Bachelor of Science (Honours) Degree Programme in
Internet and Multimedia Technologies

Full-time Credit-based
Code: 42077

Programme Booklet
2009/2010
**BSc(Hons) in Internet and Multimedia Technologies (Full-Time/Sandwich/Cooperative Education Scheme)**

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LEVEL 5

Level 5 subject syllabi are obtainable from the "Handbook of Postgraduate Scheme in Engineering" available from the EIE General Office or downloadable from the MSc/PgD Programme webpage [http://www.eie.polyu.edu.hk/prog/msc/msc5.htm](http://www.eie.polyu.edu.hk/prog/msc/msc5.htm).

*This Programme Booklet is subject to review and changes which the Department can decide to make from time to time. Students will be informed of the changes as and when appropriate.*
1. GENERAL INFORMATION

1.1 Cohort of Intakes

This programme booklet is the definitive programme document for the 2009/10 cohort of intakes, and particularly for those students who enter this programme by following the HKALE system. For those non-local students from Chinese Mainland or countries which have an education system different from the current Hong Kong system, they are required to study a one-year Foundation Curriculum on top of the normal requirements for a 3-year undergraduate degree programme as specified in this programme booklet. These non-local students are required to complete a total of 131 credits, within 4 years nominal, to attain the degree award. In addition to this programme booklet, these students should refer to the Foundation-Year Curriculum, which is specially designed and approved by the University Senate. Just in case any updated information is necessary after the publication of this booklet, students are requested to refer to the URL [http://www.eie.polyu.edu.hk/prog/bsc.html](http://www.eie.polyu.edu.hk/prog/bsc.html) for the most updated information. Should any discrepancies between the contents of the booklet and University regulations arise, University regulations always prevail.

1.2 Programme Information

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2. RATIONALE, AIMS AND INTENDED LEARNING OUTCOMES OF THE PROGRAMME

2.1 Rationale and Aims

Internet and multimedia technologies are among the key technologies that support the economic growth worldwide. Products with multimedia features such as digital cameras, personal digital assistants, 2G/2.5G mobile phones with built-in cameras, 3G mobile phones, are in great demand and new models are being developed almost everyday. Moreover, with the increasing popularity of wired broadband communications and wireless 2.5G/3G mobile communications, more and more multimedia contents are being created, delivered and shared among users via the Internet. In the years to come, there will be a rapid convergence of computer, communications and consumer electronics. There will also be a need of professionals who possess knowledge in all three areas of computer networks, multimedia signal...
processing and electronics. The Programme primarily aims to produce graduates that will fulfill such a need by providing sufficient technical training to students for a career in the field of Internet and multimedia technologies. Moreover, the Programme aims to develop all-round students to adapt to the rapidly changing environment. All students will also acquire some form of work-integrated education before graduation.

Specifically, the Programme is designed to equip students with

- the necessary practical skills in the application of Internet and multimedia technologies through hands-on experience and industrial placements;
- an in-depth and up-to-date knowledge of Internet and multimedia technologies;
- the skills to evolve into self-learners who have the necessary foundation to continue to update their expertise;
- fundamental theory and practical skills adaptable to a workplace environment;
- analytical thinking, problem solving, interpersonal and communication skills;
- the ability to develop as creative learners who can work with abstract ideas and implement them in a practical environment; and
- the necessary knowledge and skills to enable them to function in a variety of professional roles.

Upon graduation, students should have acquired sufficient knowledge to commence their careers in the following areas:

- Digital entertainment industry – designing computer games, creating digital effects for movies, planning, installing, configuring and maintaining digital broadcasting equipment.
- Internet-related business – developing applications with multimedia features on networks, particularly on the Internet.
- Data network centres – planning, installing, configuring and maintaining general computer networks.
- Mobile communications and computing – developing applications particularly for the current and future mobile systems that involve much multimedia contents, such as mobile games, mobile video streaming systems, and mobile information systems.
- Electronic industry – developing embedded electronic products with multimedia features, such as electronic toys, electronic educational units, and personal entertainment units.
2.2 Intended Learning Outcomes of the Programme*

Programme Outcomes are the attributes of the graduates who have completed the Programme successfully. These qualities are classified into two broad categories. Category A embraces such attributes as knowledge, skills, abilities, attitudes that are related to Internet and multimedia technologies. Category B embraces all-roundedness attributes possessed by the graduates to support their further development as a person.

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

On successful completion of the Programme, students should be able to:
1. identify the different aspects of Internet and multimedia systems;
2. design, develop and implement digital systems related to Internet and multimedia technologies;
3. identify, analyze and solve technical problems related to Internet and multimedia technologies;
4. apply computer programming techniques to solve practical engineering problems;
5. apply mathematical techniques to model and solve problems;
6. appreciate and identify factors/issues related to product/industrial design; and generate and evaluate design solutions to solve a specific problem; and
7. appreciate computer games' designs and complexities; and design, analyze, implement and evaluate computer games.

**Category B: Attributes for All-Roundedness**

On successful completion of the Programme, students should be able to:
8. communicate effectively, and present ideas and findings clearly in oral and written forms;
9. think critically and creatively;
10. demonstrate self-learning and life-long learning capability;
11. collaborate effectively with other members in a team, and demonstrate leadership capability;
12. realize and appreciate cultural diversity and globalization; and
13. recognize social responsibility and ethics.

* The University 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

Department of Electronic and Information Engineering, The Hong Kong Polytechnic University
developed through the curricular activities of this programme, some (including interest in local and international affairs, interpersonal skills, sense of social and national responsibility, cultural appreciation, biliteracy and trilingualism, and entrepreneurship) will be primarily addressed through 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. ENTRANCE REQUIREMENTS

For non-local students who enter this programme by following a different education system than that in Hong Kong, they must possess the non-local qualifications for meeting the general entrance requirements for Bachelor Degree Programmes as published by the University.

For students who enter this programme by following a local Advanced-level education system, they must satisfy both the University general minimum entrance requirements AND the programme-specific requirements, as set out below.

3.1 University General Minimum Entrance Requirements

For those applying on the basis of HKALE:

- E in HKALE Chinese Literature, or E in HKALE(AS-Level) Chinese Language & Culture, or (for applicants who have not taken Chinese since Secondary Five) D in a HKCEE language other than Chinese and English; AND
- E in HKALE(AS-Level) Use of English; AND
- E in two other HKALE subjects, or E in one other HKALE subject and two other HKALE(AS-Level) subjects; AND
- E in five HKCEE subjects (For attempts of English Language and Chinese Language in 2007 and after, at least Level 2 is required).

For those applying on the basis of other local qualifications:

- An appropriate Higher Certificate (as specified in section 3.2 below) from The Hong Kong Polytechnic University or the Hong Kong Institute of Vocational Education (IVE) – formerly the Hong Kong Technical Institute (TI) and the Hong Kong Technical College (TC); OR
- An appropriate Diploma (as specified in section 3.2 below) from The Hong Kong Polytechnic University or the Hong Kong Institute of Vocational Education (IVE) – formerly the Hong Kong Technical Institute (TI) and the Hong Kong Technical
College (TC), either with a Credit or Pass at Merit Level in at least three Level III subjects; OR

- An appropriate Associate Degree/Higher Diploma* from a recognised institution (suitable candidates will be considered for advanced standing entry to the senior year curriculum).

* These applicants should follow the regular application arrangements to submit their applications. The Department will consider the applicants for admission to the senior year and inform them at the time of offer.

3.2 Programme-specific Minimum Entrance Requirements

In addition to the above general requirements, applicants must also satisfy the following programme-specific requirements:

- C or above in HKCEE Mathematics or Additional Mathematics, AND
- D or above in HKCEE Physics or Engineering Science

Alternative Entry Route:

- A Higher Diploma in related disciplines; OR
- A Higher Certificate in related disciplines; OR
- A Diploma (with Credit) in related disciplines; OR
- An Associate Degree in related disciplines.

Alternative Entry Route with Credit Transfer:

- Holders of Associate Degree/Higher Diploma in related disciplines may be given credit transfer.

3.3 Admission of Advanced Standing Students Based on Advanced Academic Qualifications

(i) With approval by the Faculty, students may be admitted to the Programme beyond the initial stage provided they have demonstrably reached the general level of educational development which would have been reached had they taken the earlier stage(s) of the Programme, and provided that there is a high probability that they will complete the Programme successfully. These students will still be labelled as first year students even though they are following a second year curriculum.
(ii) Students admitted to the Programme via the above-stated admission route will be advised that based on advanced academic qualifications, they are required to take fewer subjects (normally 33 credits) than students admitted through normal entry route.

(iii) Information on the number of credits required for completion for both normal entry and for the individual students based on their admission qualifications will be reflected on transcripts of study.

(iv) If students who are admitted to the programme via the above-mentioned admission routes wish to gain higher grades by studying the subject(s) again, they may approach the Department for declining the provision of taking fewer credits (which is granted at the time of admission).

(v) Students who, upon admission, wish to apply to transfer any credits from their previous studies and take fewer credits than that confirmed at the time of admission, will have to follow the arrangements for "application for credit transfer" and to pay the related fees. The credits to be transferred are subject to the rule on validity period for subject credits.

4. PROGRAMME, SUBJECTS, AND CREDITS

4.1 Programme Specified Subjects

For those non-local students from Chinese Mainland or countries which have an education system different from the current Hong Kong system, they have to study the Foundation Year prior to studying the Year 1, Year 2 and Year 3 curricula. For the details of Foundation Year subjects and credits requirements, they shall refer to the 2008/09 Foundation-Year Curriculum (a separate booklet).

For students who enter the programme via the local HKALE system or similar, they will study the subjects in Year 1, Year 2 and Year 3 as described in the following.

This Programme is a credit-based, 3-year full-time course. The number of credits required for graduation is 99, plus 5 practical training credits and 1 WIE training credit. At the end of Year 2, students may take the Industrial Training lasting normally for one year before they commence their final year of studies; or they may opt for the Cooperative Education Scheme (CES) in which they will engage in industrial training while concurrently pursuing study in the University until graduation.
All subjects in the first two years of studies in the Programme are compulsory and they aim to provide a solid foundation to students. During the first year of studies, moreover, students are required to complete a 5-week practical training at Industrial Centre. The practical training consists of two parts: Computer Training and Electronic Practice. The two weeks’ computer training will be completed by the end of the second semester while the three weeks’ electronic practice will be conducted during the summer.

During the final year of studies, students will be allowed to select 5 electives from a pool of subjects according to their own interest. Also, they must complete an Honours Project. In addition, students will take compulsory subjects on marketing and management, and one Broadening General Education non-technical elective subject (another General Education subject “China Studies”, which is compulsory, is to be taken in Year 1). The objectives of taking such “non-technical” subjects are to broaden the knowledge base of students and to enhance the all-roundedness of students. Before graduation, students must obtain a minimum of 1 training credit on Work-Integrated Education (WIE), which can be in the form of CES, industrial training, industrial project, Preferred Graduate Development Programme (PGDP), or jobs as deemed appropriate.

Table 4.1 Compulsory and elective subjects to be taken by regular IMT and major in IMT students

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<tr>
<td>EIE388</td>
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<td>General Education Subject – Broadening*</td>
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<td>MM2711</td>
<td>Introduction to Marketing</td>
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<td>COM</td>
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<td>Product Design and Social Considerations</td>
<td>3</td>
<td>COM</td>
<td>COM</td>
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<tr>
<td>SD348</td>
<td>Introduction to Industrial Design</td>
<td>3</td>
<td>COM</td>
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<td>SD3983</td>
<td>Computer Game Development II</td>
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<td>COM</td>
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<td>SD3984</td>
<td>Computer Game Development I</td>
<td>3</td>
<td>COM</td>
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</tr>
</tbody>
</table>

* For details about GE subject syllabi, please refer to the brochures “China Studies Brochure” and “Broadening Subjects Brochure” published by the University.

4.2 University Language Requirements

4.2.1 Students are expected to possess the general standard of language proficiency through the secondary school education prior to their admission to the University as follows:

(i) English and Written Chinese

Students with overall grade “A” or “B” in HKALE(AS-level) Use of English and Chinese Language & Culture shall be considered as possessing the respective general standards of language proficiency, and thus shall be exempted from taking the respective Language Enhancement Programmes (LEP).
Students with overall grade “C” in HKALE(AS-level) Use of English and Chinese Language & Culture shall generally be considered as possessing the respective general standards of language proficiency. But if they possess component grade(s) lower than “C”, they shall be required to complete the respective LEP modules prescribed for them.

(ii) Putonghua

Students shall be assessed through the entrance test on Putonghua provided by CBS upon commencement of their programme of study at the University to determine if they shall be required to take the Putonghua LEP.

Students with grade “A” or “B” in HKCEE Putonghua shall be considered as possessing the general standard of Putonghua proficiency, and thus shall be exempted from taking the required Putonghua LEP.

Students with grade “C” in HKCEE Putonghua shall generally be considered as possessing the general standard of Putonghua proficiency. But they will be assessed again through the entrance test on Putonghua provided by CBS upon commencement of their programme of study to determine if they shall be required to take the Putonghua LEP.

4.2.2 Benchmarking mechanisms will be established for assessing students’ general standard of language proficiency upon admission, in order that appropriate enhancement can be provided, where necessary, to help them achieve the desired standard upon graduation.

(i) English and Written Chinese

HKALE(AS-level) Use of English and Chinese Language & Culture subjects shall be adopted as the benchmarking mechanisms.

Native speakers of English shall by default be given exemption. Exemption requests on other grounds shall be considered on a case-by-case basis.

(ii) Putonghua

CBS’s entrance test on Putonghua and HKCEE Putonghua subject shall be adopted as the benchmarking mechanisms for assessing students’ general levels of Putonghua proficiency upon admission.
Native speakers of Putonghua shall by default be given exemption. Exemption requests on other grounds shall be considered on a case-by-case basis.

4.2.3 To enable students to be equipped with the necessary generic language skills to pursue their studies as well as to attain the level of proficiency up to University’s desired standard, appropriate non-credit bearing enhancement programmes will be provided to students in accordance with their proficiency level as identified in the entry assessment as specified in Section 4.2.1 above.

(i) Non-credit Bearing Language Enhancement Programmes

Non-credit bearing Chinese/English Language Enhancement Programmes (LEPs) shall be prescribed and provided by CBS/ELC for individual students in respect of their proficiency levels.

Students are expected to complete the LEPs prescribed by CBS and/or ELC before their graduation. Nevertheless, non-completion of the respective LEP(s) will not affect students’ eligibility for graduation.

4.2.4 Undergraduate students will be required to undergo both Chinese and English language proficiency assessment before their graduation. In addition, final year students are strongly recommended to take external tests such as IELTS which can help to strengthen their credentials when seeking employment.

(i) Chinese and English Language Proficiency Assessments

The PolyU-developed Graduating Students’ Language Proficiency Assessment (GSLPA) in Chinese and English shall be adopted as the required language proficiency exit tests.

Students on all UGC-funded Bachelor’s degree programmes shall be required to sit for both GSLPAs before graduation. Except for those who are given exemption from attempting the GSLPA, 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, but this will entirely be on a voluntary basis.
A statement indicating that a student has completed the GSLPAs shall be included in his/her academic transcript. As regards the student’s scores obtained from the GSLPAs, they shall be reported in separate test result transcripts.

4.3 Specified Progression Pattern

For non-local students from Chinese Mainland or countries which have an education system different from the current Hong Kong system, they will have to study the Foundation Year prior to pursuing study in Year 1, Year 2 and Year 3. The progression pattern of the Foundation Year is reproduced in the following from the 2008/09 Foundation-Year Curriculum for completeness of this document. For details, please refer to the original booklet.

**Foundation Year — Semester 1**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA103</td>
<td>Foundation Mathematics I for Science and Engineering</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>AP101</td>
<td>College Physics I</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>APSS184</td>
<td>Understanding the Hong Kong Community</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>CBS2050</td>
<td>Elementary Cantonese</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ELC1004</td>
<td>English for University Studies I</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ENG1001</td>
<td>Foundation Year Seminar I</td>
<td>1</td>
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</table>

**Foundation Year — Semester 2**

<table>
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<th>Course Title</th>
<th>Credits</th>
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</tr>
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<tbody>
<tr>
<td>AMA104</td>
<td>Foundation Mathematics II for Science and Engineering</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>AMA105</td>
<td>Logic : Qualitative and Quantitative</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ELC1005</td>
<td>English for University Studies II</td>
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<tr>
<td>ENG1002</td>
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<td>Foundation Year Elective</td>
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<tr>
<td>Level 1</td>
<td>Foundation Year Elective</td>
<td>3</td>
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</table>

**Foundation Year Electives**

- ABCT102 Foundation Biology
- ABCT103 Fundamental Chemistry*
- AP102 College Physics II
- APSS185 Discovering Psychology*
- COMP100 Introduction to Information Technology*
- COMP102 Enterprise Information Technology
- COMP111 Information Technology Systems
- ELC1003 Extended Writing Skills
* Elective subjects for students who come from Guangdong Province and have been exempted from taking ‘CBS2050 Elementary Cantonese’ by the Programme Leader.

For students who enter the programme by following a local Advanced-level education system, and those who have already finished the Foundation Year, they will pursue their study in Year 1, Year 2 and Year 3 according to the progression pattern specific to each mode of study, as described in the following.

### Year 1 — Semester 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
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<tbody>
<tr>
<td>AMA227</td>
<td>Mathematics I</td>
<td>3</td>
<td>Compulsory</td>
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<tr>
<td>EIE225</td>
<td>Introduction to Electronics and Multimedia Technologies</td>
<td>3</td>
<td>Compulsory</td>
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<tr>
<td>ELC2501</td>
<td>University English I</td>
<td>2</td>
<td>Compulsory</td>
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<tr>
<td>ENG224</td>
<td>Information Technology</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ENG236</td>
<td>Computer Programming</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>GE</td>
<td>GE – China Studies</td>
<td>2</td>
<td>Compulsory</td>
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<tr>
<td>IC291</td>
<td>Practical Training</td>
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<td>Training Credits Compulsory</td>
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### Year 1 — Semester 2

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<th>Credits</th>
<th>Type</th>
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<td>EIE210</td>
<td>Electronics Design</td>
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<td>EIE214</td>
<td>Introduction to Logic Design</td>
<td>3</td>
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<td>EIE341</td>
<td>Signals and Systems</td>
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<td>University English II</td>
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<tr>
<td>ENG236</td>
<td>Computer Programming (cont’d)</td>
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<td>SD2492</td>
<td>Product Design and Social Considerations</td>
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<td>IC291</td>
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<tr>
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### Year 2 — Semester 1

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<tbody>
<tr>
<td>COMP407</td>
<td>Computer Graphics</td>
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<tr>
<td>EIE320</td>
<td>Object-Oriented Design and Programming</td>
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<td>EIE325</td>
<td>Telecommunication Technologies</td>
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<td>EIE343</td>
<td>Computer System Principles</td>
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<td>English for Effective Workplace Communication</td>
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<td>SD348</td>
<td>Introduction to Industrial Design</td>
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<td>SD3984</td>
<td>Computer Game Development I</td>
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### Year 2 — Semester 2

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<td>EIE328</td>
<td>Digital Signal Processing for Multimedia Applications</td>
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<td>EIE342</td>
<td>Computer Networks</td>
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<tr>
<td>EIE344</td>
<td>Fundamentals of Embedded Systems</td>
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<td>EIE360</td>
<td>Integrated Project</td>
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### Year 3 — Semester 1

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<td>CBS2065</td>
<td>Chinese for Electronic and Information Engineering</td>
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<td>Honours Project</td>
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<td>MM2711</td>
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### Year 3 — Semester 2

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<td>MM2021</td>
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<td>Technical Elective</td>
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<td>Technical Elective</td>
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<tr>
<td>GE</td>
<td>GE – Broadening</td>
<td>2</td>
<td>Elective</td>
</tr>
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</table>

### Final Year Technical Electives

- COMP436 Middleware and Distributed Objects
- COMP437 Mobile Computing
- EIE408 Principles of Virtual Reality
- EIE414 Computer Architecture and Systems
- EIE424 Distributed Systems and Network Programming
- EIE426 Artificial Intelligence and Computer Vision
- EIE428 Multimedia Communications
- EIE429 Corporate Networking
- EIE431 Digital Video Production and Broadcasting
EIE432 Web Systems and Technologies
EIE435 Image and Audio Processing

Level 5 subjects
EIE507 Network Design - Theory & Practice
EIE522 Pattern Recognition: Theory & Applications
EIE529 Digital Image Processing
EIE536 High Speed Networks
EIE541 Digital Signal Processing
EIE546 Video Technology
EIE552 Internet Technologies for Multimedia Applications
EIE553 Security in Data Communication
EIE555 Personal Networking Technology
EIE556 Advanced DSP for Multimedia Communications
EIE557 Computational Intelligence and its Applications
EIE558 Speech Processing and Recognition
EIE563 Digital Audio Processing
EIE565 Advanced Multimedia Technology
EIE576 Information Technology in Biomedicine
EIE579 Advanced Telecommunication Systems

Subject to the approval by the Programme Leader, students may take at most one Level 5 subject per semester to replace a final-year technical elective during their final year of study.

General Education Subjects
Students are required to complete two 2-credit General Education subjects (one under the “China Studies” category and one under the “Broadening” category).

5. MODE OF STUDY AND FRAMEWORK

5.1 Mode of Study

The following information about the various modes of study apply to students who enter the programme either after having finished the Foundation Year, or through the local HKALE system or similar. The different years of the various modes of study are referred to as Foundation Year, Year 1, Year 2, Year 3 and Year 4.

All students will pursue identical study in Year 1 and Year 2. After Year 2, they may choose a particular mode of study according to their interest, planning, and places
available. A mode of study is characterized by the credits and subjects required and the progression pattern in Year 1 to Year 4.

There are three modes of attendance, namely Full-time mode, Sandwich mode, and Cooperative Education Scheme (CES) mode.

(i) Full-time mode

Under the Full-time mode, students will normally pursue three years of study in full time and then graduate at the end of the third year after having satisfied all programme requirements.
(ii) Sandwich mode

Under the Sandwich mode, students will pursue the first and second years of study in full time, and then engage in industrial training lasting normally for one year. During the industrial training period, students may choose to study one subject each semester. After the industrial training year, students will pursue the fourth year of study in full time again. Normally students will graduate at the end of the fourth year after having satisfied all programme requirements.
(iii) Cooperative Education Scheme (CES) mode

Under the CES mode, students will pursue the first and second years of study in full time. From Semester 3 of Year 2 up to graduation, students will engage in industrial training while concurrently pursuing study of nine subjects in the University with day-release (one day leave per week) given by the employer. Students will be assigned with an industrial advisor from the enterprise where the student is being deployed, and an academic advisor from the EIE Department for guidance. In early Year 3 Semester 2, students will work together with the advisors to come up with a proposal for a job-related Honours Project, which will commence in Year 3 Semester 2 and complete in Year 4 Semester 1. In this case, students will graduate at the end of the first semester of the fourth academic year after having satisfied all programme requirements. This progression pattern is shown as Track 1 on the next page. In case of students not taking up a job-related Honours Project, students may choose to take up a normal Honours Project and the study will be extended to the end of Year 4 Semester 2. This progression pattern is shown as Track 2 on the next page.
Programme Booklet 2009/10
BSc(Hons) in Internet and Multimedia Technologies (42077)

Department of Electronic and Information Engineering, The Hong Kong Polytechnic University
5.2 Framework for Industrial Training and Cooperative Education Scheme

Students who follow either the Sandwich mode or the CES mode of study will undergo Industrial Training or Cooperative Education after the second year of study. This Section sets out the framework for these trainings.

(i) Training Contents of Industrial Training and Cooperative Education

The training will follow a structured scheme prepared jointly with the sponsoring firm and will be tailored for the student with reference to the firm to which the student will be attached.

(ii) Administration of the Industrial Training and Cooperative Education

Training will take place under the joint supervision of an Industrial Supervisor who will be appointed by the firm to which the trainee is attached, and a University Training Tutor appointed by the Department. The latter will liaise with the Industrial Supervisor to monitor the progress of the student. The Tutor will make frequent contact with the student and will visit the student on-site at regular intervals.

(iii) Log-Book and Report

The trainee is required to keep a log-book on which a brief daily entry is made. The student will submit a monthly report to the Industrial Supervisor and the University Training Tutor. At the end of the training period, the student will submit a final written report. The student will be given an oral examination on the report, and will be required to make an oral presentation to an audience of students and staff, highlighting experience gained.

