 81 credits in the Major Programme in Transportation Systems Engineering; and 18 credits from a minor programme. If the 18 credits taken are a free collection of electives in any combination of disciplines in conjunction with a Major programme, these students will graduate with a Major only. For the Minor credits, at least 9 credits must be of Level 3 or above.

1. Programme Requirements

Students are required to complete the following 81 credits for graduation in the Major Programme in Transportation Systems Engineering. They must include the following credits:

(a) all first-year subjects (33 credits);
(b) all second-year subjects (36 credits);
(c) the compulsory final-year subjects, except ENG307 (12 credits);
(d) all training credits

A student is eligible for award if he/she also satisfies the following graduation requirements.

- Satisfying the WIE and IC Training requirements
- Having a Grade Point Average (GPA) of 2.0 or above at the end of the programme
- Having sat for GSLPAs in both Chinese and English
- Satisfying the co-curricular activities requirements
- A pass in Foundation Mathematics (AMA106). It is only applicable to admittees who do not have a "pass" in the A-level or AS-level Mathematics subject(s) and who have not been given credit transfer for the subject AMA201 stipulated in the curriculum. These students are required to take a mandatory Mathematics Benchmark Test (MBT) prior to the commencement of their studies. Those who pass the MBT are exempted from this graduation requirement and they follow the normal study pattern. Those who fail or do not attend the MBT are required to take a non-credit bearing subject AMA106 “Foundation Mathematics”, which is a pre-requisite for AMA201. A pass in AMA106 “Foundation Mathematics” is thus a graduation requirement for such students.
2. **Programme Curriculum**

To be eligible for graduation in the major in Electrical Engineering, students are required to complete 81 credits as specified. All the subjects in the table below are compulsory. The tables below illustrate the typical progress pattern.

**Typical Study Pattern**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Semester One</th>
<th>Semester Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA106*</td>
<td>Foundation Mathematics</td>
<td>AMA202</td>
</tr>
<tr>
<td>AMA201*</td>
<td>Mathematics I</td>
<td>ELC2502</td>
</tr>
<tr>
<td>ELC2501</td>
<td>University English I (2 credits)</td>
<td>ENG236</td>
</tr>
<tr>
<td>ENG232</td>
<td>Engineering Science</td>
<td>ENG238</td>
</tr>
<tr>
<td>ENG236</td>
<td>Computer Programming (2 credits in semester 1)</td>
<td>CSE292</td>
</tr>
<tr>
<td>ENG237</td>
<td>Basic Electricity and Electronics I</td>
<td>GEC2801 or equivalent</td>
</tr>
<tr>
<td>CSE291</td>
<td>Transportation Engineering Fundamentals</td>
<td>AF2601</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Semester One</th>
<th>Semester Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELC3508</td>
<td>English for Effective Workplace Communication (2 credits)</td>
<td>EE3021</td>
</tr>
<tr>
<td>EE207</td>
<td>Engineering Electromagnetics (2 credits)</td>
<td>EE310</td>
</tr>
<tr>
<td>EE309</td>
<td>Control Systems and Signal Processing</td>
<td>CSE390</td>
</tr>
<tr>
<td>CSE312</td>
<td>Transportation and Highway Engineering</td>
<td>GEC2XXX</td>
</tr>
<tr>
<td>CSE331</td>
<td>Air and Noise Pollution Studies</td>
<td>EE3031</td>
</tr>
<tr>
<td>AF2108</td>
<td>Financial Accounting</td>
<td>ME3301</td>
</tr>
</tbody>
</table>

* (1 subject from the Minor Programme) 19 credits

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Semester Three (Summer Period at the end of Year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE3502</td>
<td>Summer Practical Training (6 weeks in summer)</td>
</tr>
</tbody>
</table>

(3 training credits)

* refers to Section 6.11 (page 24, Graduation Requirement ‘h’) on the condition of taking AMA106 and AMA201.
3. **Professional Recognition**

Students who wish to take the major/minor option should note that the Major programme may not meet the academic requirements for Graduate Membership from the professional bodies, such as The Hong Kong Institution of Engineers and Chartered Institute of Logistics and Transport.

4. **Admission and Registration**

Same as in the Full BEng (Hons) Programme in Transportation Systems Engineering

5. **Award Classification**

For students who have completed a Major and a Minor programme or a Major programme combined with free electives, their award classification will be based on both their “Major GPA” and “Minor GPA”.

“Major GPA” is derived based on all subjects of the Major programme plus the University mandatory subjects in general education. The “Major GPA” is weighted and the level weightings are the same as set for the full degree from which is Major programme is developed.

The mechanism for deriving the “Major GPA” is same as that for the GPA for award classifications of students on the single-discipline degree, except that there will be fewer subjects to be counted for the “Major GPA” due to the difference in the curriculum between a Major programme and a single-discipline degree.

“Minor GPA” is derived based on the 18 credits of Minor study (either a specific Minor or free combination of electives). “Minor GPA” is unweighted.

The “Major GPA” and the “Minor GPA” will be presented separately to the Boards of Examiners for considerations.

In order to be eligible for a particular award classification, a student should have comparable standard of performance in both his major and minor studies.
In cases where the attainment of students in the minor study warrants the granting of one classification lower than that the students deserve for his major study, the Board of Examiners has the discretion to recommend the upper classification which reflects the performance on the major study better. This is based on the fact that the award parchment to be granted to students who enrol on a major programme will only reflect the award title for the major programme.