(iv) Assessment of Industrial Training and Cooperative Education

For the Sandwich mode, the assessment will be completed in the first two weeks of the fourth year. For the CES Track 1 mode of study, the assessment will be completed within the examination week at the end of Semester 1 in the fourth year. For the CES Track 2 mode of study, the assessment will be completed within the examination week at the end of Semester 2 in the fourth year.
In the assessment of industrial training, the key consideration is the extent to which the objective of the training scheme has been met. The assessment components, their relative weightings and the corresponding assessors are set out as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Assessor</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log-book, monthly report and assignment</td>
<td>Industrial Supervisor</td>
<td>40%</td>
</tr>
<tr>
<td>Oral examination, presentation, and final report</td>
<td>University Training Tutor</td>
<td>60%</td>
</tr>
</tbody>
</table>

For the Sandwich mode and the CES mode of study, a pass in Industrial Training or Cooperative Education Scheme respectively is mandatory before the student is eligible for the award of a degree.

6. HONOURS PROJECT

The Honours Project is considered to be of great importance. This is reflected in the weighting given to it, being equivalent to two standard-sized subjects. The feature is “learning by doing”. The project is intended to be a challenge to the students’ intellectual and innovative abilities and to give them the opportunities to integrate and apply the knowledge and analytical skills gained in previous stages of study. It should also provide students with some appreciation of the entire process of problem solving. The progress from concept to final implementation and testing, through problem identification and the selection of alternative solutions will be emphasized.

6.1 Project Management

To facilitate the assessment of the student’s work and to promote the ability to work independently, each student will be assigned one project under the supervision of an academic staff member, although several students may work on different aspects of a larger project.

The assignment of projects is expected to be completed by the month of June preceding the beginning of the final year of studies. Guidelines on the operation of the project are given in Section 6.3.
6.2 Project Assessment

At the completion of the project, students will be required to give an oral presentation/demonstration of the project to an audience of fellow students, staff and industrialists. Two hardcopies and one softcopy of the final report, and the daily log-book are to be submitted at the end of the second semester. The reports will go to an assessment panel consisting of the project supervisor and one other staff member of the Department.

Assessment of the project will be split into 3 areas:
(i) project reports (including project proposal, preliminary report and final report);
(ii) oral presentations; and
(iii) work done over the whole project period (including daily log-book and demonstration).

The Project Management Team, which is composed of the Programme Leader and staff members from teaching sections, will oversee the overall standard of the projects to ensure a reasonable degree of uniformity of assessment.

6.3 Guidelines on the Operation of the Honours Project

(i) Project Proposal

Each student is required to submit a lucid, comprehensive project proposal to his/ her supervisor, which will be used as the basis of project development.

In the project proposal, the following points should be included:
• Statement of problems and objectives
• Result of literature survey conducted (if any)
• Approach to tackle the problem
• Outline design of hardware and software
• Preliminary project schedule

(ii) Daily Log-Book

Students are required to submit a daily log-book with the final report. The log-book should record anything that is important to the project. Typical contents include monthly summaries, notes of meetings, planning and actions, design details, experimental data and analysis, observations and
remarks. The daily log-book will be reviewed, signed and dated by the supervisor(s) at least once a month.

(iii) Preliminary Report

Students are required to prepare a preliminary report after one semester’s work. One copy of the progress report should be submitted to the supervisor, and another one to the General Office of the Department. This forms the basis for the supervisors to review the progress against the declared objectives, and to obviate any discrepancies if necessary.

(v) Oral Presentation

Students are required to give an interim presentation after submission of preliminary report and a final presentation after submission of final report.

(vi) Submission of Final Report

Students are required to submit two hardcopies and one softcopy of the final report to the General Office of the Department. They are also required to upload the soft copy of the final report to the Turnitin system. The students may use the Turnitin system to check their own final reports to prevent unintentional plagiarism. Nevertheless, it is the students’ responsibility to ensure that their final reports are plagiarism-free.

(vii) Demonstration

Each student has to give a demonstration of his/her final project results (such as hardware or software product) in the laboratory to demonstrate the project to students, staff and industrialists.
7. **PRACTICAL TRAINING**

Students are required to undergo training at the University's Industrial Centre (IC). Students have to complete Practical Training (IC291), a 5 training credits subject outside the 99-credit curriculum. Practical Training is an important part of the Programme in which students are given hands-on training, including the use of scientific computation tool, and practice on manufacturing multimedia electronic product through a project in the design and fabrication of multimedia electronic product prototype. IC training is essential for students to blend knowledge into practice and promote critical thinking so as to prepare them for working in an authentic environment.

Students will be assessed and graded in the normal manner from A+ to F. Moreover, the grades obtained from these computer training courses will be counted towards the GPA but not to the Weighted GPA.

8. **WORK-INTEGRATED EDUCATION (WIE)**

8.1 WIE is a mandatory component of the programme. There can be several routes or options for the students to pursue Work-Integrated Education (WIE). These options include the Cooperative Education Scheme (CES), Sandwich mode of study, Preferred Graduate Development Programme (PGDP), industrial projects, and other workplace training opportunities provided by the University or found by students themselves, etc.

8.2 **Credits Requirement**

In order to graduate from this programme, students must attain a minimum of one WIE training credit within the period of study. WIE credits to be earned by students may vary in a range of 1 to 39 credits. Following the Faculty of Engineering’s guideline, students will be awarded one WIE training credit for acquiring every two weeks’ full-time training. WIE training credits will not be counted towards the Grade Point Average (GPA) nor the Weighted GPA (WGPA). After assessing the student’s training performance, a Pass or a Fail grade will be awarded to the student on his/her WIE component. Depending on the actual job duration, the number of training credits obtained by the students varies. For instance, in the case of CES mode of study, the student will earn a maximum of 39 WIE credits over a period of 79 weeks of full-time employment. In the case of Sandwich training, the number of WIE credits earned over a period of 1-year full-time employment will be 26. For the case of industrial attachment or industrial project, normally 2 WIE credits will be earned by the student.
over a period of 4 weeks of workplace training. For the case of PGDP, the nominal working period is 2 months, resulting in 4 WIE credits.

The WIE credits will be reflected in the Co-curricular Activities Transcript of the student, but will not be counted towards the non-credit bearing co-curricular activities as stated in Section 9.

8.3 Intended Learning Outcomes of WIE

Since WIE can be taken in different forms and applied to different kinds of job, the learning outcomes to be achieved will vary depending on the job nature and its duration engaged by the student. However, based on the experience gained from operating the CES and Sandwich modes of the Programme, WIE can bring a lot of advantages to students’ learning both in the profession-specific areas and in their all-round development. The intended learning outcomes of the WIE component are elaborated in the following paragraph.

On successful completion of WIE component, the students will be able to:

(i) Apply knowledge and skills learned from the Programme on the job in a broad context of networking and multimedia profession.
(ii) Recognize the operation and requirement of real-life business, leading to the development of entrepreneurship, global outlook, professional ethics, social and cultural understanding.
(iii) Recognize the expectation of employers, hence leading to better employability.
(iv) Develop their all-round attributes such as interpersonal skills and leadership.
(v) Develop their critical and creative thinking, and problem-solving skills while taking into account various real-life constraints, helping them to pursue life-long learning and continuing professional development.

8.4 Structure of the WIE Component(s)

WIE component under the Programme can be in many forms, namely Cooperative Education Scheme, Sandwich Training, industrial attachment, industrial project, Preferred Graduate Development Programme, and other job opportunities.

8.4.1 Cooperative Education Scheme (CES) (EIE387)

Under this Scheme, the students engage in WIE after the second year of study in the Programme. From Semester 3 of Year 2 up to Semester 1 of Year 4, students will
take up a full-time job to work. Concurrently, they will pursue their study of the remaining curriculum through a “day-release” (the student is released from the job one day per week by the employer) arrangement. The advantage of the CES mode of WIE is that the students can engage in larger scale of projects and are assumed to bear more responsibilities as a result of a fairly long period of employment (1.5 years). Furthermore, there may be possibility for the student to stay with the job “non-stop” after graduation. The WIE performance of the student in CES mode is assessed and a grade is assigned to the subject EIE387.

8.4.2 Sandwich Training (EIE388)

The Sandwich Training is quite similar to the CES, except that its workplace training duration is not as long as CES. After the second year of study, the students will engage in a full-time job for one year. On completion of the WIE component in the Sandwich mode, the student will return to the University to continue the study of the remaining curriculum. The WIE performance of the student in Sandwich Training is assessed and a grade is assigned to the subject EIE388.

8.4.3 Industrial Project

Industrial projects are Honours Projects working with the industry. Students working on an industrial project will pursue the project in the company for a certain period of time. With the arrangement, the students will work with a real-life project in the real working environment.

8.4.4 Preferred Graduate Development Programme (PGDP)

Under the PGDP, students will engage in a real working environment by working in a company which is a partner of the PGDP programme coordinated by the SAO. The duration is usually several weeks in the summer vacation period. Such kind of training opportunity is also recognized as a WIE component.

8.4.5 Other Job Opportunities

It is possible that the students themselves find a job to work with during the summer vacation. This kind of job opportunity will be judged by the Department whether it is helpful to the students in achieving the intended learning outcomes of WIE. The students and the Personal Tutors/WIE Coordinators will work collaboratively with regard to the job selection and the subsequent training contents. The Department will
constantly monitor the progress. At the end of the training, an assessment will be
made on the achievement of learning outcomes by students.

8.5 Guidelines for Operation and Supervision of WIE

The Department adopts a set of strategies to support students’ learning in the
workplace. The followings are the details of the operation at different stages.

8.5.1 Preparation

The Department will actively align with the industry to get WIE placement
opportunities for students. It is important for students to be fully aware of the benefits
brought by WIE. Students will be asked to attend employment seminars as early as
possible. Through this type of arrangement, the students in all years will be better
prepared for job hunting and employment in advance. Students will also be able to
realize the benefits for engaging in WIE and the importance of taking an active role in
completing the training with the best effort.

8.5.2 Operation

There will be WIE Coordinators overseeing all matters related to WIE activities under
the Programme. The WIE Coordinators are the academic staff members of the
Department responsible for the organization and operation of WIE activities. To guide
and monitor students in obtaining the WIE component, each student will be assigned
an academic supervisor (who is also the student’s Personal Tutor) from the Department.
The student and his/her Personal Tutor will jointly plan the WIE details, such as job
selection, training plan, logging of activities, reporting, and assessment.

In the case that the student finds job placement(s) on his/her own, the Personal Tutor
will work with the student to design the learning outcomes if the Personal Tutor finds
the placement suitable to be recognized as a WIE activity. The Personal Tutor will
make frequent contacts with the student and, if appropriate, the employer to monitor
the progress of the student.

8.5.3 Monitoring and assessment

Each student will be guided by his/her personal tutor when conducting the WIE
training. The student’s work will also be monitored continuously and an assessment
will be given when the WIE placement is completed.
8.5.4 Assessment of the WIE Component(s)

The objective of assessment is to determine what has been achieved by the student through WIE. The actual type of work and duration will vary from case to case. For instance, there will be students taking 2-week full-time jobs while some other may undergo a 1.5-year CES training. Hence an assessment framework is set out in the following as a general guideline.

(i) Continuous Assessment

The Personal Tutor may visit the student during the training period so that the Personal Tutor and the employer will be able to discuss the student’s performance together. This will give better feedback on the student’s performance before the training is completed. In the case of CES or Sandwich training, the student is also required to keep a training logbook to document the details about the training received. The training logbook will be inspected by the training supervisor and the Personal Tutor regularly. When the training is completed, the training logbook will be submitted to the Personal Tutor for assessment.

(ii) Report

After the training is completed, the student is required to submit a report to the Personal Tutor. The details to be contained in the report should be commensurate with the training duration. In the report, the student should describe the training received, the objectives that have been achieved, and the experience gained. The student may also conduct a self-evaluation on his/her own performance.

(iii) Employer Evaluation

At the end of the training period, the employer will provide an evaluation of the student’s performance, assessing the student’s work and all-round development.

(iv) Overall Assessment

An overall assessment of the student’s performance will be made by the Personal Tutor by considering all the assessment components as stated in Section 8.5.4(i)-(iii). A pass grade will be given to the student upon
satisfactory completion of the WIE component; otherwise a failure grade will be given.

9. CO-CURRICULAR ACTIVITIES

9.1 Students are required to participate in at least 6 cumulative hours of non-credit bearing co-curricular activities (CCA) in order to satisfy the overall requirement of general education before graduation. The said duration can be a combination of a number of recognized CCA. The scope of activities recognized for fulfilling the requirement of mandatory CCA is determined by Student Affairs Office (SAO) (http://www.polyu.edu.hk/sao/cca) and outlined as follows:

(i) The CCA is non-credit bearing and non-course-required.
(ii) The learning outcomes of such activities/programmes should be able to broaden students’ horizon, and inspire them to actualize all-round development in terms of the strengthening of competencies as mentioned in Section 2.2.
(iii) The format of these activities can be structured short courses, experiential learning, workshops, competitions, talks and seminars, study tour, voluntary work within PolyU and Community Service Learning Programme, etc.
(iv) Community projects can be also recognized as co-curricular activities if the community services are endorsed by faculty/school/department. Community projects with pre-training and/or briefing sessions are more desirable.
(v) The activities should be organized or co-organized by PolyU faculties/schools/departments/units/committees, and/or endorsed by the aforesaid parties as fulfilling the above criteria. The organizer of these activities should ensure that quality assurance mechanism is in place as a measurement of student learning outcome.

9.2 Exception

Activities like internship, placement, paid work, and contribution made by office-bearers in student bodies are NOT considered as CCA. Activities counted as Work-integrated Education (WIE) should not be counted as CCA.

9.3 Fulfilment Status

If students would like to fulfil the mandatory CCA requirement, they should first check with the organizer or the Department whether the activities they are going to
participate in are recognized CCA. After students’ participation in recognized CCA, the organizer or the Department would normally input the students’ participation information into the Co-curricular Achievement Transcript (CAT) administered by SAO. Students may preview their CAT online to check their fulfilment status at http://www.polyu.edu.hk/sams/ (view the CAT category titled “Mandatory Requirement”).

Details of student participation in such co-curricular activity are shown in the CAT category titled “Developmental Programme” and/or “Contribution to University”. However, such fulfilment record originated from student participation in developmental programmes will be uploaded to CAT system normally at the end of the semester.

10. DEPARTMENTAL UNDERGRADUATE PROGRAMME COMMITTEE

10.1 The composition of the Departmental Undergraduate Programme Committee is decided by the Head of Department and normally, it consists of Programme Leaders of all degree and higher diploma programmes hosted by the Department, Head of Department, representative from the Departmental Learning and Teaching Committee, teaching staff representatives, representatives from major serving departments and student representatives. The Committee is responsible for programme review and development.

10.2 The Committee will collect and consider, on a regular basis, the views of students and other key stakeholders on the relevance and currency of the syllabi, the standards of the examinations, the development of the programme, the adequacy of resources and the local and worldwide trends related to electronic and information engineering.

11. “REGULAR” STUDENT, “SELF-PACED” STUDENT, AND STUDENT STATUS

11.1 Students’ eligibility for the range of services provided by the University will be governed by the students’ status, which is determined with reference to the mode of attendance of the academic programmes enrolled and/or the study load as described in Sections 11.5 to 11.7 below.

11.2 Students are normally expected to follow the specified progression pattern. These are referred to as “regular” students. Those students who have been given special
approval by the Programme Leader and the Head of Department for not following the specified pattern are referred to as “self-paced” students.

11.3 Students who register on programmes without any specified progression pattern are also known as self-paced students.

11.4 Self-paced students, either accelerated or decelerated, are required to seek counselling and approval from the Programme Leader and the Head of Department.

Student status:

11.5 Students enrolling on full-time/sandwich programmes or mixed-mode programme, with a study load of 9 credits or more in a semester, are classified as full-time students. Students on full-time/sandwich programmes who wish to change their status, from full-time to part-time, i.e. enrolling for less than 9 credits in a semester, will have to seek prior approval from their Department [please also refer to Section 11.6 (i)].

11.6 (i) Students enrolling on part-time, distance learning, online, and mixed-mode programmes, with a study load of less than 9 credits in a semester, are classified as part-time students.

(ii) Students who enroll on full-time programmes but have been given permission to take less than 9 credits in a semester will be given the option to pay credit fees. If students wish to exercise such option, they have to inform the Department before the end of the add/drop period of that semester. These credit fee paying students are classified as part-time students for that semester.

11.7 Students enrolling on mixed-mode programmes are classified as mixed-mode students. They may engage in a full-time or part-time study load and attend classes either in the evening, in the daytime, or a combination of both. If the mixed-mode students take subjects with a study load reaching the minimum requirement of a full-time student, they will be given full-time status in that semester. Otherwise, they will be given part-time status.

11.8 Students who wish to take individual subjects, but do not wish to register as a candidate for an award, are classified as subject-based students.
12. SUBJECT REGISTRATION (INCLUDING ADD / DROP / WITHDRAWAL OF SUBJECTS)

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

12.2 Students may register subjects for the following semester with reference to the subject results decided by the Subject Assessment Review Panel.

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

12.4 Subject to the maximum study load of 21 credits per semester and the availability of study places, students are allowed to take additional subjects on top of the prescribed credit requirement for award before they become eligible for graduation. For students of full-time programmes, they can take additional subjects from within or outside their programme curriculum. Students can choose freely from those subjects which are available for selection (unless they are barred because of pre-requisites).

12.5 Starting from the 2007/08 cohort of intakes, students studying the foundation year of a 4-year curriculum Bachelor's degree programme will be treated in the same way as students on a 3-year curriculum, in respect of taking additional subjects. Thus, the additional number of subjects taken (which are over and above that required by the programme) will be graded and shown on transcripts. They will be counted in the cumulative and semester GPA, but not necessarily in the weighted GPA (when they are being considered for their award classification). These additional subjects cannot be
taken by students on a pass/fail basis and students’ requests to audit such subjects will be considered by the Department on a case by case basis.

13. ZERO SUBJECT ENROLMENT

No students will be allowed to take zero subject in any semester unless they have obtained prior approval from the Programme Leader and the Head of Department and in any case not later than the end of the add/drop period; otherwise they will be classified as having unofficially withdrawn from their programme. Students who have been approved for zero subject enrolment (i.e. taking zero subject in a semester) are allowed to retain their student status and continue using campus facilities and library facilities. Any semester in which the students are allowed to take zero subject will nevertheless be counted towards the maximum period of registration.

14. SUBJECT EXEMPTION

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

15. CREDIT TRANSFER

15.1 Students may be given credits for recognised previous studies (including mandatory language or general education subjects; please refer also to Section 3.3 above) and the credits will be counted towards meeting the requirements for award. Transferred credits may be counted towards more than one award. The granting of credit transfer
is a matter of academic judgment. In assessing the transferability of subjects previously taken, the syllabus of that subject should be carefully scrutinized to ascertain that it is comparable to the PolyU’s curriculum. Whether the previous studies are from institutions on credit-based or non-credit-based system should not be a matter of concern, and the subject size need not be a perfect match. To ascertain the academic standing of the institution offering the previous studies, the Department might need to request the institutions concerned to provide more relevant information.

15.2 Credit transfer may be done with or without the grade being carried over; the former should normally be used when the credits were gained from PolyU. Credit transfer with the grade being carried over may be granted for subjects taken from outside the University, if deemed appropriate, and with due consideration to the academic equivalence of the subjects concerned and the comparability of the grading systems adopted by the University and the other approved institutions. Subject credit transfer is normally decided by the subject offering Department (for "Broadening" GE subjects, however, the decision will be made by the programme offering Department). However, for applications which are submitted by students who have completed an approved student exchange programme, the decision will be made by the programme offering Department in consultation with the subject offering Departments. As the application for credit transfer may involve subjects offered by more than one Department, the programme offering Department should coordinate and check whether the maximum limit for credit transfer for a student has been exceeded, and whether the student has fulfilled the residential requirement of the University.

15.3 In case of disagreement between the programme offering Department and the subject offering Department, the two Faculty Deans/School Board Chairmen concerned will make a final decision jointly on the application.

15.4 Normally, not more than 50% of the credit requirement for award may be transferable from approved institutions outside the University. For transfer of credits from programmes offered by PolyU, normally not more than 67% of the credit requirement for award can be transferred. In cases where both types of credits are being transferred (i.e. from programmes offered by PolyU and from approved institutions outside the University), not more than 50% of the credit requirement for award may be transferred.

15.5 If the transferred credits are part of a PolyU programme which is accredited by a professional body, the Department concerned should ensure that the transferred credits will also meet the requirement of the relevant professional body.
15.6 If a student is waived from a particular stage of study on the basis of advanced qualifications held at the time of admission, the student concerned will be required to complete fewer credits for award. For these students, the exempted credits will be counted towards the maximum limit for credit transfer when students apply for further credit transfer after their admission.

15.7 Notwithstanding the upper limits stipulated in Section 15.4 above, (and unless professional bodies stipulate otherwise) students may be given more credit transfer than these upper limits (e.g. upon completion of exchange activity as mentioned in Section 15.8 below), subject to their satisfying the residential requirement.

15.8 Credit transfer can be applicable to credits earned by students through study at an overseas institution under an approved exchange programme. Students should, before they go abroad for the exchange programme, seek prior approval from the programme offering Department (who will consult the subject offering Departments as appropriate) on their study plan and credit transferability. As with all other credit transfer applications, the Departments concerned should scrutinise the syllabuses of the subjects which the students are going to take at the overseas institution, and determine their credit transferability based on academic equivalence with the corresponding subjects on offer at the PolyU, and the comparability of the grading systems adopted by PolyU and the overseas institution. The transferability of credits, and the suitability for allowing grades to be carried over, must be determined and communicated to students before they go abroad for the exchange programme. In order to overcome the problems associated with subject-to-subject mappings, block credit transfer rather than subject-by-subject credit transfer can be given.

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

16. DEFERMENT OF STUDY

16.1 Students may apply for deferment of study if they have a genuine need to do so such as illness. Approval from the Programme Leader and the Head of Department is required. The deferment period will not be counted as part of the maximum period of registration.
16.2 Application for deferment of study will be entertained only in exceptional circumstances from students who have not yet completed the first year of a full-time or sandwich programme.

16.3 Where the period of deferment of study begins during a stage for which fees have been paid, no refund of such fees will be made.

16.4 Students who have been approved for deferment are not entitled to enjoy any campus facilities during the deferment period.

17. PRINCIPLES OF ASSESSMENT

17.1 The prime purpose of assessment is to enable students to demonstrate that they have met the aims and objectives of the academic 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. The assessment methods will also allow discrimination between the performance of students in each subject.

17.2 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.

17.3 The ultimate authority in the University for the confirmation of academic decisions is the Senate, but for practical reasons, the Senate has delegated to the Faculty/School Boards the authority to confirm the decisions of Boards of Examiners provided these are made within the framework of the general assessment regulations within the University. Recommendations from Board of Examiners which fall outside these regulations shall be ratified by VP(AD) and reported to the Senate.

18. ASSESSMENT METHODS

18.1 Students' performance in a subject shall be assessed by continuous assessment and/or examinations. Where both methods are used, the weighting of each in the overall subject grade shall be clearly stated in the definitive programme document.

18.2 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 shall be determined and assessed separately.

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

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

19. SUBJECT ASSESSMENT REVIEW PANEL (SARP)

SARP consists of the Head of the Department (as Chairman), the Programme Leader and the relevant subject examiners. SARP is responsible for monitoring the academic standard and quality of subjects and ratifying of subject grades. The Panel will review the distribution of grades within a subject and finalize the grades at the end of each semester/term before submission to the Board of Examiners. The Board of Examiners will not attempt to change any grades.

20. BOARD OF EXAMINERS (BoE)

20.1 The BoE will meet 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) and is responsible to the Senate for making:
   (i) a decision on the classification of awards to be granted to each student on completion of the programme;
   (ii) a decision on deregistration cases; and
   (iii) a decision on cases with extenuating circumstance.

20.2 These decisions are made by the full BoE at the end of each semester in the light of the standard of student achievement appropriate to the award to which the programme is designed to lead, the aims of the programme, the performance on the programme in previous years, the general assessment regulations of the University and the specific programme regulations, and good practice established in the University and elsewhere.

20.3 The BoE will not attempt to change the grades for any student in any subject nor condone failures. The above decisions of the BoE, except those on award and deregistration cases which are straight forward, will be ratified by the Faculty Board.
The Faculty Board may refer the decisions back to the BoE for further consideration and explanation.

20.4 Any decisions by the BoE outside the general assessment regulations of the University, supported by the Faculty Board, shall be referred to VP(AD) for ratification. All such cases shall be reported to the Senate. Decisions by BoE outside the programme regulations but within the general assessment regulations of the University fall within the authority of the Faculty Board.

20.5 Students shall be formally notified of decisions affecting them after the BoE meeting except for those cases which require ratification of the Faculty Board. These latter students shall be formally notified of decisions after the Faculty Board’s ratification or, if a decision is outside the general assessment regulations, after VP(AD) ratifies that decision. Any prior communication of results to these students shall be subject to formal ratification.

21. PROGRESSION / ACADEMIC PROBATION / DEREGISTRATION

21.1 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.

21.2 When a student has a Grade Point Average (GPA) (see Section 25.3 below) lower than 2.0, he/she will be put on academic probation in the following semester. Once when a student is able to pull his 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 transcript of studies.

21.3 A student will have ‘progressing’ status unless he falls within the following categories, either of which may be regarded as grounds for deregistration from the programme:
   (i) the student has exceeded the maximum period of registration for the programme as specified in this programme booklet; or
   (ii) the student’s GPA is lower than 2.0 for two consecutive semesters and his Semester GPA in the second semester is also lower than 2.0; or
   (iii) the student’s GPA is lower than 2.0 for three consecutive semesters.
21.4 The progression of students to the following academic year will not be affected by the GPA obtained in Summer Term, unless the programme enrolled falls into the category described in Section 21.5 below and otherwise specified in this programme booklet.

21.5 Exceptions to Section 21.4 above could only be made if the Summer Term study is mandatory for all students of the programme and that the study constitutes a substantial requirement for graduation.

21.6 Notwithstanding Sections 21.3(ii) and 21.3(iii) above, a student may be deregistered from the programme enrolled before the time specified in Sections 21.3(ii) and 21.3(iii) above if his academic performance is poor to the extent that the Board of Examiners deems that his chance of attaining a GPA of 2.0 at the end of the programme is slim or impossible.

21.7 In the event that there are good reasons, the Board of Examiners has the discretion to recommend that students who fall into categories as stated in Sections 21.3(ii) or 21.3(iii) above be allowed to stay on the programme, and these recommendations should be presented to the relevant Faculty/School Board for final decision.

21.8 Under the current procedures, a student can appeal against the decisions of Boards of Examiners to deregister him/her. If such an appeal was upheld by the Department, the recommendation (to reverse the previous decision to deregister the student) will also be presented to the relevant Faculty Board for final decision.

22. APPEAL AGAINST ASSESSMENT RESULTS

A student may appeal against a decision of a Subject Assessment Review Panel or the Board of Examiners within 5 working days upon the public announcement of the examination results. The procedures for appeals against examination results are detailed in the Student Handbook.

23. RETAKING OF SUBJECTS

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

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

23.3 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.

24. EXCEPTIONAL CIRCUMSTANCES

Absence from an assessment component

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

Aegrotat award

24.2 If a student is unable to complete the requirements of the programme in question for the award due to very serious illness, or other very special circumstances which are beyond his control, and considered by the Board of Examiners as legitimate, the Faculty/School Board will determine whether the student will be granted an aegrotat award. Aegrotat award will be granted under very exceptional circumstances.
24.3 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.

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

24.5 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.

*Other particular circumstances*

24.6 A student's particular circumstances may influence the procedures for assessment but not the standard of performance expected in assessment.
25. **GRADING**

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

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

‘F’ is a subject failure grade, whilst all others (‘D’ to ‘A+’) are subject passing grades. No credit will be earned if a subject is failed.
25.2  A numeral grade point is assigned to each subject grade, as follows:

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

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

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

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

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

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

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

26. ELIGIBILITY FOR AWARD

For students entering the programme via the local Advanced Level examination system, they
will pursue a 3-year study in Year 1, Year 2 and Year 3. For these students, the requirements
for BSc(Hons) in IMT award are specified in the following Sections 26.1 to 26.3. For students
entering the programme form Chinese Mainland or countries which have an education system
different from the current Hong Kong system, they will have to pursue a 4-year curriculum in
this programme. They will have to satisfy the 32 credits requirement as specified in the
Foundation-Year curriculum in addition to the requirements as stated in Sections 26.1 to 26.3
below in order to be eligible for the BSc(Hons) in IMT award.

26.1 Students are required to acquire a total of 99 credits in order to graduate from this
Programme.

A student would be eligible for award if he/she satisfies all the subject requirements
listed below:

(i) Complete all compulsory subjects, the practical training and the honours
project.

(ii) Complete 5 technical electives, and two 2-credit General Education subjects
(one under the “China Studies” category and one under the “Broadening”
category).

(iii) Satisfy the residential requirement for at least 1/3 of the credits to be
completed for the award he is currently enrolled, unless the professional
bodies stipulate otherwise.

(iv) Obtains at least 1 WIE credit as set out in Section 8.

(v) Fulfills the requirement of co-curricular activities as set out in Section 9.

(vi) Achieves a GPA of 2.0 or above.

(vii) Fulfills the University language requirements as set out in Section 4.2.

(viii) Passes Foundation Mathematics (AMA106)

(It is only applicable to admittees who have not studied Foundation Year and
who do not have a "pass" in the A-level or AS-level Mathematics subject(s)
or equivalent, and who have not been given credit transfer for the subject
AMA227 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

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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”. A pass in AMA106 “Foundation Mathematics” is thus a graduation requirement for such students.)

26.2 A student is required to graduate as soon as he/she satisfies all the conditions for award as set out in Section 26.1 above.

26.3 Subject to the maximum study load of 21 credits per semester, a student may take more credits than he/she needs to graduate up to a maximum of 9 credits on top of the prescribed credit requirements for his/her award in or before the semester within which he/she becomes eligible for award.

27. GUIDELINES FOR AWARD CLASSIFICATION

27.1 The guidelines for award classification are stated in the following. In using these guidelines, 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.

27.2 This programme uses Weighted GPA as a guide for helping to determine award classifications. All Level 2 subjects carry a weighting of 0.2. All Level 3, Level 4 and Level 5 subjects carry a weighting of 0.4. The weighting of each level is a measure of the relevance of the level to the classifications of the degree.

Weighted GPA will be computed as follows:

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

where \( W_i \) = weight assigned according to the level of the subject.

\( n \) = number of all subjects counted in GPA calculation as set out in Section 25.3, except those exclusions specified in Section 27.3.

Same as GPA, Weighted GPA is capped at 4.0.
27.3 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. However, if a student attempts more elective subjects (or optional subjects) than those required for graduation in or before the semester in which he/she becomes eligible for award, the elective subjects (or optional subjects) with a higher grade/contribution shall be included in the grade point calculation (i.e. the excessive subjects attempted with a lower grade/contribution, including failed subjects, will be excluded).

27.4 The following are guidelines for Board for Examiners’ reference in determining award classifications:

<table>
<thead>
<tr>
<th>Award Classification</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>The student’s performance/attainment is outstanding, and identifies him/her as exceptionally able in the field covered by the programme in question.</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; (Division I)</td>
<td>The student has reached a standard of performance/attainment which is more than satisfactory but less than outstanding.</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; (Division II)</td>
<td>The student has reached a standard of performance/attainment judged to be satisfactory, and clearly higher than the ‘essential minimum’ required for graduation.</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</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>

27.5 A Pass-without-Honours degree award will be recommended only under exceptional circumstances, when the student has demonstrated a level of final attainment which is below the ‘essential minimum’ required for graduation with Honours from the programme in question, but when he has nonetheless covered the prescribed work of the programme in an adequate fashion, while failing to show sufficient evidence of the intellectual calibre expected of Honours degree graduates. For example, if a student in an Honours degree programme has a Grade Point Average (GPA) of 2.0 or more, but his Weighted GPA is less than 2.0, he may be considered for a Pass-without-Honours classification.
27.6 The following is a set of indicators, for Boards of Examiners’ reference, which can be used in helping to determine award classification:

<table>
<thead>
<tr>
<th>Award Classification</th>
<th>Weighted GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>3.7+ - 4</td>
</tr>
<tr>
<td>2nd (Division I)</td>
<td>3.2+ - 3.7-</td>
</tr>
<tr>
<td>2nd (Division II)</td>
<td>2.3+ - 3.2-</td>
</tr>
<tr>
<td>3rd</td>
<td>2.0 - 2.3-</td>
</tr>
</tbody>
</table>

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

27.7 There is no requirement for the Board of Examiners to produce an award list which conforms to the guidelines in Section 27.6 above.

28. MAJOR IN INTERNET AND MULTIMEDIA TECHNOLOGIES

28.1 Application for Taking Major/Minor Option

Students will be invited in their first year of registration to indicate an irrevocable option of whether to follow a Major/Minor route or to continue with the single-discipline degree. In conjunction with the Major in Internet and Multimedia Technologies (Major in IMT) programme, students may either choose a specific Minor programme, in which a set of specific subjects are prescribed for students to study, or students may just freely select elective subjects to fulfil the credit requirements (such subjects are called free electives). Normally a Minor programme requires 18 credits.

28.2 Progression Pattern

If a student chooses to follow the Major/Minor route of study, s/he will basically follow the progression pattern set out below when selecting the subjects to study in Year 1, Year 2 and Year 3. In this regard, s/he should consult the Programme Leader in choosing the subjects to study in a particular stage.
### Year 1 — Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA227</td>
<td>Mathematics I</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>EIE225</td>
<td>Introduction to Electronics and Multimedia Technologies</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ELC2501</td>
<td>University English I</td>
<td>2</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ENG224</td>
<td>Information Technology</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ENG236</td>
<td>Computer Programming</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>GE</td>
<td>GE – China Studies</td>
<td>2</td>
<td>Compulsory</td>
</tr>
<tr>
<td>IC291</td>
<td>Practical Training</td>
<td>5 training credits</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

### Year 1 — Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMA228</td>
<td>Mathematics II</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>EIE210</td>
<td>Electronics Design</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>EIE214</td>
<td>Introduction to Logic Design</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>EIE341</td>
<td>Signals and Systems</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ELC2502</td>
<td>University English II</td>
<td>2</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ENG236</td>
<td>Computer Programming (cont'd)</td>
<td>---</td>
<td>Compulsory</td>
</tr>
<tr>
<td>SD2492</td>
<td>Product Design and Social Considerations</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>IC291</td>
<td>Practical Training (cont'd)</td>
<td>---</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

### Year 1 — Semester 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC291</td>
<td>Practical Training (cont'd)</td>
<td>---</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

### Year 2 — Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIE320</td>
<td>Object-Oriented Design and Programming</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>EIE325</td>
<td>Telecommunication Technologies</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ELC3508</td>
<td>English for Effective Workplace Communication</td>
<td>2</td>
<td>Compulsory</td>
</tr>
<tr>
<td>SD3984</td>
<td>Computer Game Development I</td>
<td>3</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

### Year 2 — Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIE342</td>
<td>Computer Networks</td>
<td>3</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

5 Major/ Minor/ Free Electives# 15 credits

Major/ Minor/ Free
Year 3 — Semester 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBS2065</td>
<td>Chinese for Electronic and Information Engineering</td>
<td>2</td>
<td>Compulsory</td>
</tr>
<tr>
<td>MM2711</td>
<td>Introduction to Marketing</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td></td>
<td>4 Major/ Minor/ Free Electives#</td>
<td>12</td>
<td>Major/ Minor/ Free</td>
</tr>
</tbody>
</table>

Year 3 — Semester 2

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM2021</td>
<td>Management and Organisation</td>
<td>3</td>
<td>Compulsory</td>
</tr>
<tr>
<td>GE</td>
<td>GE – Broadening</td>
<td>2</td>
<td>Elective</td>
</tr>
<tr>
<td></td>
<td>3 Major/ Minor/ Free Electives#</td>
<td>9</td>
<td>Major/ Minor/ Free</td>
</tr>
</tbody>
</table>

# Total credits accumulated for “Major Electives” in Year 2 and Year 3 must be at least 21 credits.

28.3 Credit Requirement for Major in IMT Award

The credit requirement for the Major in EIE award is 78 credits made up by the following subjects and as set out under the “Major in IMT” column in Table 4.1:

- 45 credits from the subjects categorized as COM (compulsory)
- 21 credits from the subjects categorized as ELE (elective)
- 4 credits from the subjects categorized as GE (General Education)
- 6 credits from the subjects categorized as ELC (English Language)
- 2 credits from the subject categorized as CBS (Chinese Language)

28.4 Eligibility for graduation with Major in IMT Award with / without a Minor Award

Students must satisfy the following requirements in order to graduate:

(i) Credit requirement:

- 78 credits required by the Major in IMT programme as stated in Section 28.3
- 18 credits required by the specific Minor programme or from subjects of any combination of disciplines (i.e. free electives)
- A total of not less than 99 credits (if the credits required for the Major and Minor combination are less than 99, students must take extra credits from any level 1 to level 4 subjects to make up the total credit requirement of 99 credits)

(ii) Achieves a GPA of not less than 2.0
(iii) Satisfies the residential requirement for at least 1/3 of the credits to be completed for the award the student is currently enrolled, unless the professional bodies stipulate otherwise.

(iv) Fulfils the University Language requirements as set out in Section 4.2

(v) Achieves 5 credits categorized as TRN in Table 4.1

(vi) Achieves at least 1 WIE credit as set out in Section 8.2

(vii) Fulfils the requirement of co-curricular activities as set out in Section 9.

(viii) Passes Foundation Mathematics (AMA106)

(It is only applicable to admittees who have not studied Foundation Year and who do not have a "pass" in the A-level or AS-level Mathematics subject(s) or equivalent, and who have not been given credit transfer for the subject AMA227 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". A pass in AMA106 "Foundation Mathematics" is thus a graduation requirement for such students.)

28.5 Guidelines for Award Classification (Major / Minor Programme)

(i) For students who have completed a Major/Minor programme, a single classification will be awarded and their award classification will be based on both their "Major GPA" and "Minor GPA". For students who have completed a Major programme combined with free electives, their award classification will be determined by their "Major GPA" and the grades obtained in the free electives.

(ii) "Major GPA" is derived based on all subjects of the Major programme.

(iii) The "Major GPA" will be Weighted GPA to be derived by a mechanism same as that for the Weighted GPA for award classifications of students on the single-discipline degree (see Sections 27.1 to 27.3 above).

(iv) "Minor GPA" is derived based on the 18 credits of Minor study (either a specific Minor or a free combination of electives). "Minor GPA" will be unweighted.

(v) The "Major GPA" and the "Minor GPA" will be presented separately to the Board of Examiners for consideration. The guidelines for determining award
classification as stipulated in Sections 27.4 to 27.7 are applicable to Major/Minor studies.

(vi) 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.

(vii) In cases where the attainment of a student in the Minor study may warrant the granting of an award classification different from the one the student deserves for his Major study, the Board of Examiners has the discretion to recommend a classification which better reflects the student's performance on the Major study.

29. CURRICULUM MAP

(Please see pages 52 to 53)

30. SYLLABI

(Please see pages 54 to 192)
| Programme Intended Learning Outcomes | AMA227* | AMA228* | COMP436# | COMP437# | EIE210* | EIE214* | EIE225* | EIE320* | EIE325* | EIE328* | EIE341* | EIE342* | EIE343* | EIE344* | EIE360* | EIE408# | EIE414# | EIE424# | EIE426# | EIE428# | EIE429# | EIE430* | EIE431# | EIE432# | EIE435# |
|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 Ability to identify the different aspects of Internet and multimedia systems | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       |
| 2 Ability to design, develop and implement digital systems related to Internet and multimedia technologies | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       |
| 3 Ability to identify, analyze and solve technical problems related to Internet and multimedia technologies | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       |
| 4 Ability to apply computer programming techniques to solve practical engineering problems | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       | ✔       |
| 5 Ability to apply mathematical techniques to model and solve problem | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     |
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| 9 Ability to think critically and creatively | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     |
| 10 Ability to demonstrate self-learning and life-long learning capability | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     |
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| 12 Ability to realize and appreciate cultural diversity and globalization | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     | ✔ ✔     |
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**Note:**

* Compulsory subject
# Elective subject
✔ Supports this programme intended learning outcome

**EIE Subject Title**

- EIE210 Electronics Design
- EIE214 Introduction to Logic Design
- EIE225 Introduction to Electronics and Multimedia Technologies
- EIE320 Object-Oriented Design and Programming
- EIE325 Telecommunication Technologies
- EIE328 Digital Signal Processing for Multimedia Applications
- EIE341 Signals and Systems
- EIE342 Computer Networks
- EIE343 Computer System Principles
- EIE344 Fundamentals of Embedded Systems
- EIE360 Integrated Project
- EIE408 Principles of Virtual Reality
- EIE414 Computer Architecture and Systems
- EIE424 Distributed Systems and Networking Programming
- EIE426 Artificial Intelligence and Computer Vision
- EIE428 Multimedia Communications
- EIE429 Corporate Networking
- EIE430 Honours Project
- EIE431 Digital Video Production and Broadcasting
- EIE432 Web Systems and Technologies
- EIE435 Image and Audio Processing

**Servicing Subject Title**

- AMA227 Mathematics I
- AMA228 Mathematics II
- CBS2065 Chinese for Electronic and Information Engineering
- COMP437 Computer Graphics
- COMP436 Middleware and Distributed Objects
- ELC2502 University English II
- ELC2501 University English I
- ELC3508 English for Effective Workplace Communication
- ENG224 Information Technology
- ENG236 Computer Programming
- JCDP1 Practical Training
- MM2711 Introduction to Marketing
- SD2492 Product Design and Social Considerations
- SD3484 Product Design and Social Considerations
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## Programme Intended Learning Outcomes

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<th>MM2711*</th>
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# Elective subject
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**EIE Subject Title**

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- COMP436 Middleware and Distributed Objects
- COMP437 Mobile Computing
- ELC2501 University English I
- ELC2502 University English II
- ELC3508 English for Effective Workplace Communication
- ENG224 Information Technology
- ENG236 Computer Programming
- IC291 Practical Training
- MM202 Introduction to Management and Organisation
- MM2711 Introduction to Marketing
- SD2492 Product Design and Social Considerations
- SD348 Introduction to Industrial Design
- SD3983 Computer Game Development II
- SD3984 Computer Game Development I
SUBJECT DESCRIPTION FORM

Subject Title: Foundation Biology  
Subject Code: ABCT102

Number of Credits: 3  
Hours Assigned:  
Lecture: 32 hours  
Tutorial: 10 hours

Pre-requisite: nil  
Co-requisite: nil  
Exclusion: nil

Objectives:
The lectures aim to explain and discuss the knowledge of biology at foundation level which is essential to proceed to higher level of study in biology-related disciplines.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:

1. understand the basic features and functions of cells;
2. describe the basic structures and functions of body systems;
3. understand the fundamental features of microorganisms; and
4. understand the basic features of ecosystems.

Keyword Syllabus (Indicative):

1. Cells  
   • Structures and functions of the cell  
   • Homeostasis and transport within the cell  
   • Cellular respiration and photosynthesis  
   • Cell reproduction - mitosis and meiosis

2. Genetics  
   • Fundamentals of genetics  
   • Nucleic acids and protein synthesis  
   • Inheritance patterns  
   • DNA technology

3. Body Functions  
   • Organization of human tissues, organs and systems  
   • Overview of physiological functions:  
     Nervous system, cardiovascular system, respiratory system, digestive system, renal system, immune system, endocrine and reproductive systems

4. Microorganisms  
   • Bacteria and viruses  
   • Protozoa  
   • Algae and fungi

5. Ecology  
   • Introduction to ecology and populations

Teaching and Learning Approach:
The teaching and learning approach includes lectures which aim to enrich the knowledge and concepts of biology at foundation level. In addition, written assignments and tutorial sessions are also included for further consolidating the knowledge discussed in lectures. Students will be assessed by written assignments, quizzes and written examination.

Method of Assessment:
Continuous Assessment: 50%  
Examination: 50%
Essential Reading:

Reference List:
Subject Title: Fundamental Chemistry
Subject Code: ABCT103
Number of Credits: 3
Hours Assigned: Lecture 36 hours
Tutorial 6 hours
(The students are also expected to spend about 80 hours for self-study.)

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
This subject educates student with fundamental knowledge in chemistry. It is also a bridging course for students previously learned chemistry in a language other than English.
The subject aims to:
1. provide students with a broad fundamental knowledge in chemistry required for the study of science, technology, engineering or related programme; and
2. help student study chemistry effectively in an English-medium learning environment and to acquaint student with the necessary chemical vocabularies.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:
1. understand the fundamental principles of chemistry;
2. have sufficient chemical knowledge for their chosen field of study; and
3. understand and appreciate the chemical terms and principles that they may encounter in written and oral communication.

Keyword Syllabus:
1. Atomic Structure
   Electromagnetic radiation, hydrogen spectrum, energy levels, electron spin, quantum numbers, dual properties of matter, wave function and probability, uncertainty principle, charge clouds of s, p, d and f orbits, radial distribution curves, electronic configurations of many-electron atoms, Pauli exclusion principle, Aufbau principle, ionization energy, electron affinity, electronegativity, atomic and ionic radii and periodicity.
2. Chemical Bonding
   Ionic bonds, covalent bonds, dative bonds, metallic bonds, van der Waals forces, hydrogen bonds, concepts of valence bond theory and hybridization, resonance, molecular shapes by VSEPR method, molecular orbital theory of homonuclear and heteronuclear diatomic molecules, multi-centre bonding in electron deficient molecules.
3. Properties of Solid
   Solids: amorphous solids, types of crystals, unit cell, co-ordination number, closest packing, crystal structures.
4. General Inorganic Chemistry
   Main group elements and their compounds.
5. General Organic Chemistry

Teaching and Learning Approach:
Lectures will provide students with general outlines of key concepts and guidance on further reading. Lectures will be further consolidated through assignments and tutorials. Students will be assessed by assignments, quizzes as well as an end-of-term written examination.
Method of Assessment:
Continuous Assessment: 60%  Examination: 40%

Essential Reading:
Subject Title: Foundation Mathematics I for Science and Engineering

Subject Code: AMA103

Number of Credits: 3

Hours Assigned: Lecture 28 hours, Tutorial and Student Presentation 14 hours

Pre-requisite: nil

Co-requisite: nil

Exclusion: nil

Objectives:

This is a subject to provide students with a solid foundation in Differential and Integral Calculus. It is essential for all undergraduate students of Engineering or Science. The emphasis will be on application of mathematical methods to solving basic engineering science problems.

Learning Outcomes:

On successful completion of this subject, students are expected to be able to:

1. understand the concept of functions and inverse functions;
2. use mathematical induction in various contexts;
3. understand the algebra and geometry of complex numbers and apply complex numbers to solve science and engineering problems;
4. apply mathematical reasoning to analyse essential features of different mathematical problems such as differentiation and integration;
5. apply appropriate mathematical techniques to model and solve problems in science and engineering;
6. extend their knowledge of mathematical techniques and adapt known solutions in different situations;
7. undertake continuous learning.

Keyword Syllabus:

1. Basic Concepts
   - Mathematical induction; Functions and inverse functions; Elementary functions, trigonometric functions; Complex numbers; De Moivre's Theorem; Roots of a complex number.

2. Differential Calculus
   - Limits and continuity; Derivatives; Techniques of differentiation; Mean value Theorem; Higher derivatives; Maxima and minima; Curve sketching.

3. Integral Calculus
   - Definite and indefinite integrals; Fundamental Theorem of Calculus; Techniques of integration; Taylor's Theorem; Applications in geometry, physics and engineering.

Teaching and Learning Approach:

The lectures aim to provide the students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. To develop students' ability for logical thinking and effective communication, tutorial and presentation sessions will be held.

Method of Assessment:

Continuous Assessment: 40% Examination: 60%

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

SUBJECT DESCRIPTION FORM

Subject Title: Foundation Mathematics II for Science and Engineering  
Subject Code: AMA104  
Number of Credits: 3  
Hours Assigned: Lecture 28 hours, Tutorial and Student Presentation 14 hours  
Pre-requisite: Foundation Mathematics I for Science and Engineering (AMA103)  
Co-requisite: nil  
Exclusion: nil  

Objectives:  
This is a subject to provide students with a solid foundation in Mathematics and Statistics. It aims to prepare the students for studying an undergraduate programme in Engineering or Science. The emphasis will be on application of mathematical methods to solving basic engineering science problems.

Learning Outcomes:  
On successful completion of this subject, students are expected to be able to:  
1. understand the concepts of convergence and divergence of series and to apply Taylor’s expansions in solving numerical problems;  
2. use the methods in matrices and linear equations in problem solving; and  
3. apply the techniques of statistics to model and solve problems in science and engineering;

Keyword Syllabus:  
1. Infinite Series  
   Convergence of series, including tests for convergence; power series; Taylor expansions of functions; applications.  
2. Linear Algebra  
   Matrices and determinants; Systems of linear equations.  
3. Probability and Statistics:  
   Descriptive statistics; Frequency distribution; Mean, median and mode; Variance and standard deviation; Probability; Discrete and continuous random variables; Normal distribution.

Teaching and Learning Approach:  
The lectures aim to provide the students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. To develop students’ ability for logical thinking and effective communication, tutorial and presentation sessions will be held.

Method of Assessment:  
Continuous Assessment: 40%  
Examination: 60%  
To pass this subject, students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components.
Reference List:

SUBJECT DESCRIPTION FORM

Subject Title: Logic: Qualitative and Quantitative
Subject Code: AMA105
Number of Credits: 3
Hours Assigned: Lecture 28 hours
Tutorial 14 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
This subject aims to develop students’ ability in logical and analytical thinking through the qualitative and quantitative aspects of logic. The first part will emphasize qualitative logic and will be taught by the General Education Centre. The second part will emphasize quantitative logic. Some topics from discrete mathematics will be presented as illustrations of the general theory. This part will be taught by the Department of Applied Mathematics.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to demonstrate some ability to:
1. demonstrate basic logical reasoning.
2. see the relationship between formal logic and natural language.
3. apply logical reasoning in both everyday and academic situations.
4. recognize and refute common logical fallacies.
5. appreciate the axiomatic approach in mathematics.
6. understand why proofs of mathematical statements work; and
7. apply logical reasoning in problem solving.

Keyword Syllabus:
1. Qualitative Logic:
2. Quantitative Logic:
   - Sets and propositions; Permutations and combinations; Relations and Functions; Graphs and Trees; Natural Numbers.

Teaching and Learning Approach:
Introduction to the key concepts and relationships of formal logic will be done primarily through lectures. Examples and case studies will be presented in small group tutorials. Finally, self-study will be encouraged through student accessible computer-based exercises. Assessment will be in the form of both in-class mid-term tests as well as group projects associated with tutorials.

Method of Assessment:
Continuous Assessment: 40%  Examination: 60%
To pass this subject, students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components.
Reference List:

SUBJECT DESCRIPTION FORM

Subject Title: Foundation Mathematics  
Number of Credits: 3  
Subject Code: AMA106  
Hours Assigned:  
- Lecture 28 hours  
- Tutorial and Student Presentation 14 hours

Pre-requisite: nil  
Co-requisite: nil  
Exclusion: nil

Objectives:
To provide students with a solid foundation in Differential and Integral Calculus, and in Matrix Algebra.

Learning Outcomes:
On successful completion of this subject, students are expected to 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.

Keyword Syllabus:
1. Basic concepts
   Functions and inverse functions; Elementary functions, Trigonometric functions.

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

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

4. Matrix Algebra
   Introduction to matrices and determinants.

Teaching and Learning Approach:
The subject will be delivered mainly through lecturers, tutorials and presentation. The lectures aim to provide the 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 for logical thinking and effective communication.

Method of Assessment:
Problem-based questions in assignments: 10%  
Mid-term test: 30%  
Examination: 60%
Reference List:

Alignment of Assessment and Learning Outcomes:

<table>
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<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td>Continuous Assessment</td>
<td>1,2,3,4,5</td>
<td>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.</td>
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**Subject Title:** College Physics I  
**Subject Code:** AP101  
**Number of Credits:** 3  
**Hours Assigned:**  
- Classroom teaching and laboratory experiments  
  - Lecture 34 hours  
  - Laboratory 8 hours  
- Multimedia teaching/learning and other activities  
  - Virtual Laboratory 12 hours  
  - Self-study 60 hours  

**Pre-requisite:** nil  
**Co-requisite:** nil  
**Exclusion:** nil

### Objectives:
This is the first bridging course in physics of the Foundation Programme for students admitted from mainland. It provides a broad foundation in mechanics and thermal physics, preparing students to study science, engineering, or related programmes.

### Learning Outcomes:
On successful completion of this subject, students are expected to be able to:

1. solve simple problems in single-particle mechanics using calculus and vector;  
2. solve problems on rotation of rigid body about fixed axis;  
3. define simple harmonic motion and solve simple problems;  
4. apply Archimedes’ principle to solve problems in hydrostatics;  
5. apply Bernoulli’s equation to simple problems in fluid flow;  
6. explain ideal gas laws in terms of kinetic theory;  
7. apply the first law of thermodynamics to simple processes;  
8. solve simple problems related to the Carnot cycle;  
9. solve simple problems in travelling waves;  
10. explain the formation of acoustical standing waves and beats; and  
11. use Doppler’s effect to explain changes in frequency received.

### Keyword Syllabus:

1. **Preparation in Mathematics**  
   Review of algebra, geometry and trigonometry; Function and graph; Derivative; Integration; Vectors and coordinate system.

2. **Mechanics**  
   Calculus-based kinematics, dynamics and Newton’s laws; Calculus-based Newtonian mechanics, involving the application of impulse, momentum, work and energy, etc.; Conservation law; Gravitation field; Systems of particles; Collisions; Rigid body; Rotation; Angular momentum; Oscillations and simple harmonic motion; Pendulum; Statics and elasticity; Hydrostatics and Archimedes’ principle; Bernoulli’s equation.

3. **Thermal Physics**  
   Conduction, convection and radiation; Black body radiation and energy quantization; Ideal gas and kinetic theory; Work, heat and internal energy; First law of thermodynamics; Entropy and the second law of thermodynamics; Carnot cycle; Heat engine and refrigerators.

4. **Waves**  
   Longitudinal and transverse waves; Travelling wave; Doppler effect; Acoustics.
Teaching and Learning Approach:
1. Lectures are given to deliver the subject outline and key physics concepts to the students. The students will also get the guidance on further reading.
2. Assignments are used to help the students gain analytical abilities through problem-solving and also to help them strengthen the concepts taught.
3. Laboratories are designed to help the students gain hands-on experience in the operation of equipment and apply their knowledge in the experiments.

Method of Assessment:
Continuous Assessment: 40%  Examination: 60%

Essential Reading and CD-ROM:

Reference List:
SUBJECT DESCRIPTION FORM

Subject Title: College Physics II
Number of Credits: 3

Subject Code: AP102
Hours Assigned:
Classroom teaching and laboratory experiments
  Lecture 34 hours
  Laboratory 8 hours
Multimedia teaching/learning and other activities
  Virtual Laboratory 12 hours
  Self-study 60 hours

Pre-requisite: College Physics I (AP101)
Co-requisite: nil
Exclusion: nil

Objectives:
This is the second bridging course in physics of the Foundation Programme for students admitted from mainland. It is built on College Physics I and continues on topics in waves and optics, electromagnetism and modern physics, in preparing students to study science, engineering, or related programmes.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:

1. apply simple laws in optics to explain image formation;
2. explain phenomena related to the wave character of light;
3. define electrostatic field and potential;
4. use Gauss’ law in solving problems in electrostatics;
5. solve problems on interaction between current and magnetic field;
6. apply electromagnetic induction to various phenomena;
7. solve simple problems in AC circuits,
8. describe simple models of the atom and the nucleus, and

Keyword Syllabus:

1. Waves and Optics
   Reflection and refraction; Image formation by mirrors and lenses; Compound lens; Microscope and telescope; Superposition of waves; Huygen’s principle; Interference and diffraction; Interferometers and diffraction grating; Polarization; Wave-particle duality.

2. Electromagnetism
   Charge and field; Coulomb’s law and Gauss’ law; Electrostatic field and potential difference; Capacitors and dielectric; Current and resistance; Ohm’s law; Electromotive force, potential difference and RC circuits; Magnetic force on moving charges and current; Hall effect; Biot-Savart law and Ampere’s law; Faraday’s law and Lenz’s law; Self inductance and mutual inductance; Transformers; AC circuits and applications.

3. Modern Physics
   Photons and photoelectric effects; Bohr model and hydrogen spectrum; Compton effect.

Teaching and Learning Approach:
1. Lectures are given to deliver the subject outline and key physics concepts to the students. The students will also get the guidance on further reading.
2. Assignments are used to help the students gain analytical abilities through problem-solving and also to help them strengthen the concepts taught.
3. Laboratories are designed to help the students gain hands-on experience in the operation of equipment and apply their knowledge in the experiments.
Method of Assessment:
Continuous Assessment: 40%  Examination: 60%

Essential Reading and CD-ROM:

Reference List:
# SUBJECT DESCRIPTION FORM

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Understanding the Hong Kong Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code:</td>
<td>APSS184</td>
</tr>
<tr>
<td>Number of Credits:</td>
<td>3</td>
</tr>
<tr>
<td>Hours Assigned:</td>
<td>Lecture 24 hours, Seminar 18 hours</td>
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<table>
<thead>
<tr>
<th>Pre-requisite:</th>
<th>nil</th>
</tr>
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<tr>
<td>Co-requisite:</td>
<td>nil</td>
</tr>
<tr>
<td>Exclusion:</td>
<td>nil</td>
</tr>
</tbody>
</table>

## Objectives:

The subject aims to provide the students with an integrated knowledge required for the understanding and application of sociological concepts to understand the social and cultural development of Hong Kong.

## Learning Outcomes:

On successful completion of this subject, students are expected to be able to:

1. understand and describe the historical development, social life, and cultural trajectory of colonial and post-colonial Hong Kong; and
2. analyze the social, cultural and political aspect of colonial and post-colonial Hong Kong.

## Keyword Syllabus:

1. Pre-1841 Hong Kong: Wall Communities and the Form of Living.
2. Domestic Villages and the Survival Strategies.
3. 1841: The Coming of the Colonial Hong Kong.
4. The Chinese Communities.
5. Post-1950's Hong Kong: the Minimally Integrated Social and Political System.
6. The Development and the Future of Social Service in Hong Kong.
7. Modern City Life of Hong Kong: Shopping Malls.
8. Residence Patterns of Hong Kong People: Public Housing and Home Ownership.
9. Landscape of Hong Kong: Disney World, Tourism and Economic Development.
10. Hong Kong's Tomorrow.

Students will also have to participate in field visits which introduce them to various aspects of the traditional and modern social lives in Hong Kong. They are encouraged to focus on the cultural and social aspects of Hong Kong society. Appropriate sites for visit may include: Market at Yuen Long, Fanling and Sheung Shui; Tai O- a fishing Village, Central and Sheung Wan: Wan Cha; Hong Kong Museum of History and etc.

## Teaching and Learning Approach:

Apart from the lectures, students would participate in outings by which they are introduced to, on the one hand, the historic sites that could exhibit the traditional social lives of Hong Kong people, and on the other the modern landscapes of Hong Kong. In addition, students are required to attend seminars and present their views on various aspects of the traditional and modern social lives in Hong Kong. Students are encouraged to focus on the cultural and social aspects of Hong Kong society.

## Method of Assessment:

Continuous Assessment: 100%

1. 30% - Individual term paper on social/cultural life of HK
2. 40% - Participation (lecture/seminar/fieldtrip)
3. 30% - Group presentation
Reference List:

SUBJECT DESCRIPTION FORM

Subject Title: Discovering Psychology
Subject Code: APSS185
Number of Credits: 3
Hours Assigned:
- Lecture: 28 hours
- Seminar: 14 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
To enable students to:
1. acquire foundational understanding of major psychological theories and their relations to everyday life; and
2. clarify myths and facts about psychology through exploring different psychological specializations.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:
1. develop clear understanding of essentials of psychology; and
2. appreciate the diverse applications of psychological concepts and research findings to real-world problems and challenges.

Keyword Syllabus:
1. Discovering Major Psychological Perspectives and Their Contributions.
2. Exploring Diversity of Psychological Specializations.
   - Biological Psychology: brain’s building, nervous system and human behaviour
   - Cognitive Psychology: snapshots of memory, thinking and creativity
   - Developmental Psychology: life-span human development (from newborn to old age)
   - Psychology of Gender and Sexuality: psychology of men and women, theories of love and interpersonal attraction
   - Personality Psychology: major personality types and assessment
   - Health Psychology: stress and coping strategies
   - Abnormal Psychology: basic perspectives of abnormality and major therapies
   - Social Psychology: social perception, attitudes, social and group influence
   - Industrial and Organizational Psychology: work motivation and leadership
   - Consumer Psychology: advertising and conditioning, consumer behavioural patterns
   - Chinese Psychology: application of psychological theories in Chinese culture

Over the past decades, psychology as an integrated discipline of social sciences, arts and science, has become increasingly popular. This subject is designed to provide students with essential psychological concepts and their applications in everyday life. Students are encouraged to explore salient and interesting features of specializations of psychology in a student-friendly format, including: an overview of major theories of psychology and their contributions, brain and human behaviour (biological psychology), snapshots of memory, thinking and creativity (cognitive psychology), life-span approach to human development (developmental psychology), psychology of gender and sexuality, major personality theories and assessment (psychology of personality), concepts of abnormality and major therapies (abnormal psychology), stress and coping (health psychology), social cognition and influence (social psychology), work motivation and styles of leadership (industrial / organizational psychology), and application of psychological theories in Chinese culture (Chinese Psychology).

Teaching and Learning Approach:
The learning and teaching approach is characterized by active experiential learning, which encourages students to master psychological concepts through interactive lectures, small group discussions, and interaction with web-assisted learning and teaching materials. This learn-by-doing focus engages students through active class participation, seminar discussion, group project, and web-assisted practice exercises/quiz.
**Method of Assessment:**

Continuous Assessment: 100%

1. Class and Seminar Participation (10%)
2. Quiz (30%)
3. Individual Seminar Presentation or Reflection Paper (30%)
4. Group Project Presentation and Report (30%)

**Essential Reading:**


**Reference List:**

SUBJECT DESCRIPTION FORM

Subject Title: Introduction to Information Technology  Subject Code: COMP100
Number of Credits: 3  Hours Assigned: Lecture 14 hours
                        Laboratory 42 hours

Pre-requisite: nil  Co-requisite: nil  Exclusion: nil

Objectives:
This subject provides students with the basic concepts of information technology and computing, as well as knowledge and practice on deploying and controlling common information technology applications. This subject is suitable for all students as a first subject in information technology, whether they intend to continue to study information technology or not. Students who intend to study information technology-related programmes are strongly recommended to take both COMP100 and COMP111.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:

1. understand how a computer works;
2. understand the potentials of information technologies in business and industry;
3. use popular operating systems to carry out sequence of tasks;
4. appreciate the power of programmed computer operation;
5. understand the current trends in the development of popular information technologies such as the Internet and related tools; and
6. appreciate IT-related intellectual property issues and their protection.

Keyword Syllabus:
1. Introduction to Computer Systems
   Major components of computer systems: central processing units, storage devices and media, inputs / outputs; working principle of computers; contemporary types of CPU, memory, input / output devices currently in use.

2. System Software
   Functions and operations of system software; basic features and commands of MS Windows and Unix / Linux; script language and task control.

3. Communication, Multimedia and the Internet
   Communication and networking; Internet resources and tools; multimedia information creation and application.

4. IT Applications
   Introduce typical applications of information technologies such as office automation, knowledge management, education, entertainment, digital edutainment, manufacturing, geo-informatics, bio-informatics, etc.

5. Inside IT Applications
   Role of programming in IT applications, e.g. shell programs, macros in Excel, robotic control concept of algorithm and programming, debugging.

6. IT Intellectual Property
   Security, privacy and ethics with software; copyright and patent law; trade secrets and registered design.

Teaching and Learning Approach:
The course material will be delivered as a combination of mass lectures and small group supervised laboratory sessions. Students will get familiarized with common operating systems and environment, internet and multimedia tools. They will also attempt to use basic office automation tools such as word processing, spreadsheet, and simple database operations.
Method of Assessment:
Coursework: 100%

Reference List:
SUBJECT DESCRIPTION FORM

Subject Title: Enterprise Information Technology
Subject Code: COMP102
Number of Credits: 3
Hours Assigned: Lecture 28 hours
 Tutorial/Laboratory 14 hours

Pre-requisite: nil  Co-requisite: nil  Exclusion: nil

Objectives:
This subject provides students with the concept of information systems and their role in today’s enterprises. This subject can be taken with or without having taken COMP100 as a pre-requisite. It is suitable for all students.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:

1. understand the use of information systems at various organizational levels;
2. understand the basic principles of the modelling, storage, retrieval and management of information in an enterprise;
3. appreciate the use of strategic information systems for competitive advantages; and
4. understand ethical and social implications of information systems.

Keyword Syllabus:
1. Basic Principles of Databases
   Data, information and knowledge; modelling and storage of information in databases; querying and retrieval of data; transaction processing.
2. More Advanced Manipulation and Management of Information
   The principles and applications of data warehousing, data mining, and knowledge management in an enterprise.
3. Decision Support for Business Intelligence
   Decision and executive support systems; business intelligence technologies such as expert systems, genetic algorithms for organizational modelling, neural networks and fuzzy logic for business applications; hands-on experience in using tools such as SPSS, data mining tool, neural network engine.
4. Electronic Commerce/Business
   Business use of the Internet, world wide web, intranets and extranets; electronic banking; cyber trading and investing; marketing on the internet; smart card trends, development methods and tools; security and cryptography.
5. Networked Enterprise
   Managing cooperative work environments; workflow and business process engineering; groupware and platforms for collaborative work, e.g. Novell.
6. Knowledge Management Concepts
   Corporate memory, intellectual capital, personal knowledge management, knowledge transfer, business intelligence.

Teaching and Learning Approach:
Lectures for delivery of conceptual knowledge and analytical techniques in case studies. Tutorials/Laboratories for discussion of real business cases and hands-on experience of tools and databases.

Method of Assessment:
Coursework: 60%  Examination: 40%
Reference List:

SUBJECT DESCRIPTION FORM

Subject Title: Information Technology Systems
Subject Code: COMP111
Number of Credits: 3
Hours Assigned: Lecture 28 hours, Laboratory 28 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
This subject provides the students with the foundations of information systems, and basic methods of problem-solving with computer-based tools. It can be taken with or without having taken COMP100. Students who intend to study information technology-related programmes are strongly recommended to take both COMP100 and COMP111.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to:

1. understand underlying principles of computer organization;
2. solve simple problems with computer-based tools involving programming, algorithms and other technologies; and
3. be able to control and be aware of the opportunities and limitations provided by ready-made tools and software.

Keyword Syllabus:
1. Fundamental Concepts
   Computer logic and organization, binary number representation and manipulation, modern computer architectures and trends, computer cluster, supercomputer, the computational grid.

2. System Software
   Operating system concepts, basic software development methods and tools, programming language, compiler, project management (Unix make file), debugger.

3. Basic Programming
   Basic C programming, simple data types, expression, control structure, structured data types, I/O, files.

4. Basic Algorithm and Problem Solving
   Problem solving procedure and tool, flowchart, pseudo-code, simple algorithms like linear search and bubble sort, implication on program execution time.

5. Data Communication, the Internet, and the World Wide Web
   Networking concepts; TCP/IP and Novell; features of Internet and Internet address, mobile computing.

6. Problem Solving with Computer-based Tools
   Integration of different computer-based technologies such as system software, application software, databases, networking, and mobile technologies to solve real-world problems.

Teaching and Learning Approach:
Lectures for delivery of conceptual knowledge and problem solving techniques. Tutorials/Laboratory for discussions, hands-on programming and implementation of solutions.

Method of Assessment:
Coursework: 60%  Examination: 40%
Reference List:

SUBJECT DESCRIPTION FORM

Subject Title: Extended Writing Skills
Subject Code: ELC1003
Number of Credits: 3
Hours Assigned: Seminars 42 hours

Pre-requisite: English for University Studies I (ELC1004)
Co-requisite: nil
Exclusion: nil

Objectives:
This subject aims to further develop students’ competence in written communication in academic contexts and to enhance their ability to communicate effectively in an English-medium learning environment. The main emphasis of the subject is on enhancing students’ confidence and their competence in the use of grammar, vocabulary and academic writing conventions.

Learning Outcomes:
On successful completion of this subject, students are expected to be able to use the language and study skills needed to:
1. organize, write and revise academic essays and project reports;
2. organize and write correspondence to request assistance for study-related work; and
3. participate effectively in discussions.

Keyword Syllabus:
The learning outcomes will focus on the use of grammar and vocabulary in the writing of a variety of text types. Activities to enhance speaking and listening skills will be integrated into the interactive and project-based work throughout the course.

1. Appropriateness and accuracy of vocabulary and grammar
   Collocation and connotation of words; verb forms, prepositions and complex sentences.

2. Coherence and cohesion in writing
   Paragraph development; topicalisation and thematisation; cohesive devices including articles, determiners, connectives, pronouns and anaphoric references.

3. Logical development in writing
   Organisation in a variety of text types; selection of information; logical development of themes and topics.

4. Language development and independent learning strategies
   Self-access study tools such as online dictionaries, thesauruses and web concordancers to enhance language proficiency and develop vocabulary; independent language learning strategies such as the use of learning portfolios.

Teaching and Learning Approach:
The study method is primarily seminar-based and interactive learning techniques will be employed in activities such as discussions, role-plays and individual and group activities. Information technology will be employed to facilitate the learning and application of writing skills and online writing tools.

Method of Assessment:
Continuous Assessment: 100%

Indicative references:
SUBJECT DESCRIPTION FORM

Subject Title: English for University Studies I

Subject Code: ELC1004

Number of Credits: 3

Hours Assigned: Seminars 42 hours

Pre-requisite: nil

Co-requisite: nil

Exclusion: nil

Objectives:
This subject aims to help students study effectively in an English-medium learning environment and to enhance their proficiency in English.

The course is designed to enable students to use English effectively in the contexts they will encounter in their university studies. The main emphasis is on improving students’ confidence and competence in grammar, vocabulary and pronunciation in these contexts.

Learning Outcomes:
At the end of the course, the students are expected to be able to use the language and study skills needed to:
1. deliver effective oral presentations;
2. summarise and paraphrase materials from written and spoken sources; and
3. plan, write and revise expository essays.

Keyword Syllabus:
This syllabus is indicative. The balance of the components, and the weighting accorded to each, will be based on the specific needs of the students.

1. Spoken communication
   Developing and practising specific oral skills required to prepare and deliver effective oral presentations; developing awareness of interpersonal communication strategies in different social and cultural contexts.

2. Written communication
   Analysing and practising common writing functions; improving abilities of writing topic sentences and strategies for paragraph development; understanding common patterns of organisation in writing; taking notes from written and spoken sources; introducing summarising skills; improving coherence and cohesion in writing; developing revision and proofreading skills.

3. Reading and listening
   Understanding the content and structure of information delivered orally and in print form; reading and listening for different purposes.

4. Language development
   Developing relevant grammar, vocabulary and pronunciation skills.

Teaching and Learning Approach:
The study method is primarily seminar-based. Seminar activities will include discussions, role-plays and individual and group activities. Use will be made of information technology where appropriate. Learning and teaching materials developed by the English Language Centre will be used throughout this course. Teachers will recommend additional reference materials as required.
Method of Assessment:
Continuous Assessment: 100%

Indicative references:
SUBJECT DESCRIPTION FORM

Subject Title: English for University Studies II  
Subject Code: ELC1005
Number of Credits: 3  
Hours Assigned: Seminar 42 hours

Pre-requisite: English for University Studies I (ELC1004)  
Co-requisite: nil  
Exclusion: nil

Objectives:
This course aims to further enhance the written and spoken English communication skills that students will need to function effectively in their university studies. The main emphasis is on improving students’ confidence and competence in writing essays and participating in discussions.

Learning Outcomes:
At the end of the course, students are expected to be able to use the language and study skills needed to
1. participate effectively in formal and informal discussions;
2. organise and compose descriptive writing; and
3. plan and write argumentative essays.

Keyword Syllabus:
This syllabus is indicative. The balance of the components, and the weighting accorded to each, will be based on the specific needs of the students.

1. Spoken communication
   Enhancing and practising specific oral and aural skills required to participate effectively in formal interactions involving such activities as discussions and debates, as well as in a variety of informal contexts.

2. Written communication
   Writing descriptive texts; understanding and using common organisational patterns of argumentative essays; improving coherence and cohesion in writing; reinforcing revision and proofreading skills; achieving appropriate tone and style in writing.

3. Reading and listening
   Understanding the content and structure of information delivered orally and in print; reading and listening for different purposes.

4. Language development
   Developing relevant grammar, vocabulary and pronunciation skills.

Teaching and Learning Approach:
The study method is primarily seminar-based. Seminar activities will include discussions, role-plays and individual and group activities. Use will be made of information technology where appropriate. Learning and teaching materials developed by the English Language Centre will be used throughout this course. Teachers will recommend additional reference materials as required.
**Method of Assessment:**
Continuous Assessment: 100%

**Indicative references:**

SUBJECT DESCRIPTION FORM

Subject Title: Foundation Year Seminar I
Subject Code: ENG1001
Number of Credits: 1
Hours Assigned: Seminars 8 hours
Visits 6 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
The subject is to enable students to have a foretaste of the discipline-specific or related study and to provide opportunities for more interaction with the Faculty members, through which students would also be helped to cultivate a sense of belonging to their parent faculty and departments and to build up a correct learning attitude in the University.

Learning Outcomes:
On completion of the subject, students will

1. have a better understanding of their discipline, parent Faculty and Departments;
2. develop a sense of belonging to their parent Faculty and Departments; and
3. familiarise with the issues in effective learning.

Seminar Topics:
Typical Topics of the Seminars

1. Enhancing study habits as independent learners
2. Introduction and development of computing science and its related disciplines
3. Introduction and development of electronic and information engineering and its related disciplines
4. Introduction and development of electrical engineering and its related disciplines
5. Introduction and development of industrial and systems engineering and its related disciplines
6. Introduction and development of mechanical engineering and its related disciplines

Three of the five topics (2) – (6) will be covered in this subject.

Teaching and Learning Approach:
This subject consists of four seminars and three laboratory visits delivered by three Engineering Departments of the Faculty and SAO. Each of the three Departments will offer one seminar and one laboratory visit, and SAO will be responsible for one seminar.

Method of Assessment:
Continuous Assessment: 100%

The subject is assessed on a pass/fail basis, and method of assessment involves a Personal Log Book and a Reflective Essay.
SUBJECT DESCRIPTION FORM

Subject Title: Foundation Year Seminar II
Subject Code: ENG1002
Number of Credits: 1
Hours Assigned: Seminars 6 hours
Visits 6 hours
Program Specific Activity 2 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
The subject is to enable students to have a foretaste of the discipline-specific or related study and to provide opportunities for more interaction with the Faculty members, through which students would also be helped to cultivate a sense of belonging to their parent faculty and departments and to build up a correct learning attitude in the University.

Learning Outcomes:
On completion of the subject, students will
1. have a better understanding of their discipline, parent Faculty and Departments;
2. develop a sense of belonging to their parent Faculty and Departments; and
3. familiarise with the issues in effective team work.

Seminar Topics:
Typical Topics of the Seminars
1. Building effective teams in learning
2. Introduction and development of computing science and its related disciplines
3. Introduction and development of electronic and information engineering and its related disciplines
4. Introduction and development of electrical engineering and its related disciplines
5. Introduction and development of industrial and systems engineering and its related disciplines
6. Introduction and development of mechanical engineering and its related disciplines

Two of the five topics (2) – (6) will be covered in this subject.

Teaching and Learning Approach:
This subject consists of three seminars, two laboratory visits, one visit to the Industrial Centre and one program specific activity. SAO will conduct one seminar, and two Engineering Departments of the Faculty will be responsible for two seminars and two laboratory visits. In addition to a visit to the Industrial Centre, a program specific activity will be arranged to let the students have further understanding of their own department. Typical activity includes a gathering to provide students opportunities to meet senior students of their own programmes.

Method of Assessment:
Continuous Assessment: 100%

The subject is assessed on a pass/fail basis, and method of assessment involves a Personal Log Book and a Reflective Essay.
SUBJECT DESCRIPTION FORM

**Subject Title:** Mathematics I
**Subject Code:** AMA227
**Number of Credits:** 3

**Hours Assigned:**
- Lecture: 28 hours
- Tutorial: 14 hours
- Mid-term Test and Examination: 5 hours

**Pre-requisite:** nil
**Co-requisite:** nil
**Exclusion:** nil

**Objectives:**
The lectures aim to provide the students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. To develop students’ ability for logical thinking and effective communication, tutorial and presentation sessions will be held.

**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. apply appropriate mathematical techniques to model and solve problems in engineering;
3. develop and extrapolate mathematical concepts in synthesizing and solving new problems;
4. search for useful information in problem solving.

**Programme Outcomes:**

**Category A: Professional/academic knowledge and skills**
- Programme Outcomes 5.

**Category B Attributes for all-roundedness**
- Programme Outcome 8 and 9.

**Syllabus:**
1. **Algebra of Complex Number**
   Complex numbers; Geometric representation; n-th roots of complex numbers.

2. **Linear Algebra**
   Matrices and determinants; Systems of linear equations; Vector space; Eigenvalues and eigenvectors; Normalization and orthogonality.

3. **Calculus of One Variable**
   Limits and derivatives; Mean-value theorem; Definite and indefinite integrals; Fundamental Theorem of Calculus; Techniques of integration.

4. **Fourier Series and Fourier Transform**
   Fourier series expansion of a periodic function; Half-range expansions; Basic properties of Fourier transform; Simple applications.

**Teaching and Learning Approach:**
A two hour mass 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.

**Method of Assessment:**
Continuous Assessment: 40%  Examination: 60%
To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.
Textbooks and Reference Books:

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>1,2,3,4</td>
<td>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.</td>
</tr>
<tr>
<td>Examination</td>
<td>1,2,3,4</td>
<td></td>
</tr>
</tbody>
</table>
Subject Title: Mathematics II
Subject Code: AMA228
Number of Credits: 3

Objectives:
The lectures aim to provide the students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. To develop students’ ability for logical thinking and effective communication, tutorial and presentation sessions will be held.

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

1. apply mathematical reasoning to analyse essential features of different problems in engineering;
2. develop and extrapolate statistical concepts in synthesizing and solving new problem;
3. search for useful information and use statistical packages in solving statistical problems;
4. think critically about the uses and limitations of various statistical methods for solving problems in commerce and industry.

Programme Outcomes:
Category A: Professional/academic knowledge and skills
- Programme Outcomes 5 and 6.

Category B Attributes for all-roundedness
- Programme Outcome 8 and 9.

Syllabus:
1. Ordinary Differential Equations
   First and second order linear ordinary differential equations; Laplace transform; Convolution theorem.
2. Descriptive Statistics
   Categorical and Numerical data; Frequency distributions; Mean, mode and median; Range and quartile; Standard Deviation.
3. Probability
   Rules of sums and products; Combinatorial probability; Independence and mutual exclusion; Bayes’ theorem.
4. Random Variables
   Discrete and continuous random variables; Binomial, Poisson, Exponential and Normal distributions; Law of large numbers; The Central Limit Theorem.
5. Markov Process
   Recursions and Markov chains; Applications to queuing theory.

Teaching and Learning Approach:
A two hour mass 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.
Method of Assessment:
Continuous Assessment: 40%  Examination: 60%
To pass this subject, students are required to obtain grade D or above in both the continuous assessment and the examination components.

Textbooks and Reference Books:

Alignment of Assessment and Learning Outcomes:

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<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>1,2,3,4</td>
<td>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 and statistical techniques in solving problems in science and engineering.</td>
</tr>
<tr>
<td>Examination</td>
<td>1,2,3,4</td>
<td></td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Elementary Cantonese 基礎粵語  
Subject Code: CBS2050  
Number of Credits: 3  
Hours Assigned: 每週 4 小時（共 10.5 週）

Pre-requisite: nil  
Co-requisite: nil  
Exclusion: nil

Objectives:
本課程旨在幫助國內學生在短期內學會日常生活所需使用的香港廣州話，並且通過粵語的學習，幫助他們了解香港文化，認識香港社會。

Learning Outcomes:
1. 幫助學員掌握香港粵語的語音、詞匯和語法的基本特點；
2. 幫助學員以粵語進行日常交際；
3. 通過學習粵語使學員了解香港社會文化並認識香港方言字。

Keyword Syllabus:
第一單元 簡介香港粵語的特點
        粵語的拼音方案，粵語的語音
第二單元 介紹
        重點學習：常見姓氏
        “先”字的句式
第三單元 問候
        重點學習：香港人常用的問候方式
        比較格式
第四單元 打電話
        重點學習：香港人電話交談的方式雙賓語句式
第五單元 約會
        重點學習：簡單式語氣助詞
第六單元 問路
        重點學習：方位表達法
第七單元 購物
        重點學習：算錢的方式
第八單元 交通
        重點學習：粵語“定”的動補結構式
第九單元 天氣
        重點學習：天氣的表達
第十單元 飲食
        重點學習：“之嘛”等複合式語氣助詞
第十一單元 香港
        重點學習：將字句
第十二單元 買餸
        重點學習：單音節形容詞的重疊式
第十三單元 病醫博士
        重點學習：意願的表達方式
第十四單元 工作──換工跳槽
        重點學習：表達同意的方式
第十五單元 報紙
        重點學習：表達可能的方式
第十六單元 旅遊──海洋公園
        重點學習：囑咐的表達方式
第十七單元 電視文化
        重點學習：責備的表達方式
Teaching and Learning Approach:
本課程採取情境教學法，共有十八個單元，讓學生在模擬的情境中對話，自然地學習語言。本課程也著重講解在每個情境中所使用的粵語各個成分，包括語音、詞匯和語法，讓學生全面地和更有效地掌握香港粵語，以進行基本的語言交際，包括課堂上的一般討論。

Method of Assessment:

<table>
<thead>
<tr>
<th>Method of Assessment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>課堂表現</td>
<td>10%</td>
</tr>
<tr>
<td>測試</td>
<td></td>
</tr>
<tr>
<td>一. 課堂練習測驗</td>
<td>20%</td>
</tr>
<tr>
<td>二. 個人短講</td>
<td>30%</td>
</tr>
<tr>
<td>三. 期末小組口頭報告</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Essential Reading:
1. 鄭定歐等編, 《粵語香港話教程》, 三聯書店出版, 2003年10月.

Reference List:
1. 高華年, 《廣州方言研究》, 商務印書館, 1984年1月.
2. 李新魁等, 《廣州方言研究》, 廣東人民出版社, 1995年6月.
3. 歐陽覺亞, 《普通話廣州話的比較與學習》, 中國社會科學出版社, 1996年9月.
4. 饒秉才等, 《廣州話方言詞典》, 商務印書館, 1996年11月.
5. 《廣州音字典》,(普通話對照), 三聯書店(香港)有限公司, 1996年4月.
6. 曾子凡, 《廣州話、普通話口語詞對譯手冊》, 三聯書局, 1994年5月.
7. 張洪年, 《香港粵語語法的研究》, 香港中文大學, 1972年10月.


**SUBJECT DESCRIPTION FORM**

**Subject Title:** Chinese for Electronic and Information Engineering  
**Subject Code:** CBS2065

**Number of Credits:** 2  
**Hours Assigned:** 28 hours

**Pre-requisite:** nil  
**Co-requisite:** nil  
**Exclusion:** nil

**Role and Purpose:**

This subject aims to equip the students of EIE with competence in written Chinese and Putonghua to cope with the increasing professional interactions between Chinese mainland and Hong Kong. The training will enhance the students’ abilities in (1) writing Chinese official letters, notice, email for communication / negotiation, (2) reading document such as report, articles and to familiarize with Chinese terminology of the profession; and (3) writing professional report, proposal.

**Learning Outcomes:**

On successfully completing the subject, students will be able to:

**Category A: Professional/academic knowledge and skills**
1. master the functions, formats and styles of various Chinese practical writing for formal communication and other purposes in professional settings,
2. be familiarized with the style and the terminology of the profession in reading professional articles, reports and other documents,
3. produce professional documents such as report, proposal, guidelines/manuals.

**Category B: Attributes for all-roundedness**
4. develop the confidence in writing Chinese genres / documents for official communication and professional interaction;
5. develop the competence of choosing suitable styles and strategies of expression for the intended functions through Chinese writing.

**Indicative Content:**

1. **Practical Chinese writing for effective communication (12 hrs)**
   - official letters
   - internal memos
   - press releases
   - web writing
   - direct-mail packages

2. **Reading of professional documents and terminology (4 hrs)**
   - glossary of terminology (English vs Chinese)
   - articles
   - reports

3. **Writing of professional documents (12 hrs)**
   - report
   - proposal
   - manual / guideline

**Forms of learning and teaching:**

This subject will mainly be in the form of lectures interspersed with small group discussions. By using working examples, a tight link between theoretical input and practical applications will be made. Students are required to work individually and in small groups to develop their language and analytical skills.
Method of Assessment:

100% of the assessment for this subject is based on coursework in terms of both subject knowledge and writing skills in professional contexts, among which 60% will be based on 3 written assignments which evaluate students' written expression and 40% will be based on a group project on project activity. The group project will also include an end-of-semester oral presentation.

Reading List:

1. 司有和, 《科技寫作簡明教程》, 安徽教育出版社, 1984。
2. 香港貿易發展局中文事務組編, 《中國貿易應用文》, 香港三聯書店, 1994。
3. 于成鲲, 《現代應用文》, 復旦大學出版社, 1996。
4. 陳瑞端著, 《生活錯別字》, 中華書局, 2000。
5. 邢福義 汪國勝主編, 《現代漢語》, 華中師範大學出版社, 2003。
SUBJECT DESCRIPTION FORM

Subject Title: Electronics Design
Subject Code: EIE210
Number of Credits: 3
Hours Assigned: Lecture/Tutorial 39 hours
Laboratory 3 hours
(Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: Introduction to Electronics and Multimedia Technologies (EIE225)
Co-requisite: nil
Exclusion: nil

Objectives:
To provide a broad treatment of the fundamentals of electronics design, with emphasis on multimedia technologies.

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

Category A: Professional/academic knowledge and skills
1. Understand the fundamentals of electronics systems and the associated technologies.
2. Solve problems and design simple electronics systems related to multimedia technologies.
3. Apply theory to practice by doing laboratory experiments on important electronics techniques.
4. Appreciate the importance of creativity and critical thinking in the creation of ubiquitous electronics systems in a modern society, and to realize that there is no unique solution for any particular situation and that engineers have to find "optimum" solutions, or make optimum designs.

Category B: Attributes for all-roundedness
5. Present ideas and findings effectively.
6. Think critically.
7. Learn independently.
8. Work in a team and collaborate effectively with others.

Programme Outcomes:

Category A Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of some of the fundamentals of electronics systems and the associated technologies and providing opportunities for students to practice the application of the knowledge.
- Programme Outcome 3: This subject contributes to the programme outcome by providing opportunities for students to solve practical engineering problems pertaining to the field of multimedia technologies.

Category B Attributes for all-roundedness
- Programme Outcome 8: This subject contributes to the programme outcome by providing the students with an opportunity to orally present their works in class.
- Programme Outcome 9: This subject contributes to the programme outcome by providing opportunities for students to conduct literature survey and select materials in a critical manner.

Syllabus:
1. Introduction to electronics systems

2. Analog subsystems

3. Digital subsystems
Operation and design of CMOS logic gates. Typical operation and design of flip-flops, registers, counters. Multi-vibrators and timers. Estimation of the speed of operation. Memory circuits: structure and operation of ROM, RAM.

Laboratory Experiments:
1. Active analog filters
2. Power amplifiers
3. Voltage regulators

Case Study: A selected topic in electronics

Method of Assessment:
Continuous Assessment: 40% Examination: 60%

The continuous assessment will consist of a number of assignments, and a series of quizzes.

Textbooks:

Reference books:

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 2</td>
<td>fundamental principles and key concepts of the subject are delivered to students</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 4</td>
<td>students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>1, 2, 3, 4</td>
<td>students in groups of 2-3 will conduct practical measurement and evaluate the performance of electronic circuits</td>
</tr>
<tr>
<td>Case study</td>
<td>5, 6, 7, 8</td>
<td>Each student is required to perform a detailed study on a subject in electronics in a team and present the result independently</td>
</tr>
</tbody>
</table>
Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short quizzes</td>
<td>1</td>
<td>mainly objective tests (e.g., multiple-choice questions, true-false, and matching items) conducted to measure the students’ ability to remember facts and figures as well as their comprehension of subject materials</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>1, 2</td>
<td>end-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Laboratory sessions, mini-project</td>
<td>1, 2, 5</td>
<td>each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed; oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
</tr>
<tr>
<td>Case study</td>
<td>5, 6, 8</td>
<td>each student will produce a written report; students will be assessed based on the content/organization of the report</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Introduction to Logic Design
Subject Code: EIE214
Number of Credits: 3
Hours Assigned: Lecture/tutorial 37 hours
Laboratory 5 hours
(Equivalent to 15 hours spent by student in laboratory)

Pre-requisite: nil
Co-requisite: nil
Exclusion: Logic Design (EIE211)

Objectives:
To provide students with a broad view in hardware aspects of digital logic systems and enable them to have better understanding and knowledge that can be applied in later digital design related courses.

Emphasis will be placed on the following topics:
1. Common binary logic components
2. Sequential circuits
3. Structure and organization of digital logic system
4. Usage and applications of programmable logic devices

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

Category A: Professional/academic knowledge and skills
1. Apply the fundamental knowledge of digital systems and associated technologies
2. Design and conduct experiments for simple logic components
3. Design a simple digital system to meet realistic specification
4. Aware different design issues to solve practical engineering problems of digital system

Category B: Attributes for all-roundedness
5. Present their ideas and observation effectively
6. Think critically and creatively
7. Work in a team and collaborate effectively with others

Programme Outcomes

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of the fundamentals of digital systems and providing the students with an opportunity to practice the application of knowledge.
- Programme Outcome 2: This subject contributes to the programme outcome through designing of digital system and providing the students with an opportunity to conduct experiments.
- Programme Outcome 6: This subject contributes to the programme outcome by providing opportunity for students to aware different design issues in order to solve practical engineering problems of digital system.

Category B Attributes for all-roundedness
- Programme Outcome 8: This subject contributes to the programme outcome through oral presentation and report writings.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically and creatively in conducting experiments.
- Programme Outcome 11: This subject contributes to the programme outcome by providing students with an opportunity to practice working in a team.
Syllabus:

1. **Number Systems, Operations, and Codes and Logic Circuits**
   1.1 Binary, octal and hexadecimal numbers; base conversions
   1.2 1’s complement, 2’s complement and binary arithmetic
   1.3 Binary-coded-decimal (BCD) representation
   1.4 Fundamentals of Boolean algebra (DeMorgan’s theorem)
   1.5 Electronic logic gates (NOT, AND, OR, NAND, NOR, XOR and XNOR)
   1.6 Circuit simplification (Karnaugh Maps)

2. **Combinational Circuits**
   2.1 Decoders and encoders
   2.2 Multiplexers and de-multiplexers
   2.3 Binary adders, binary adder-subtractors
   2.4 HDL representations of combinational circuits

3. **Sequential Circuits**
   3.1 Latches
   3.2 Master-slave flip-flops, edge-triggered flip-flops (SR, D, JK, T)
   3.3 Flip-flop timing
   3.4 HDL representations of sequential circuits

4. **Counters**
   4.1 Asynchronous counters and synchronous counters
   4.2 Up-down counters
   4.3 Counters with arbitrary sequence
   4.4 Design procedure of counters
   4.5 Circuit representations of counters
   4.6 HDL representations of counters

5. **Digital Sequential Systems**
   5.1 Asynchronous reset and synchronous reset
   5.2 Design procedure of sequential systems (state table and state diagram)
   5.3 Finite state machine (Mealy model and Moore model)
   5.4 Timing characteristics of sequential systems
   5.5 Circuit representations of sequential systems
   5.6 Case Study: Sequential number recognizer and traffic light

6. **Memory and Register**
   6.1 RAM: Write and read operations, timing waveforms, RAM integrated circuits, three-state buffers, DRAM ICs
   6.2 Memory organization
   6.3 Register design and register transfer structure

7. **Micro-operations in Microprocessors**
   7.1 Serial arithmetic operations
   7.2 Shift operations
   7.3 Shift and add multiplier

**Laboratory Experiment:**
1. Basic logic gates and their applications
2. Programmable logic devices with HDL

**Method of Assessment:**
Continuous Assessment: 50%   Examination: 50%

The continuous assessment will consist of a number of assignments, laboratory exercises and two tests.

**Textbook:**
Reference Books:

## Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 3, 4, 6</td>
<td>Fundamental principles and key concepts of the subject are delivered to students</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 3, 4, 5, 6</td>
<td>Supplementary to lectures are conducted with smaller class size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The students will be able to clarify concepts and to have a better understanding of the lecture material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some exercises and application examples are given for discussion</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>Students will make use of the software and hardware tools to develop simple digital systems and perform simulations</td>
</tr>
</tbody>
</table>

## Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial exercises</td>
<td>1, 3, 4, 5, 6</td>
<td>Some questions are conducted to measure the students’ ability to remember facts and figures as well as their comprehension of the subject materials</td>
</tr>
<tr>
<td>Tests and examination</td>
<td>1, 3, 4, 5, 6</td>
<td>End-of chapter type problems are used to evaluate students’ ability in applying concepts and skills learned in class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The students are needed to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Laboratory sessions, mini-project</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>Each student is required to give demonstrations and produce a written report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accuracy and the presentation of the report will be assessed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Introduction to Electronics and Multimedia Technologies
Subject Code: EIE225

Number of Credits: 3

Hours Assigned: Lecture/Tutorial 33 hours
Laboratory 3 hours
(Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: nil
Co-requisite: nil
Exclusion: Basic Electricity and Electronics I (ENG237)

Objectives:
Introduce the fundamental concepts and theory of (i) electronic principles & components and (ii) multimedia technologies. Develop ability for solving problems involving electronic circuits and multimedia technologies. Provide experimentation on electronic and multimedia systems.

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

Category A: Professional/academic knowledge and skills
1. To understand the basic theories of analogue and digital electronics.
2. To understand the underlying concepts and principles of multimedia technologies.
3. To understand the basic building blocks of electronic and multimedia systems.
4. To conduct experiments in basic electronic and multimedia systems.
5. To appreciate the applications of electronics in multimedia systems.

Category B: Attributes for all-roundedness
6. To be able to learn independently.
7. To be able to work in a team.
8. To appreciate the importance of creativity and critical thinking.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 2: This subject contributes to the programme outcomes through the teaching of the foundation knowledge in electronic and multimedia technologies by providing students with an opportunity to apply their knowledge.
- Programme Outcome 3: This subject contributes to the programme outcome through the teaching of different ways in analyzing electronic and multimedia technologies.
- Programme Outcome 5: This subject contributes to the programme outcome by providing an opportunity for students to solve practical engineering problems pertaining to the fields of electronic and multimedia technologies.

Category B: Attributes for all-roundedness
- Programme Outcomes 8, 11: This subject contributes to the programme outcomes by providing students with laboratory exercises to go through the operations of typical electronic equipment and systems and evaluate their performance.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the development of various electronic and multimedia systems.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of electronic and multimedia technologies.
Syllabus:

1. DC Circuits
   1.1 Quantities and Units
   1.2 Voltage, Current, and Resistance
   1.3 Ohm’s Law, Energy, and Power
   1.4 Series and Parallel Circuits
   1.5 Magnetism and Electromagnetism

2. AC Circuits
   2.1 Introduction to Alternating Current and Voltage
   2.2 Capacitors and RC circuits
   2.3 Inductors and RL Circuits
   2.4 RLC Circuits and Resonance
   2.5 Time Response of Reactive Circuits
   2.6 Transformers

3. Devices
   3.1 Diodes and Applications
   3.2 Transistors and Applications
   3.3 The Operational Amplifier
   3.4 Basic Op-Amp Circuits and Applications

4. Digital Circuits
   4.1 Binary Number System and Arithmetic
   4.2 Boolean Algebra
   4.3 Basic Logic Gates and Applications

5. Introduction to Multimedia Technologies
   5.1 Basics of Multimedia signals
   5.2 Digital Multimedia

6. Multimedia Authoring and Data Representation
   6.1 Multimedia Authoring and Tools
   6.2 Graphics and Image Data Representation
   6.3 Colour in Image and Video
   6.4 Fundamental Concepts in Video
   6.5 Basics of Digital Audio.

7. Multimedia Data Processing
   7.1 Data Storage
   7.2 Data Compression
   7.3 Communication and Retrieval

Laboratory Experiment:

Students are required to
1. Carry out a number of experiments to appreciate the applications of analogue electronic circuits and digital electronic circuits,
2. Appreciate the method of quantization and sampling using the audio interface on a PC with suitable data acquisition software
3. Appreciate the method of multimedia data storage and processing, with emphasis on image and video information.

Case Studies:

Detail study of a typical multimedia system for appreciating the applications of electronic technologies in multimedia systems.

Assessment Methods:

Continuous Assessment: 40%                  Examination: 60%

The continuous assessment consists of short quizzes, assignments, a case study, laboratory reports and tests. The assessment criteria will be made known to the students prior to conducting the assessment.
Textbooks:

Reference Book:

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<td>1,2,3,5</td>
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</tr>
<tr>
<td>Tutorials</td>
<td>1,2,3,6,8</td>
<td>Supplementary to lectures and are conducted with smaller class size. Students will be able to clarify concepts and to have a deeper understanding of the lecture material.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>3,4,7</td>
<td>Students will go through experiments with typical electronic components, equipment and systems.</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

<table>
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<tr>
<th>Assessment Method</th>
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</thead>
<tbody>
<tr>
<td>Short quizzes</td>
<td>1,2,3</td>
<td>Short questions to measure students’ understanding of the theories, concepts and applications of subject materials</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>1,2,3,5,6,8</td>
<td>End-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom. For some questions, students need to think critically and creatively in order to establish alternative approaches for solving problems.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>3,4,7</td>
<td>Students are required to produce written reports, which will be assessed by the presentation and interpretation of results and observations. For practical work, students are required to demonstrate their technical knowledge and skills.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: University English I
Subject Code: ELC2501
Number of Credits: 2
Hours Assigned: 28 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

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.

Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in an academic context through
1. writing well-organised academic texts, such as expository essays;
2. delivering effective oral presentations; and
3. using appropriate referencing skills in academic writing and speaking.

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 theme in a text.

Programme Outcomes:
Category B: Attributes for all-roundedness
- Programme Outcome 8: Communicate effectively, and present ideas and findings clearly in oral and written forms.
- Programme Outcome 9: Think critically and creatively.
- Programme Outcome 10: Demonstrate self-learning and life-long learning capability.
- Programme Outcome 11: Collaborate effectively with other members in a team, and demonstrate leadership capability.

Content:
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.

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**Teaching and Learning Approach:**  
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.

---

**Method of Assessment:**  
Continuous Assessment: 100%

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.

---

**Indicative references:**


---

**Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:**

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorials</td>
<td>1,2,3</td>
<td>Independent learning is also encouraged</td>
</tr>
</tbody>
</table>

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**Alignment of Assessment with Learning Outcomes:**

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written test</td>
<td>1,3</td>
<td>A short academic text</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>2</td>
<td>Based on a group research project</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: University English II  
Number of Credits: 2

Subject Code: ELC2502  
Hours Assigned: 28 hours

Pre-requisite: University English I (ELC2501)  
Co-requisite: nil  
Exclusion: nil

Objectives:
This subject aims to further develop those English language skills required by students to study effectively in the University’s English medium learning environment.

Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in academic contexts through
1. writing academic argumentative essays, and
2. participating actively in academic discussions.

To achieve the above outcomes, students are expected to use language and text structure appropriate to the academic context and to critically select relevant information to develop a thesis and arguments in a text.

Programme Outcomes:
Category B: Attributes for all-roundedness
- Programme Outcome 8: Communicate effectively, and present ideas and findings clearly in oral and written forms.
- Programme Outcome 9: Think critically and creatively.
- Programme Outcome 10: Demonstrate self-learning and life-long learning capability.
- Programme Outcome 11: Collaborate effectively with other members in a team, and demonstrate leadership capability.

Content:
This syllabus is indicative. The balance of the components, and the corresponding weighting, will be based on the specific needs of the students.

1. Written academic communication
   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.

2. Spoken academic communication
   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.

3. Reading and listening in academic contexts
   Understanding the content and structure of ideas delivered orally and in print; distinguishing between ‘fact’ and ‘opinion’.

4. Language development
   Further improving and extending relevant features of grammar, vocabulary and pronunciation.

Teaching and Learning Approach:
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.

Method of Assessment:

Continuous Assessment: 100%

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.

Indicative references:


Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<th>T&amp;L Method</th>
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</tr>
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<tbody>
<tr>
<td>Tutorials</td>
<td>1,2</td>
<td>Independent learning is also encouraged</td>
</tr>
</tbody>
</table>

Alignment of Assessment with Learning Outcomes:

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<thead>
<tr>
<th>Assessment Methods</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar discussion</td>
<td>2</td>
<td>Based on a research project</td>
</tr>
<tr>
<td>Discursive essay</td>
<td>1</td>
<td>2 versions: draft and final</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Information Technology
Subject Code: ENG224
Number of Credits: 3
Hours Assigned: Lecture/Tutorial 42 hours
Laboratory 9 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
To provide the foundation knowledge in computers, computer networks and data processing that is essential to modern information system design.

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

Category A: Professional/academic knowledge and skills
1. Understand the functions and features of computer hardware and software components.
2. Understand the architecture and functions of a computer operating system and be able to use the services it provided for managing computer resources.
3. Understand the basic structure of a database system and be able to set up and configure a simple database system.
4. Understand the principles of computer networks and be able to set up and configure a simple computer network.

Category B: Attributes for all-roundedness
5. Solving problems using systematic approaches.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme outcome 1: identify the different aspects of Internet and multimedia systems.
- Programme outcome 3: identify, analyze and solve technical problems related to Internet and multimedia technologies.

Category B: Attributes for all-roundedness
- Programme outcome 10: demonstrate self-learning and life-long learning capability.

Syllabus:
1. Introduction to computers
   Introduction to applications of information technology in different engineering disciplines. Introduction to computer hardware components: CPU, RAM, ROM, I/O devices and internal buses. Software components: applications, utilities and operating systems.
   Case study: Linux – user Interfaces, file management and process management.
   (10 hours)

2. Computer networks
   Case studies: Ethernet – cabling, topology and access methods.
   (18 hours)

3. Introduction to data processing and information systems
   Database systems – architecture, relational database concept, structural query language (SQL), database management systems, Web and database linking, database application development.
   Introduction to Information systems. Workflow management.
   Case study: Database management using Microsoft Access/MySQL.
   (14 hours)
Laboratory Experiments and other Practical Work (18 hours):
1. File management and process management in Linux
2. Setting up a Web server
3. Network Address Translation and IP Routing

Method of Assessment:
Continuous Assessment: 40%  Examination: 60%

The continuous assessment consists of assignments and test.

Reference Books:

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<tr>
<th>T&amp;L Method</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>1, 3, 4</td>
<td>Part of Learning outcome 4: Understand the principles of computer networks</td>
</tr>
<tr>
<td>Tutorial</td>
<td>1, 3, 4</td>
<td>-</td>
</tr>
<tr>
<td>Lab</td>
<td>2,3</td>
<td>Part of Learning outcome 2: Understand the architecture and functions of a computer operating system</td>
</tr>
</tbody>
</table>

Alignment of Assessment with Learning Outcomes:

<table>
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<tr>
<th>Assessment Methods</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment/Tests</td>
<td>1, 2, 3, 4, 5</td>
<td>-</td>
</tr>
<tr>
<td>Exam</td>
<td>1, 2, 3, 4, 5</td>
<td>-</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Computer Programming
Subject Code: ENG236
Number of Credits: 3
Hours Assigned: Lecture/Tutorial/Laboratory 42 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
1. To introduce the fundamental concepts of computer programming.
2. To equip students with sound skills in C/C++ programming language.
3. To equip students with techniques for developing structured computer programs.
4. To demonstrate the techniques for implementing engineering applications using computer programs.

Student Learning Outcomes:
Category A: Professional/academic knowledge and skills
After taking this subject, the students should be able to develop a good computer program using C/C++ programming language. To be specific, the students should be able to achieve the following:
1. Familiarize themselves with at least one C/C++ programming environment.
2. Be proficient in using the basic constructs of C/C++ to develop a computer program.
3. Be able to develop a structured and documented computer program.
4. Understand the fundamentals of object-oriented programming and be able to apply it in computer program development.
5. Be able to apply the computer programming techniques to solve practical engineering problems.

Category B: Attributes for all-roundedness
6. Solve problems by using systematic approaches.
7. Write technical reports and present the findings.
8. Learn team working skills.

Programme Outcomes:
Category A: Professional/academic knowledge and skills
- Programme Outcome 2 and 3: This subject contributes to the programme outcome through the teaching computer programming and requiring students to finish a mini-project.
- Programme Outcomes 4 and 7: This subject contributes to these programme outcomes through the teaching of the concepts and skills for using C/C++ programming language, and by providing students with the opportunity to apply the programming techniques to solve practical engineering problems.

Category B: Attributes for all-roundedness
- Programme Outcomes 8 and 11: This subject contributes to the programme outcome by providing the students with an opportunity to practice working in a team for the mini-project.

Syllabus:
1. Introduction to programming
   Software components of a computer – Operating system, directories, files. Evolution of programming languages. Programming environment – Compiler, linker and loader. Building the first program – Hello World. (3 hours)
2. Bolts and Nuts of C/C++
   Preprocessor, program codes, functions, comments. Variables and constants. Expressions and statements. Operators. (3 hours)
3. Program Flow Control
   If, else, switch, case. Looping – for, while, do. Functions, parameters passing, return values. Local and global variables. Scope of variables. (4.5 hours)
4. Program Design and Debugging

5. **Basic Object Oriented Programming**
   Objects and classes. Encapsulation. Private versus public. Implementing class methods. Constructors and destructors. (4.5 hours)

6. **Pointer and Array**

7. **Stream I/O**
   Input and Output. Input using cin. Output using cout. File I/O using streams. (6 hours)

8. **Using C/C++ in Engineering Applications**
   Solving numerical problems using C/C++. Developing graphical user interfaces for Engineering applications. Control I/O devices using C/C++. (7.5 hours)

**Method of Assessment:**
Continuous Assessment: 100%

For this subject, students need to go through three 2-hours programming tests in which students will be asked, within the allowed time period, to develop a set of computer programs using the C/C++ programming language to solve a problem. These three tests are worth 30% of the total marks.

Students also need to go through three 1-hour written tests to demonstrate their understanding to C/C++ programs. These three tests are worth 20 % of the total marks.

Besides, students need to finish a mini-project in this subject. Students are expected to spend not less than 35 hours of self-studying in order to finish the mini-project. The mini-project is worth 30% of the total marks.

The remaining 20% of marks are allotted to assignments that will be given during and after the classes.

**Textbook:**

**Reference Book:**

**Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:**

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1 - 6</td>
<td>Fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Programming exercises during and after class</td>
<td>1 - 6</td>
<td>As a supplementary to lectures, the exercises help students to clarify concepts and to have a deeper understanding of the lecture materials. Problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Mini-project</td>
<td>1 - 8</td>
<td>Students in groups of 2 are required to build a medium-scale software system.</td>
</tr>
</tbody>
</table>
Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming tests</td>
<td>1 - 6</td>
<td>For this subject, students need to go through three 2-hours programming tests in which students will be asked, within the allowed time period, to develop a set of computer programs using C/C++ programming language to solve a problem. These three tests are worth 30% of the total marks</td>
</tr>
<tr>
<td>Written tests</td>
<td>1 - 6</td>
<td>Students also need to go through three 1-hour written tests to demonstrate their understanding to C/C++ programs. These three tests are worth 20 % of the total marks.</td>
</tr>
<tr>
<td>Mini-project</td>
<td>1 - 8</td>
<td>Besides, students need to finish a mini-project in this subject. Students are expected to spend not less than 35 hours of self-studying in order to finish the mini-project. For this mini-project, students need to make a presentation and submit a project report. The mini-project is worth 30% of the total marks.</td>
</tr>
<tr>
<td>Assignments and class exercises</td>
<td>1 - 6</td>
<td>The remaining 20% of marks are allotted to exercises and assignments that will be given during and after the classes, respectively.</td>
</tr>
</tbody>
</table>
Subject Title: Practical Training

Subject Code: IC291

Number of Credits: 5 training credits

Hours Assigned:
- Class Contact: 147 hours
- Other Student Study Effort: 8 Hours

Pre-requisite: nil

Co-requisite: nil

Exclusion: nil

Objectives:
The objective of this subject is to provide hands-on technical training to students with focus on multimedia electronic product fabrication and development. Training on practical scientific computing software will also be provided. Practical training will be conducted in Industrial Centre (IC) of the university to prepare student for a professional career.

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

1. design and fabricate multimedia electronic product prototype for demonstration, development and experimentation purposes;
2. use electronic design automation software to product circuit and perform simple PCB design;
3. understand, specify and explain contemporary pragmatic manufacturing processes, interconnects and assembly methods for simple multimedia electronic product;
4. prescribe and perform parametric test, analysis and troubleshooting of simple electronic circuits;
5. use scientific computation software in academic study.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 2: This subject contributes to the programme outcome through practical training on professional practice in the design and development of Internet and multimedia electronic products.
- Programme Outcomes 3, 6: This subject contributes to the programme outcome through practice in the design and construction of multimedia electronic product prototype.
- Programme Outcomes 4, 5: This subject contributes to the programme outcome through teaching and training in scientific computing software and programming practice.
- Programme Outcome 7: This subject contributes to the programme outcome through practical training in electronic and microcontroller practice including simple computer game interfaces.

Category B: Attributes for all-roundedness
- Programme Outcome 8, 12: This subject contributes to the programme outcome through project discussion, report and presentation on Internet.
- Programme Outcomes 9, 11: This subject contributes to the programme outcome through practical training in student groups. Students should be able to practise and demonstrate their team work skill, critical thinking ability and creativity through working with each other in projects that are encountered in practical training.
- Programme Outcome 10: This subject contributes to the programme outcome through induction and practical training that could bring up the awareness and cognition in self-learning and life-long learning as demand for a professional career.
- Programme Outcome 13: This subject contributes to the programme outcome through induction on the importance of training, responsibility and ethics for a professional in science and engineering.

Syllabus:
1. Electronic Practice for Electronic and Information Engineering (TM1106 – 30 hours)
1.1 Introduction to electronics and its products, cost factors and technical aspects. Introduction to common electronic circuits and components, soldering and desoldering techniques. Introduction to surface mount techniques, choices & properties of related materials.
1.2 PCB design, circuit artwork, etching process, prototype PCB fabrication. Hands on practice of PCB circuit design in EDA environment. Use of basic test instruments. Mounting and installation of electronic circuits, wiring of subassemblies.
1.3 Training and practice in programming PC interface control.
1.4 Training and practice in embedded device programming.

2 Advanced Electronic Practice with Multimedia Application (TM1109 – 60 hours)
2.1 Training in design modification from circuit prototype for multimedia application.
2.2 Embedded device programming practice for multimedia electronic product.
2.3 Multimedia electronic product prototype fabrication.
2.4 Testing and troubleshooting techniques in multimedia electronic product.
2.5 Project presentation using Internet.

3 Basic Scientific Computing (TM3012 - 27 hours)
3.1 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.
3.2 Basic plotting, formatting graph, 2D and 3D plots, annotations, contour, mesh and surface plots, colormap.
3.3 M-file programming & debugging; scripts, functions, logic operations, flow control and graphic user interfaces.

4 Microcomputer Application and Practice (TM1110 – 30 hours)
4.1 Introduction to Microchip Microcomputer families and development tools.
4.2 Hands-on practice on memory, I/O, data communications, ADC operations.
4.3 Hands-on practice on LED and LCD displays.
4.4 Hands-on practice on motor control and sensors.
4.5 Application of Microcomputer on consumer electronic products, mechatronics, home automation products, wired and wireless connectivity.

Training Pattern:
TM1106: Year 1, Summer
TM1109: Year 1, Summer
TM3012: Year 1, Term 1
TM1110: Year 1, Term 2

Teaching and Learning Approach:
The teaching and learning approach is based on practical workshop training arranged in modules and it can be broadly divided into two parts based on their contents; practice in multimedia electronic product and scientific computing:

(i) Training in multimedia electronic product practice will enable student to learn the requirement of practical electronic product fabrication, appreciate the fabrication process so as to create, develop and integrate their knowledge into future design. On completion of the training, student should be able to manage the fabrication of multimedia electronic product prototype for design and development.

In module TM1106, student will learn the basics of electronic product construction practice, printed circuit assembly prototype construction skills, techniques and best practice of the electronic industry. Training activities will include tutorials, practical assignments, test and report.

In module TM1110, student will work on microcomputer programming for embedded application.

In module TM1109, students will participate in training groups under an industrial environment with an objective to produce a prototype of electronic product. The product will normally contain multimedia feature with embedded controller. Student will develop the product under an electronic design automation environment and tackle different parts of product design so as to produce a working prototype for demonstration. Student will experience practical problems that are commonly encountered in the electronic industry during product development. Student will derive solutions to overcome difficulties, produce deliverables for the project in a given time frame. Individual merit will be assessed together with group performance. As such, the training
task and activities will be organized in a way to enable a clear identification of work involved while allowing students to work independently and in groups for assessment.

Besides fabrication technologies and prototype implementation, students should be able to cultivate their personal quality, creativity, management skills and leadership in teamwork collaborations. Tutorials and inductions will be provided as require. In addition to the quality and output of the practical tasks such as PCB assembly fabrication, chassis fabrication, prototype testing and demonstration, assessment will include creativeness and a web site for product presentation on the Internet.

(ii) TM3012 will provide an opportunity for student to learn and use a popular scientific computing tool, Matlab for their study.

**Method of Assessment:**

Continuous Assessment: 100%

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment / Project</td>
<td>30%</td>
</tr>
<tr>
<td>Tests</td>
<td>30%</td>
</tr>
<tr>
<td>Others (Reports &amp; Logbook)</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Reference Software List:**

1. MATLAB from The Mathworks Inc.
2. PADS from Mentor Graphics Inc.
3. MPLAB from Microchip Corp.

**Reference Books:**

Training material, manual and articles published by Industrial Centre.

**Alignment of Assessment and Learning Outcomes:**

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</thead>
<tbody>
<tr>
<td>Assignment / Project</td>
<td>1,2,3,4,5</td>
<td>The projects are designed to facilitate students to reflect and apply the knowledge periodically throughout the training.</td>
</tr>
<tr>
<td>Tests</td>
<td>1,2,3,4,5</td>
<td>Tests are designed to facilitate students to review the breadth and depth of their understanding on specific topics.</td>
</tr>
<tr>
<td>Others (Reports &amp; Logbook)</td>
<td>1,2,3,4,5</td>
<td>Report writing is designed to facilitate students to acquire deep understanding on the topics of the training and to present those concepts clearly.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Management and Organisation
Subject Code: MM2021
Number of Credits: 3
Hours Assigned: Lectures 28 hours, Tutorials 14 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: People and Management (MM2191)

Role and Purpose:
This subject contributes to the achievement of the programme outcomes by enabling students with an understanding of management functions, group and individual dynamics within organisations and to apply such concepts to analyse and solve problems in business situations. The subject also provides students with knowledge and skills in leadership, teamwork, and decision making. In addition, it prepares students on how to analyse and resolve ethical issues in various business settings.

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

1. explain the nature of managerial work in a variety of forms of organisations, and analyse the impact of the external environments, both domestic and global, on managers’ jobs;
2. explain and analyze the functions of management in organisations, i.e. planning, organising, leading, and controlling;
3. apply the essence of human behaviour in teamwork, leadership, and decision making and evaluate the implications for the management of organisations;
4. analyse and compare the arguments surrounding social responsibility and ethical behaviour in organisations and businesses.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 2 & 5: identify and analyse the functions of management in organisations, i.e. planning, organising, leading, and controlling.
- Programme Outcomes 3, 4 & 6: solve and evaluate the practical management problems pertaining to the business environment.
- Programme Outcome 7: apply the management concepts and models in a variety of forms of organisations, and analyse the impact of the external environments.

Category B: Attributes for all-roundedness
- Programme Outcomes 8 & 9: provide an opportunity to present ideas and findings clearly, and think critically and creatively.
- Programme Outcomes 10 & 11: collaborate effectively with other members in a team and demonstrate self-learning and life-long learning capability with the foundations for continual professional development in management field.
- Programme Outcomes 12 & 13: realise the issues on cultural diversity, globalization, and social responsibility and ethics in business organisations.

Indicative Contents:
1. Management Functions
   The major elements of the management functions: planning, organising, leading, and controlling, and their importance for the effective management of business organisations.
2. Planning
3. Organising an Enterprise
   Review of a variety of organisational structures and the identification of the conditions under which they are appropriate. Managerial communication and information technology. Staffing and human resource management.

4. Leading
   The manager’s role as a leader. Foundations of human behaviour. Leading and motivating employees – individuals and groups.

5. Controlling

6. Social Responsibility and Managerial Ethics
   Arguments for and against social responsibility as a business objective. Factors affecting managerial ethics. Approaches to improving ethical behaviour.

Teaching / Learning Approach:
The two-hour weekly lecture will be structured to guide and promote students’ understanding of relevant management and organisation concepts. In addition, there will be one tutorial of one hour per week. The tutorials will adopt a student centred approach, including case study, in-class exercises, newspaper and professional articles for discussion and team-presentation.

Method of Assessment:
Coursework: 50% Final Examination: 50%

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

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The various methods are designed to ensure that all students taking this subject –

- Read the key chapters of the recommended textbooks and indicative journals in subject outline;
- Demonstrate the basic understanding of management functions which are presented in the lectures;
- Analyse business situations and problems in contemporary business settings;
- Identity teamwork, leadership and decision making process in the business environment;
- Discuss the ethical issues arising from the cases and other questions;
- Participate in in-class exercises, case study, professional articles or discussion question to be presented in the lectures.

Feedback is given to students immediately following the presentations and all students are invited to join this discussion.

Recommended Textbooks:

References:
Indicative Periodicals & Newspapers Readings:
1. Company Annual Reports
2. The Asian Wall Street Journal
3. The Economist
4. South China Morning Post
5. Business Week

Indicative Journal Readings:
1. Academy of Management Journal
2. Academy of Management Review
3. Asia Pacific Journal of Management
4. Journal of Management
5. Journal of Organizational Behaviour
6. Human Relations

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<th>T&amp;L Method</th>
<th>Programme Outcome</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 2, 3, 5</td>
<td>Fundamental management principles and key concepts of the subject</td>
</tr>
<tr>
<td>Tutorials</td>
<td>4, 6, 8, 9, 11</td>
<td>Adopt a student of centred approach, including case study, in-class exercises, newspaper and professional articles for discussion and team-presentation Students will involve in discussion and gain a deeper understanding of the lecture material.</td>
</tr>
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Alignment of Assessment and Learning Outcomes:

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<th>Assessment Method</th>
<th>Programme Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Work</td>
<td>3, 5, 12, 13</td>
<td>These can measure the students’ understanding of the management theories and concepts</td>
</tr>
<tr>
<td>Group Project</td>
<td>4, 6, 7</td>
<td>Each group of students are required to have an oral presentation, and produce a written report to evaluate their management knowledge and communication skills</td>
</tr>
<tr>
<td>Participation</td>
<td>8, 9, 10, 11</td>
<td>Students need to participate in class activities, and think critically and learn independently</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Introduction to Marketing
Subject Code: MM2711
Number of Credits: 3
Hours Assigned: Lectures 28 hours
Seminars 14 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: Marketing and the Consumer (MM2791)

Role and Purpose:
This core subject introduces the basic principles and concepts of Marketing. It also provides an analytical foundation for further study of Marketing.

Learning Outcomes:
Upon completion of the subject, students will be able to:
1. analyse diverse marketing situations and identify marketing opportunities and threats;
2. apply marketing theories and models to practical marketing situations;
3. evaluate ethical issues from a marketing perspective and suggest appropriate actions;
4. analyse and/or suggest ways to create value in goods and services and deliver these to customers;
5. critically select and manage information, develop and present coherent arguments on marketing issues.

Programme Outcomes:
Category B Attributes for all-roundedness
- Programme Outcomes 8,9,11,12,13: This subject provides students with the opportunity to evaluate ethical marketing issues. It also provides students with the opportunity to work with others in analysing and presenting the group’s views on a case/marketing situation.

Indicative Contents:
1. Fundamentals of Modern Marketing
   Marketing in the modern organization, types of marketing, overview of the marketing process, strategic marketing planning, introduction to the marketing mix, developing competitive advantages.
2. Analysing Marketing Structure and Behaviour
   Global and competitive marketing environment, consumer and organization markets and their buying behaviour.
3. Researching and Planning of Marketing Activities
   Marketing research and audit, marketing information system, marketing planning and forecasting.
4. Selecting Market Opportunities
   Market segmentation, market targeting, product positioning, pricing, promotion and distribution.
5. Introduction to the Marketing Mix
   Product, Pricing, Promotion and Distribution.
6. Marketing and Society
   Social and Marketing ethics: marketing impacts on individual consumers, society and other businesses.

Teaching / Learning Approach:
The two-hour weekly lecture aims to guide and promote students’ understanding of relevant concepts. The weekly one-hour tutorial activities include discussions on case studies, contemporary marketing topics and journal articles. Students will also work in groups to prepare and make presentations, and to critique the work presented by others. Emphasis is placed throughout on the application of theory to the solution of practical and realistic marketing problems in the local and the global setting.
Method of Assessment:
Coursework: 50%  Final Examination: 50%

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

Recommended Textbook:

References:

Various newspapers, magazines, journal articles and web addresses will be referenced.

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<tr>
<td>Lectures</td>
<td>1,2,3,4,5</td>
<td></td>
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<tr>
<td>Tutorials</td>
<td>1,2,3,4,5</td>
<td></td>
</tr>
<tr>
<td>Presentations</td>
<td>1,2,3,4,5</td>
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Alignment of Assessment and Learning Outcomes:

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<tr>
<th>Assessment Method</th>
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<tbody>
<tr>
<td>Individual essay</td>
<td>3,5</td>
<td>This tests students’ ability to evaluate whether a company’s marketing activity is unethical and to offer solutions.</td>
</tr>
<tr>
<td>Group project(s) and presentation</td>
<td>1,2,3,4,5</td>
<td>This requires students to work with others in analysing a problem/situation and to communicate the group’s views to others.</td>
</tr>
<tr>
<td>Individual contribution to class discussions</td>
<td>5</td>
<td>This measures students’ ability to evaluate information and to develop their own opinions.</td>
</tr>
<tr>
<td>Examination</td>
<td>1,2,3,4,5</td>
<td>This tests understanding and application of theories and concepts learnt.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Product Design and Social Considerations
Subject Code: SD2492
Number of Credits: 3
Hours Assigned: Lecture/Seminar 21 hours, Tutorial/Exercise 21 hours

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Brief Description and Aims:
Social factors are important in product design. Through a research and design project, students will be able to obtain a fundamental concept and experience in design, in particular considering the social factors. Local contexts related to Hong Kong and Chinese mainland are emphasized in this subject.

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

Professional skills
1. develop fundamental skills in product design.
2. identify social factors/issues related to a particular design or everyday topic.
3. identify the relationship among users, society and design.
4. conduct research to explore a particular topic related to daily life and product design.
5. generate design solution(s) to solve a specific problem.
6. present their design ideas by using 2-D and 3-D methods.

Transferable skills
7. apply the research and design experience related to social consideration in other related subjects and future career.

Indicative Contents:
1. Recent cultural, social and industrial changes
2. Social factors in design
3. Cultures and society
4. Subcultures and design
5. Daily activities and design
6. User, design and designer
7. Policy, implementation and management in design
8. Fundamental inclusive and universal concepts in design
9. Fundamental social/design research

Each student is required to conduct research and identify a design project. The project activities include:
1. Investigation of a current social issue
2. Identification of a design need and title
3. Proposal of design solution(s)
4. Presentation(s): 2-D and 3-D

Method of Assessment:
Coursework (design project) 100%
1. The ability to carry out an independent investigation related to social issues of product design, in particular related to the local context (20%).
2. The ability to apply findings in design project (25%).
3. The ability to develop design ideas (40%).
4. The ability to present design ideas (visual and verbal) (15%).
Indicative References:


Journals:

1. Design Issues
2. The Design Studies
3. The Design Journal
4. The International Journal of Design
5. Journal of Popular Culture
6. Popular Culture Review
SUBJECT DESCRIPTION FORM

Subject Title: Object-Oriented Design and Programming
Subject Code: EIE320

Number of Credits: 3
Hours Assigned: Lecture/Tutorial 36 hours
Laboratory 6 hours
(Equivalent to 18 hours spent by student in laboratory)

Pre-requisite: Computer Programming (ENG236)
Co-requisite: nil
Exclusion: nil

Objectives:
This subject will provide students with the principles of object orientation from the perspective of Java implementation and UML. Students are expected to learn the concepts of and practical approaches to object-oriented analysis, design and programming using UML and Java.

Student Learning Outcomes:
On successful completion of this subject, the students will be able to:

Category A: Professional/academic knowledge and skills
1. Understand the principles of object oriented design.
2. Apply Java in object oriented software development.
3. Apply UML in object oriented software modeling.
4. Apply object oriented approach to developing computer software.

Category B: Attributes for all-roundedness
5. Learn independently and be able to search for the information required in solving problems.
6. Present ideas and findings effectively.
7. Think critically.
8. Work in a team and collaborate effectively with others.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of the principles of object oriented design and providing the students with an opportunity to identify the different aspects of Internet and multimedia systems.
- Programme Outcome 2: This subject contributes to the programme outcome through designing of object oriented programming applications and providing the students with an opportunity to design and implement digital systems related to Internet and multimedia technologies.
- Programme Outcome 4: This subject contributes to the programme outcome by providing opportunity for students to apply computer programming techniques to solve practical engineering problems pertaining to the field of object oriented programming.
- Programme Outcome 6: This subject contributes to the programme outcome through designing of object oriented programming applications to appreciate and identify factors/issues related to software design, and generate design solutions to solve a specific problem.

Category B: Attributes for all-roundedness
- Programme Outcome 8: This subject contributes to the programme outcome through presentations and exchange of design ideas in mini-project to communicate effectively, and present ideas and findings clearly in oral and written forms.
- Programme Outcome 9: This subject contributes to the programme outcome by providing opportunity for students working on different Java programming problems to think critically and creatively.
- Programme Outcome 10: This subject contributes to the programme outcome through taking up new programming technology to demonstrate self-learning and life-long learning capability.
- Programme Outcome 11: This subject contributes to the programme outcome by providing the opportunity for students working on mini-projects to collaborate effectively with other members in a team, and demonstrate leadership capability.
Syllabus:

1. Introduction to Software Engineering
   Software products; software processes; software process models.

2. Java Programming Basic
   Java technologies; Java platform; Java language basic: variables, operators, expressions, statements, blocks, control flow, methods, arrays.

3. Object-Oriented Programming with Java
   Objects and classes; class definition; fields, constructors and methods; object interaction; grouping objects; array and collections; designing classes; inheritance and polymorphism; managing inheritance: creating subclasses and super-classes, hiding member variables, overriding methods. Interfaces and packages.

4. Web Programming with Java
   Java applets: creating custom applet subclasses, create interactive applets using Java Swing. Java Servlets: architecture of servlets, client interaction, life cycle of servlets, saving client states; servlet communications, session tracking, and using server resources.

5. Unified Modelling Language (UML)

Laboratory Experiment:

1. Laboratory Work
   Students will implement an on-line shopping system using Java Servlets and Tomcat Web server. Students will use a UML software tool to write requirement specifications and design documents for the on-line shopping system.

2. Practical Work
   Students will be requested to write and debug Java programs during tutorial and lab sessions.

Method of Assessment:

Coursework: 40%   Examination: 60%

The continuous assessment consists of a number of short quizzes, programming assignments, a mini-project, laboratory reports and a mid-term test.

Textbooks:


Reference Books:


### Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<tbody>
<tr>
<td>Lectures</td>
<td>1, 2, 3</td>
<td>fundamental principles and key concepts of the subject are delivered to students</td>
</tr>
<tr>
<td>MC Quizzes</td>
<td>1, 2, 3</td>
<td>students’ knowledge on/understanding of certain topics can be easily estimated, and the corresponding teaching time will be adjusted accordingly</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 4, 5, 6</td>
<td>supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts through developing simple Java programs.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>4, 5, 7</td>
<td>Students will need to design, develop, test, and document Java programs.</td>
</tr>
<tr>
<td>Mini-project</td>
<td>3, 4, 5, 7, 8</td>
<td>Students in groups of 2-3 are required to build a 3-tier online shopping software. They will also need to use UML to document their software.</td>
</tr>
</tbody>
</table>

### Alignment of Assessment and Learning Outcomes:

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<tr>
<td>Short quizzes</td>
<td>1</td>
<td>Multiple choices and true/false questions will be used to test and enhance students’ understanding about the topics covered in lectures.</td>
</tr>
<tr>
<td>Assignments</td>
<td>2, 3, 4, 5, 7</td>
<td>Students will be asked to write Java programs and test the programs. They will also need to use UML diagram to illustrate the structure of their programs. Students will need to think critically and creatively in order to come up with a good solution for an existing problem.</td>
</tr>
<tr>
<td>Laboratory sessions and mini-project</td>
<td>2, 4, 6-8</td>
<td>Each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed; In the mini-project, students will need to work as a team to solve a complex problem. Each of them will be responsible for part of the software.</td>
</tr>
<tr>
<td>Test and Exam</td>
<td>1</td>
<td>End-of-chapter problems will be used to evaluate students’ ability in applying concepts and skills learnt in the classroom</td>
</tr>
</tbody>
</table>
## SUBJECT DESCRIPTION FORM

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Telecommunication Technologies</th>
<th>Subject Code:</th>
<th>EIE325</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Credits:</td>
<td>3</td>
<td>Hours Assigned:</td>
<td>Lecture/Tutorial 36 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Laboratory 6 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Equivalent to 18 hours spent by student in laboratory)</td>
</tr>
</tbody>
</table>

### Pre-requisite:
For 42077
- Information Technology (ENG224) and
- Linear Systems (EIE312) or
- Signals and Systems (EIE341)

For 61031
- Principles of Programming (COMP201) and
- Analog and Digital Communications (EIE218) or
- Communication Fundamentals (EIE239)

### Co-requisite:
nil

### Exclusion:
nil

### Objectives:
To equip students with the fundamentals of data communication systems, and to train students to appreciate the underlying principle of modern communication systems.

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

**Category A: Professional/academic knowledge and skills**
1. Understand the fundamentals of telecommunication systems and associated technologies.
2. Solve problems and design simple systems related to telecommunications.
3. Apply theory to practice by doing laboratory experiments on important telecommunication techniques.

**Category B: Attribute for all-roundedness**
4. Team work and presentation skills will be developed through the case study.
5. Judicious choice of case studies will also allow students to develop a fuller understanding of social and community issues related to the application of telecommunications technologies.
6. To appreciate the importance of creativity and critical thinking, and to realize that there is no perfect telecommunication system for any particular situation and that engineers have to find “optimum” solutions, or make optimum designs.

### Programme Outcomes:

**Category A: Professional/academic knowledge and skills**
- Programme Outcome 2: This subject contributes to the programme outcome through the teaching of the theories and concepts of telecommunication systems and through providing the students with an opportunity to apply their knowledge.
- Programme Outcome 3: This subject contributes to the programme outcome through teaching the design and requirements of telecommunication systems.
- Programme Outcome 5: This subject contributes to the programme outcome by providing the opportunity for students to solve practical engineering problems pertaining to the field of telecommunication systems.

**Category B: Attributes for all-roundedness**
- Programme Outcome 9: This subject contributes to the programme outcome by providing the students with an opportunity to think critically about the design and analysis of telecommunication systems.
**Syllabus:**

1. **Introduction**
   - A communication model. Digital data communications and networks.

2. **Data Transmission and Channel**
   - Review of time and frequency domain representations, Fourier Series, Fourier transform, sampling and aliasing. Analogue and digital data transmission. Data rate and required bandwidth. Channel impairments. Characterisation and attenuation of transmission media, twisted pair, cable, optical fibre, free space.

3. **Data Encoding**

4. **Data Link Control**

5. **Data Communication Interface, Multiplexing and Switching**

6. **Current Applications**
   - Fixed telephone network. Private automated branch exchange. RS-232. V.90 56kbps modem. ADSL, discrete multitone, xDSL. Cable modem. Hybrid fibre coax. Other selected applications examples such as mobile cellular network, satellite networks, global position system.

**Laboratory Experiment:**

1. Construction and testing of a simple FSK modem (9 hours)
2. Simulation of analogue modulation using MATLAB (3 hours)
3. Simulation of digital line coding and estimation of BER using MATLAB (3 hours)
4. Simulation of code division multiple access using MATLAB (3 hours)

**Case Study:**

1. A detailed study of one of the current applications of telecommunication technologies addressed in this course (for example, section 6 of the Syllabus).

**Method of Assessment:**

- Continuous Assessment: 40%
- Examination: 60%

The continuous assessment consists of a number of short quizzes, assignments, the case study, laboratory reports and two tests.

**Textbook:**


**Reference Books:**

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<td>Lectures</td>
<td>1, 2, 6</td>
<td>fundamental principles and key concepts of the subject are delivered to students</td>
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<tr>
<td>Tutorials</td>
<td>1, 2, 6</td>
<td>supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>3</td>
<td>students will make use of the software MATLAB to simulate various types of communication systems and evaluate their performance</td>
</tr>
<tr>
<td>Mini-project</td>
<td>3</td>
<td>students in groups of 3-4 are required to build a prototype of a modem</td>
</tr>
<tr>
<td>Case study</td>
<td>4, 5</td>
<td>students will form groups of 3-4. Each group is required to perform a detailed study on one of the current applications of telecommunication technologies</td>
</tr>
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Alignment of Assessment and Learning Outcomes:

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<tr>
<td>Short quizzes</td>
<td>1</td>
<td>mainly objective tests (e.g., multiple-choice questions, true-false, and matching items) conducted to measure the students’ ability to remember facts and figures as well as their comprehension of subject materials</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>2, 6</td>
<td>end-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Laboratory sessions, mini-project</td>
<td>3, 4</td>
<td>each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed; oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
</tr>
<tr>
<td>Case study</td>
<td>3, 4, 5</td>
<td>each group of students will produce a written report and make a presentation of 20 minutes in front of the whole class; students will be assessed based on the content/organization of the report/presentation as well as their communication skills</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Digital Signal Processing for Multimedia Applications

Subject Code: EIE328

Number of Credits: 3

Hours Assigned: Lecture/Tutorial 33 hours
Laboratory 3 hours
(Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: nil

Co-requisite: nil

Exclusion: nil

Objectives:
This subject provides students with the concepts of using digital signal processing techniques for multimedia applications. After the completion of the subject, the student should be able to appreciate a wide range of techniques and standards adopted in the multimedia industry.

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

Category A: Professional/academic knowledge and skills
1. Understand the concepts of using digital signal processing techniques for multimedia applications.
2. Understand the formats of different multimedia signals.
3. Understand the fundamentals of using digital signal processing techniques for different multimedia standards and the technologies.
4. Perform multimedia authoring, and to process and integrate different types of signals to form multimedia presentations.
5. Appreciate the architectures and technologies of various multimedia products, such as DVD player, digital video camera, MP3 player, etc.

Category B: Attributes for all-roundedness
6. Communicate effectively.
7. Think critically and creatively.
8. Assimilate new technological and development in related fields.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through the teaching of the theories and concepts of digital signal processing and through providing the students with an opportunity to apply their knowledge.
- Programme Outcome 3: This subject contributes to the programme outcome through teaching the different ways of analyzing multimedia signals.
- Programme Outcome 4: This subject contributes to the programme outcome through the teaching of software tools for integrating multimedia signals.

Category B: Attributes for all-roundedness
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the most suitable digital signal processing techniques for analyzing multimedia signals.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of digital signal processing and multimedia systems.
Syllabus:

1. **Introduction**
   - Perspective of multimedia computing and communications, review of the key enabling technologies, overview of multimedia system requirements and multimedia software tools.

2. **Digital Signal Processing for Multimedia Compression**
   - Media and data streams. DSP for multimedia processing and coding. DSP for image processing and coding and audio coding.

3. **Multimedia Compression Standards**

4. **Multimedia Information Indexing and Retrieval**
   - MPEG7, Content-based retrieval (CBR) in image database, some existing CBR systems/applications. Digital libraries.

5. **Tools for Multimedia Integration**

6. **Digital Signal Processing for Multimedia Communications**
   - Quality of service (QOS) requirements for multimedia communications. Traffic modelling of multimedia sources. Application example.

7. **Case Studies**
   - DVD player, Digital video cameras, Digital video cassette recorder, and/or MP3 Player

Laboratory Experiments:

1. Developing Simple Multimedia Applications using SMIL
2. Developing Interactive Multimedia Applications using SMIL
3. Developing 3D Multimedia Applications using VRML.
4. Analysis of image/video coding

Method of Assessment:

Continuous Assessment: 40%  Examination: 60%

The continuous assessment will consist of a number of assignments, laboratory reports, and two tests.

Reference Books:


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<td>Laboratory sessions</td>
<td>4, 7, 8</td>
<td>students will make use of the various software tools to perform multimedia authoring.</td>
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</tr>
<tr>
<td>Laboratory sessions</td>
<td>4, 7, 8</td>
<td>oral examination based on the laboratory exercises will be conducted to evaluate student’s technical knowledge and communication skills</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Signals and Systems  
Subject Code: EIE341  
Number of Credits: 3  
Hours Assigned: Lecture/Tutorial 36 hours  
Laboratory 6 hours  
(Equivalent to 18 hours spent by student in laboratory)

Pre-requisite: Mathematics I (AMA227)  
Co-requisite: nil  
Exclusion: nil

Objectives:
1. To provide students with basic concepts and techniques for the modelling and analysis of linear continuous-time and discrete-time signals and systems.
2. To provide students with an analytical foundation for further studies in Communication Engineering and Digital Signal Processing.

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

Category A: Professional/academic knowledge and skills
1. Understand the representations and classifications of the signals and systems.
2. Understand the modelling of linear systems.
3. Use different techniques to analyze and design systems.
4. Apply software tools to laboratory exercises for experimenting with theories, and to the analysis and design of signals and systems.
5. Appreciate the advantages and disadvantages of using the different representations and modelling approaches.

Category B: Attributes for all-roundedness
6. Present ideas and findings effectively.
7. Think critically and learn independently.
8. Work in a team and collaborate effectively with others.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 2: This subject contributes to the programme outcome through the teaching of the theories and concepts of signals and systems and through providing the students with an opportunity to apply their knowledge.
- Programme Outcome 3: This subject contributes to the programme outcome through teaching the different ways of analyzing signals and modelling systems.
- Programme Outcome 4: This subject contributes to the programme outcome through the teaching of software tools for analyzing signals and systems.
- Programme Outcome 5, 6: This subject contributes to the programme outcome by providing the opportunity for students to solve practical engineering problems pertaining to the fields of signals and systems.

Category B: Attributes for all-roundedness
- Programme Outcomes 8, 11: This subject contributes to the programme outcome by providing students with laboratory exercises to analyze signals and system responses.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the most suitable signal processing techniques for analyzing linear systems.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of signal processing and linear systems.
Syllabus:

1. Signal Representation
   Signal Classification, Continuous and Discrete-Time Signals. Time-Domain and Frequency-Domain Representations.

2. Continuous-Time and Discrete-Time Systems

3. Fourier Representations for Signals

4. System Analysis
   Frequency Response of LTI systems, System Frequency Response, Applications, Linear and Circular Convolution, Ideal Filters

5. Laplace Transform

6. z-Transform

Laboratory Experiments:

1. Fundamentals of Signals
2. Linear Time-Invariant Systems
3. Fourier Analysis of Continuous-time Signals
4. Sampling
5. Fourier Analysis of Discrete-time Signals
6. Laplace Transform

Method of Assessment:

Continuous Assessment: 40%   Examination: 60%

Reference Books:

### Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<td>1, 2, 3, 5</td>
<td>Fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 3, 5, 7</td>
<td>These are supplementary to lectures; students will be able to clarify concepts and to gain a deeper understanding of the lecture material; problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>4, 6, 7, 8</td>
<td>Students will make use of the software MATLAB and/or LabView to simulate various theories and visualize the results.</td>
</tr>
</tbody>
</table>

### Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short quizzes</td>
<td>1, 2, 3, 5</td>
<td>These can measure the students’ understanding of the theories and concepts as well as their comprehension of subject materials.</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>6, 7</td>
<td>End-of-chapter-type problems are used to evaluate the students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and to learn independently in order to come up with an alternative solution to an existing problem.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>4, 6, 8</td>
<td>Oral examination based on the laboratory exercises will be conducted to evaluate student’s technical knowledge and communication skills.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Computer Networks
Subject Code: EIE342
Number of Credits: 3
Hours Assigned: Lecture/Tutorial 36 hours, Laboratory 6 hours (Equivalent to 18 hours spent by student in laboratory)

Pre-requisite: Telecommunication Technologies (EIE325)
Co-requisite: nil
Exclusion: Data and Computer Communications (EIE442)

Objectives:
1. To provide a solid foundation to the students about architectural concepts of data communications and computer networking
2. To enable the students to master the knowledge about data communications and computer networking in the context of real-life applications
3. To prepare the students for understanding, evaluating critically, and assimilating new knowledge and emerging technology about computer networks
4. To enable the students to understand the impact of new computer and network technology on human society

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

Category A: Professional/academic knowledge and skills
1. Describe the services, functions, and inter-relationship of different components with an architectural model such as Open System Interconnection (OSI) seven layer model and TCP/IP model.
2. Describe how components and subsystems in the physical layer, data link layer, and network layer inter-operate and analyze their performance.
3. Evaluate critically the performance of some common computer networks.
4. Design solutions to solve engineering problems that require the applications of computer network technology.
5. Appreciate the principles and operations of various network applications.
6. Take up new knowledge by reading related magazines, journal papers, and trade brochures, and by analyzing new situations while taking into account various constraints.
7. Describe how rapid progress of computer and network technology can impact on the society in various aspects, such as culture and economics.

Category B: Attributes for all-roundedness
8. Present ideas and findings effectively.
9. Think critically.
10. Learn independently.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcome 1, 2, 5: This subject contributes to the programme outcome through the teaching of the theories and concepts of computer networks and through providing with an opportunity to apply their knowledge.
- Programme Outcome 3, 6: This subject contributes to the programme outcome by providing students with laboratory exercises to understanding of networking and internetworking concepts.
- Programme Outcome 4: This subject contributes to the programme outcome by providing the opportunity for students to solve practical engineering problems pertaining to the fields of computer networks.
Category B: Attributes for all-roundedness

- Programme Outcome 8: This subject contributes to the programme outcome by providing students with an opportunity to practice communicating effectively.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the most suitable network analysis and debugging techniques for analyzing computer networks.

Syllabus:

1. **Computer Networks, Services, and Layered Architectures**

2. **Protocols in Data Link Layer**
   Automatic Repeat Request (ARQ) protocol and reliable data transfer service. Sliding-window flow control. Framing and point-to-point protocol, flow control and error controls.

3. **Packet Switching Technology**

4. **TCP/IP Protocols**
   IP packet format, addressing, subnetting, and IP routing. TCP protocol: connection management and congestion control. Dynamic Host Configuration, Network Address Translation.

5. **Network Applications**
   Sockets, client-server model, Domain Name Systems (DNS), the File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), Hypertext Transfer Protocol (HTTP).

6. **Case Studies (conducted in tutorial sessions)**
   Recent development in data communications and computer networking; Selected topics: Voice over IP, Virtual Private Network, Internet 2, high speed router design, network security, etc.

Laboratory Experiments:

1. Cisco router configuration and programming
2. Static routing and dynamic routing
3. Protocol analysis
4. Network Address Translation
5. Routing simulation study
6. Terminal server over the Ethernet

Method of Assessment:

Continuous Assessment: 40% Examination: 60%

The continuous assessment will consist of a number of assignments, laboratory reports, case study reports (administered in tutorial sessions), and two tests.

Textbook:


Reference Books:

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures 1, 2, 3, 4, 5, 9</td>
<td></td>
<td>Fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Tutorials 1, 2, 3, 4, 5, 6, 7, 9, 10</td>
<td></td>
<td>Supplementary to lectures and are conducted with smaller class size; Students will be able to clarify concepts and to have a deeper understanding of the lecture material; Problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Laboratory sessions 8, 9, 10</td>
<td></td>
<td>Students will set up a mini-internet and conduct practical exercises to reinforce concepts and techniques learned.</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short quizzes</td>
<td>1, 2, 3, 5</td>
<td>Mainly objective tests conducted to measure the students’ understanding of the theories and concepts as well as their comprehension of subject materials</td>
</tr>
<tr>
<td>Assignments, tests and examination 4, 6, 7, 8, 9, 10</td>
<td></td>
<td>End-of-chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; Assignments of reading report type to assess students’ ability in acquiring new knowledge related to computer networks; Students need to think critically and creatively in order to come with an alternate solution for an existing problem.</td>
</tr>
<tr>
<td>Laboratory sessions 8, 10</td>
<td></td>
<td>Each group of students is required to produce a written report; Accuracy and the presentation of the report will be assessed; Oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Computer System Principles
Subject Code: EIE343
Number of Credits: 3
Hours Assigned: Lecture/Tutorial 36 hours
Laboratory 6 hours
(Equivalent to 12 laboratory hours)

Pre-requisite: Introduction to Logic Design (EIE214) or Logic Design (EIE211)
Co-requisite: nil
Exclusion: Computer System Fundamentals (EIE311)

Objectives:
This subject provides students with a broad treatment of the fundamentals of computer systems. Upon completion of the subject, the students should be able to appreciate the typical design concepts adopted in Intel 80x86 microprocessors, memory organization and cache memory, to understand interfacing techniques for the I/O system and the basic concepts of operating systems, and to develop simple assembly language programs.

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

Category A: Professional/academic knowledge and skills
1. Understand the fundamentals of computer systems.
2. Appreciate basic computer arithmetic algorithms and the design issues of fast addition and multiplication.
3. Understand memory organization and the working principle of cache memory.
4. Appreciate different important computer interfacing techniques.
5. Understand the basic concepts of operating systems.
6. Develop simple assembly programs with an assembler and a debug tool.

Category B: Attributes for all-roundedness
7. Present ideas and findings effectively.
8. Think critically.
9. Learn independently.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1 and 2: This subject contributes to the programme outcomes through exploring the concepts and design issues of computer systems and through providing the students with an opportunity to apply their knowledge.
- Programme Outcome 2: This subject contributes to the programme outcome through teaching interfacing design of memory and I/O systems.
- Programme Outcome 4: This subject contributes to the programme outcome through teaching assembly language programming and debugging tools.
- Programme Outcomes 2 and 4: This subject contributes to the programme outcomes by providing students with laboratory exercises to simulate cache memory, to analyze DOS file systems, to examine 80x86 registers and memory architecture, and to write and debug simple assembly language programs.

Category B: Attributes for all-roundedness
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the design issues of computer systems and their components.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of computer architecture and organization.
Syllabus:

1. **Introduction to Computing**
   - Data formats
   - Internal organization of computers
   - Inside CPUs
   - Brief history of the CPU

2. **Computer Arithmetic**
   - Floating-point numbers and operations
   - Fast addition
   - Fast multiplication algorithms

3. **The 80x86 Microprocessor**
   - Brief history of the 80x86 family
   - Inside the 80x86

4. **Assembly Programming**
   - Types of instructions
   - Segments in the 80x86
   - 80x86 addressing modes
   - A sample program
   - Assemble, link, and run a program

5. **Memory and Memory Interfacing**
   - Memory address decoding
   - IBM PC memory map
   - Data integrity in RAM and ROM
   - 16-bit memory interfacing

6. **Input/Output and I/O Interfacing**
   - Input/output instructions
   - I/O address decoding
   - I/O address map of x86 PCs
   - 8255 PPI chip
   - Basics of interrupts
   - 8086/86 interrupts
   - Direct memory accessing

7. **I/O Devices**
   - Hard disks
   - Video displays

8. **386 Microprocessor: Real vs. Protected Mode**
   - 80386 in real mode
   - 80386: a hardware view
   - 80386 protected mode

9. **High-Speed Memory Interfacing and Cache**
   - Memory cycle time of the 80x86
   - Cache memory
   - High-speed memory

10. **Introduction to Operating Systems**
    - Basic input/output system (BIOS) and basic disk operating system (DOS)
    - File systems
    - Multitasking and time-sharing

**Laboratory Experiments:**

1. 80x86 registers and memory architecture
2. Assembly language programming
3. Cache system
4. 8255 PPI chip programming and applications
5. DOS file systems
Method of Assessment:
Continuous Assessment: 40%  Examination: 60%

The continuous assessment consists of laboratory reports and tests.

Reference Books:

Alignment of Teaching and Learning (T&L) with Learning Outcomes:

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<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 2, 3, 4, 5</td>
<td>fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9</td>
<td>supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>1, 3, 4, 6, 7, 8, 9</td>
<td>students will make use of an x86 assembler and debugger to develop assembly programs and explore basic file systems and OS concepts; software MATLAB to simulate cache memory; and circuit boards to study various I/O interfacing techniques and evaluate their efficiency and performance.</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test and examination</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>end-of-chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>1, 3, 4, 6, 7, 9</td>
<td>each student is required to produce a written report; accuracy and the presentation of the report will be assessed.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Fundamentals of Embedded Systems  
Subject Code: EIE344

Number of Credits: 3  
Hours Assigned: Lecture/Tutorial 37 hours  
Laboratory 5 hours  
(Equivalent to 15 hours spent by student in laboratory)

Pre-requisite: Computer System Principles (EIE343) or  
Computer System Fundamentals (EIE311)  
Co-requisite: nil

Exclusion: Interface and Embedded Systems (EIE322)

Objectives:
To provide students with the concepts and techniques in designing embedded software and hardware interfaces.

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

Category A: Professional/academic knowledge and skills
1. Understand and apply the fundamental knowledge of embedded systems
2. Apply circuit and computer knowledge to design a simple embedded system to meet realistic specification.
3. Apply programming techniques to satisfy functional and response-time requirements of embedded systems
4. Formulate and evaluate the performance of different embedded systems

Category B: Attributes for all-roundedness
5. Present their ideas and observation effectively
6. Think critically and creatively
7. Work in a team and collaborate effectively with others

Programme Outcomes

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of the fundamentals of embedded systems and providing the students with an opportunity to practice the application of knowledge.
- Programme Outcome 2: This subject contributes to the programme outcome by providing opportunity for students to design a simple embedded system to meet realistic specification.
- Programme Outcome 4: This subject contributes to the programme outcome providing the students with an opportunity to conduct experiments such as applying programming techniques to satisfy functional and response-time requirements of embedded systems
- Programme Outcome 6: This subject contributes to the programme outcome by providing opportunity for students to formulate and evaluate the performance of different embedded systems

Category B Attributes for all-roundedness
- Programme Outcome 8: This subject contributes to the programme outcome through oral presentation and report writings.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically and creatively in conducting experiments.
- Programme Outcome 11: This subject contributes to the programme outcome by providing students with an opportunity to practice working in a team.
Syllabus:

1. **Introduction on Embedded System**
   - Microcontroller-based, microprocessor-based and PC-based approaches
   - The details of a typical microcontroller architecture, e.g. the 8051
   - Programming (assembly and C) techniques based on embedded system
   - Performance evaluation on assembly program, e.g. program size and running time
   - Data conversion and serialization

2. **Programming with the Built-in Components in Microcontroller**
   - Timers/counters
   - Serial port communications and RS232 interfacing
   - Interrupt handling: timer interrupt, serial communication interrupt and external hardware interrupt

3. **I/O Interfacing**
   - Pulse generation and measurement
   - Keyboard multiplexing
   - Display multiplexing and driving LCD controllers
   - Analog signals sensing: ADC and DAC interfacing

4. **Peripheral Interfacing**
   - Motor control, e.g. DC motor, stepper motor and servo motor
   - Detection and measurement of motor movements

5. **Memory Interfacing**
   - Address bus and data bus control for external memory devices
   - Interfacing to memory devices, e.g. RAM, NV-RAM and ROM

   - Discussion on the embedded software issues including tasks and events, interrupt, inter-task communication and shared-variables problems
   - Introduction to RTOS: Kernel services, semaphores, priority inversion, task priority and scheduling

**Laboratory Experiments:**

1. **Serial I/O and timer-based baud rate generation**
2. **Timer-based pulse width generation and measurement**
3. **Interrupt handling**

**Method of Assessment:**

Continuous Assessment: 50%  
Examination: 50%

The continuous assessment will consist of assignments, tests and laboratory work.

**Reference Books:**

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 3, 4, 6</td>
<td>Fundamental principles and key concepts of the subject are delivered to students</td>
</tr>
</tbody>
</table>
| Tutorials        | 1, 3, 4, 5, 6    | Some exercises and application examples are given for discussion          
                     |                  | The students will be able to clarify concepts and to have a better understanding of the lecture material |
| Laboratory sessions | 1, 2, 3, 4, 5, 6, 7 | Students will make use of the software and hardware tools to develop simple prototype of embedded systems |

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>1, 3, 4, 5, 6</td>
<td>Enhance the understanding of the taught materials in the lectures</td>
</tr>
<tr>
<td>Tests and examination</td>
<td>1, 3, 4, 5, 6</td>
<td>End-of chapter type problems are used frequently to evaluate students' ability in applying concepts and skills learned in class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The students are also needed to think critically and creatively in order to come with alternate solutions for existing problems</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>Each group of students is required to give demonstrations and produce a written report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accuracy and the presentation of the report will be assessed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Integrated Project
Subject Code: EIE360
Number of Credits: 3
Hours Assigned: Lecture / Laboratory / Mini-project Work
Total 120 hours

Pre-requisite: Computer Programming (ENG236) and Computer System Principles (EIE343) or Computer Systems Fundamentals (EIE311)

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
At a mid-stage of the programme, this subject plays the role of applying knowledge acquired in other subjects in an integrated manner. While the emphasis will be placed on the technical challenges that may encompass system integration, software development and troubleshooting, students will also be given opportunities to face various non-technical difficulties behind the development of multimedia/information systems.

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

Category A: Professional/academic knowledge and skills
1. Design effective and reliable software programs to achieve the objectives of a project.
2. Critically evaluate the different alternatives and strategies when implementing a project.
3. Locate and resolve problems in a multimedia and networking system and the related software.

Category B: Attributes for all-roundedness
4. Search, self-learn and try untaught solutions.
5. Effectively use the limited resource and exercise discipline and time-planning to meet deadlines.
6. Present ideas and findings effectively.
7. Work in a team and collaborate effectively with others.

(Note: The above outcome number will be referred to within square brackets later)

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome by teaching students the features of different network and multimedia systems.
- Programme Outcome 2: This subject contributes to the programme outcome by providing students with an opportunity to design and implement digital systems to achieve the objectives of a project.
- Programme Outcome 3: This subject contributes to the programme outcome through the development process of a multimedia and network system.
- Programme Outcome 4: This subject contributes to the programme outcome through the development process of software programs used in a multimedia and network system.
- Programme Outcome 7: This subject contributes to the programme outcome by providing students with an opportunity to design and implement basic components of computer games, which include human computer interfaces, 2D and 3D computer graphics, etc.

Category B: Attributes for all-roundedness
- Programme Outcome 8: This subject contributes to the programme outcome by providing students with an opportunity to present their ideas in the forms of oral presentation and formal project reports.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically and understand the creative process.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the area of multimedia system development.
- Programme Outcome 11: This subject contributes to the programme outcome by providing the students with an opportunity to practice working in a team.

**Syllabus / Operation:**

The project(s) shall be of software development in nature \([1,2,3,4,5,6,7]\) with defined milestones (or **Subtasks**). The scope to be covered will include multimedia and network system design, but does not exclude the possibilities of extending into areas such as computer animation or image processing. The project will not be close-ended in nature \([1,2,4]\) and will provide ample headroom for the more enthusiastic students to excel. Students will work in groups of two or three \([7]\). Each **Subtask** will be given a certain period of time to complete \([5]\). Progress will be measured by functional **Demonstrations**, and one or two written **Progress Reports** \([6]\). Upon the completion of the project, each group will give a demonstration/presentation \([6]\) of the completed system and submit a **Final Report** \([6]\). Students are required to individually keep a **Logbook** \([6]\) on the work performed during the entire period. The logbooks are to be evaluated and signed by the supervisor /assessor on a monthly or more frequent basis. At the end of the project, the logbooks will be collected and graded.

**Lectures:**

Lectures are to be conducted at the beginning of the semester. During these lectures, the instructor shall give clear explanation on the functional and technical requirements, with a schedule for submitting deliverables. Concepts specific to the project(s), which are not yet learnt by the students, are to be covered in these lectures. Concepts behind critical use of tools and equipment will also be strengthened. Copies of supplementary/reference material will be distributed, or, links to on-line material will be provided for self-paced learning.

**Guided Laboratory Experiments:**

The project will normally require the students to learn to use specific tools and/or equipment. Laboratory demonstrations and exercises will be arranged in the early weeks. Below are some examples:

1. Use of project-specific development tools, software and hardware.
2. Implementation of the basic framework of the project.
3. Software techniques to optimize the performance of the system.

**Self-Paced Work:**

Multiple sessions of laboratory will be scheduled to cater for self-paced work in the laboratory, particularly during the second half of the semester. To ensure the students are working in a correct direction, defined milestones are given in the course of their work. Students are required to demonstrate their works at each milestone to show their progress.

**Method of Assessment:**

Continuous assessment: 100%

Assessment on individual student’s ability and contribution will be conducted, according to the attributes detailed below.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSIGHT</td>
<td>as evidenced by how well the concepts are understood ([1,2])</td>
</tr>
<tr>
<td>CREATIVITY</td>
<td>as evidenced by ingenuity and imagination ([1,2])</td>
</tr>
<tr>
<td>WORKMANSHIP</td>
<td>as evidenced by how well ideas are implemented and how problems are resolved ([3])</td>
</tr>
<tr>
<td>DRIVE</td>
<td>as evidenced by initiative, diligence and tenacity ([4])</td>
</tr>
<tr>
<td>COMMUNICATION</td>
<td>as evidenced by an ability to express ideas clearly and succinctly ([6])</td>
</tr>
<tr>
<td>MANAGEMENT</td>
<td>as evidenced by how time, manpower and other resources are effectively used ([5,7])</td>
</tr>
</tbody>
</table>

At the completion of each subtask, team members will be asked to give a demonstration to the assessor. Based on the presentation and response to questions addressed to the members, the assessor will rate the contribution, achievement, and performance of each member. Other assessment items include lab reports, logbook, progress report, final demonstration, report and presentation.
Reference Books:
To be specified by the subject lecturer for each project.

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<tr>
<th>T&amp;L Method</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 2, 3</td>
<td>Principles and key concepts of the multimedia platform used in the project are explained to students. Uses of tools are demonstrated. The goals are specified. The various problems to be encountered are explained.</td>
</tr>
<tr>
<td>Supervised Laboratory sessions</td>
<td>1, 2, 3, 6, 7</td>
<td>Students will work in teams of two or three to construct a multimedia system. They need to learn to use the provided software modules and expand them to accommodate new functionalities.</td>
</tr>
<tr>
<td>Extended self-paced laboratory work</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>Same as above.</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

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<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Lab reports</td>
<td>1, 2, 3, 6.</td>
<td>To measure the students’ understanding of the theories and concepts as well as some practical issues in their subject materials</td>
</tr>
<tr>
<td>Progress and Final Demonstrations</td>
<td>1, 2, 3, 4, 6</td>
<td>Students need to think critically and creatively in order to come up with good alternate solution for an existing problem. Oral examination on the approach taken will be conducted for each group member to evaluate his contribution, technical knowledge and communication skills.</td>
</tr>
<tr>
<td>Logbook &amp; Reports</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>Each group of students is required to produce one or two progress reports and a final report. Accuracy and the presentation of the reports will be assessed. Each group needs to explain in the reports the solutions they plan to use or have been used in the project. The reason behind of choosing such solutions should also be exemplified. The students also need to explain how the limited resources are used in the project and how the team members work together to achieve the project goal. Logbooks are assessed to evaluate contributions and the quality of records on the progress.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: English for Effective Workplace Communication
Subject Code: ELC3508
Number of Credits: 2
Hours Assigned: 28 hours

Pre-requisite: University English I (ELC2501)
University English II (ELC2502)
Co-requisite: nil
Exclusion: nil

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

Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in workplace contexts through
1. interacting professionally in a job interview;
2. writing appropriate correspondence related to engineering professions; and
3. 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.

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

**Method of Assessment:**

Continuous Assessment: 100%

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.

**Indicative references:**

SUBJECT DESCRIPTION FORM

Subject Title:  Introduction to Industrial Design
Subject Code:  SD348
Number of Credits:  3
Hours Assigned:  Lecture/Seminar 28 hours
                   Tutorial/Exercise 14 hours

Pre-requisite:  nil  Co-requisite:  nil  Exclusion:  nil

Brief Description and Aims:
This course gives an introduction to the field of Industrial Design as a creative discipline, a discipline which synthesises knowledge from fields as diverse as e.g. the Arts, the Sciences and Engineering. Industrial Design is known for its capacity to innovate and to add value to products and services. Industrial Designers solve problems centred on user needs with the intent to improve the quality of people’s lives. The design process incorporates unique problem solving methods and creativity process. Industrial Design intends to work with technological and ecological parameters in an appropriate way. The development and use of state of the art tools and technologies puts Industrial Design in a significant position socially and economically.

It is the aim of this course to equip students with enough knowledge and experience of Industrial Design to appreciate the profession, relate to its practitioners in different work situations, employ the design process appropriately for problem solving and innovation, and to realise the importance of a user centred approach to the creation of new products and services.

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

Professional skills
1. To appreciate the industrial/product design profession, relate to its practitioners in different work situations.
2. To employ the design process appropriately for problem solving and innovation.
3. To realise the importance of a user centered approach to the creation of new products and services.
4. To apply visualisation skill in project presentation.

Transferable skills
5. To understand objectives of industrial/product design, and apply knowledge and experience in other related subjects and future career.

Indicative Contents:
The field of Industrial Design is introduced through a series of lectures featuring a review of milestones of design achievements internationally and locally. The relationships between Design, culture and society are highlighted through a look at topics like cultural identity in product design, user centred design, employment of technologies, and design and sustainability.

Further lectures and seminars cover two major parts of Industrial Design and its professional practice:

1. The essentially theoretical foundation of the industrial design process and methodology covering topics such as
   - Design and culture
   - Form, aesthetics and semantics
   - Human factors and ergonomics in design
   - Research and problem identification
   - Design requirements and design brief
   - Design development and specifications
   - Design evaluation and concept selection

2. The essentially practical aspects of the industrial design process covering topics such as
   - Design visualisation, presentation and communication
   - Product prototyping and user testing
Emphasis in the practical exercises is placed on student’s creativity in relation to designing. Students explore different approaches to problems and experience methods of problem solving with the designer’s tools.

**Method of Assessment:**
Coursework (design project): 100%

1. The ability to understand design process (10%).
2. The ability to conduct investigation and then to apply their findings in design (30%).
3. The ability to develop design ideas (45%).
4. The ability to present design ideas (visual and verbal) (15%).

**Indicative References:**

3. *Design Management Journal*. The Design Management Institute. (Journal)
SUBJECT DESCRIPTION FORM

Subject Title: Computer Game Development II
Subject Code: SD3983
Number of Credits: 3
Hours Assigned: Lectures/Tutorials 35 hours, Laboratory 20 hours

Pre-requisite: Computer Graphics (COMP407) and Computer Game Development I (SD3982) or Computer Game Development I (SD3984)
Co-requisite: nil
Exclusion: nil

Objectives:
1. To introduce students with fundamental concepts and algorithms in developing 3D computer game.
2. To provide students with hands-on experience in designing and developing 3D computer game.

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

Professional/academic knowledge and skills
1. Identify essential building blocks in 3D computer games
2. Understand, analyze, implement and evaluate algorithms in developing 3D computer games
3. Realize trends in real-time algorithms in advanced 3D computer games
4. Explore new algorithms for future 3D computer games
5. Demonstrate understanding of game production process through developing a 3D computer game in a team starting from ideas

Attitudes of all-roundedness
6. Collaborate, organize and communicate with others in effective team work
7. Realize the interdisciplinary nature in 3D computer games development and appreciate importance of collaboration
8. Be creative and critical to game and play design

Syllabus:
1. Introduction
   Game production pipeline, 3D game engine and components.
2. Graphics and Rendering
   Graphics rendering pipeline; 3D hardware: programmable graphics pipeline, shading languages, procedural shading, lighting, effects; scene management; visibility processing, resource management; 3D modelling, skeleton, texturing and materials, animation.
3. Audio
   3D and multi-channel audio; modelling for effects, echo.
4. Physics
   Physics basic concepts; kinematics, kinetics, dynamics; Newton’s laws, mass, moment of inertia, friction, force; constrained motion; particle systems.
5. Artificial intelligence
   Path planning; agent architecture; decision-making systems; genre-specific AI (FPS, RTS, RPG, racing and sport AI), behavioural modelling, artificial life.
6. Network
   Multiplayer game architecture, networking, protocols, topologies, security, database; online game systems.

Laboratory Experiment:
3D modelling software (3D Studio Max).
Method of Assessment:
Laboratory: 30%  Mini-project: 70%

Reference Books:
SUBJECT DESCRIPTION FORM

Subject Title: Computer Game Development I
Subject Code: SD3984
Number of Credits: 3
Hours Assigned: Lectures/Tutorials 36 hours, Laboratory 28 hours

Pre-requisite: Computer Programming (ENG236)  Co-requisite: nil  Exclusion: nil

Objectives:
1. To provide a broad overview of fundamental elements and concepts in computer games design and development, and in their production process
2. To provide students with hands-on experience in designing and developing a computer game

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

Category A: Professional/academic knowledge and skills
1. Design, analyze, implement and evaluate computer games
2. Appreciate computer games’ designs and complexities
3. Demonstrate understanding of game production process through developing a computer game in a team starting from ideas

Category B: Attitudes of all-roundedness
4. Collaborate, organize and communicate with others in effective team work
5. Realize the interdisciplinary nature in computer games development and appreciate importance of collaboration
6. Be creative and critical to game and play design

Syllabus:
1. Game Design Overview
   History of computer games, types of computer games (video, console, arcade, hand-held, wireless, mobile); game genres; play mechanics; game rules; game balancing: obstacle/aid, penalties/rewards; board game, role-playing game; interface design, information design, human-computer interaction design; integration of visual, audio, tactile and textual elements; visual design: composition, lighting and colour, graphics design; Audio design: music, sound effects; storytelling; game theory

2. Media and Tools
   Game arts; tools and standards of media: image and audio

3. Game Production Process
   Evaluating game concepts; game design documentation, storyboard, playtest; content creation, team roles, group dynamics, risk assessment; software engineering, project management; prototyping, iterative development; pre-production, production, testing

4. Game Programming
   Game loop; game engine architecture; event processing; SDL; physics and collision detection; networking

Method of Assessment:
Laboratory: 30%  Miniproject: 70%
Reference books:

12. IGDA (www.igda.org).
13. SDL (www.libsdl.org).
## SUBJECT DESCRIPTION FORM

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Computer Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code:</td>
<td>COMP407</td>
</tr>
<tr>
<td>Number of Credits:</td>
<td>3</td>
</tr>
<tr>
<td>Hours Assigned:</td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
<td>42 hours</td>
</tr>
<tr>
<td>Laboratory</td>
<td>7 hours</td>
</tr>
</tbody>
</table>

**Pre-requisite:** Computing Programming (ENG236)  
**Co-requisite:** nil  
**Exclusion:** nil

### Objectives:
This subject allows students to:
1. learn basic and fundamental computer graphics techniques;
2. learn image synthesis techniques;
3. examine applications of modelling, design and visualization.

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

**Category A: Professional/academic knowledge and skills**
1. gain proficiency in 3D computer graphics API programming;
2. understand the interactive computer graphics architecture;
3. possess in-depth knowledge of display systems, image synthesis, shape modelling, and interactive control of 3D computer graphics applications;
4. enhance their perspective of modern computer system with modelling, analysis and interpretation of 2D and 3D visual information.

**Category B: Attributes for all-roundedness**
5. understand, appreciate and follow the development and advancement of computer graphics technologies, including advanced technologies for 3D modelling, high performance rendering.

### Programme Outcomes:

**Category A: Professional/academic knowledge and skills**
- Programme Outcomes 1, 2: This subject contributes to the programme outcomes through the teaching of the related concepts for graphics and multimedia, providing the students with an opportunity to apply their knowledge in programming exercises and laboratories.
- Programme Outcomes 4 and 9: This subject contributes to the programme outcomes through graphics project development with careful design and implementation.

**Category B: Attributes for all-roundedness**
- Programme Outcomes 4 and 9: This subject contributes to the programme outcomes through graphics project development with careful design and implementation.
- Programme Outcomes 8 and 11: This subject contributes to the programme outcomes with group project development and associated report writing.

### Syllabus:
1. **Basic Computer Graphics Hardware/Software Interfaces (15 hours)**
   Graphical input/output devices; 2D primitive drawing; rasterization; 2D transformation; 3D transformation and projection; synthetic camera and viewing volume; clipping; object modelling and hierarchical structures.
2. **Image Synthesis and Generation Techniques (12 hours)**
   Some of the important image generation techniques including hardware-based rendering, scan-conversion, local illumination models, reflections and shading; related issues such as anti-aliasing and texture mapping.
3. **Applications of Computer Graphics (15 hours)**
   Introduction to OpenGL and device independent Application Programming Interfaces (API), virtual reality, hardware supported 3D modelling and rendering.
Laboratory Experiment:
Laboratory exercises will normally be conducted using the currently available computer graphics API such as OpenGL. The students will be exposed to basic frame-buffer control, pixel processes, rasterization, 2D drawings, 3D transformations, projections, scene hierarchy, modelling objects, colour and interactive animation.

Case Study:
If applicable, case studies may be conducted on modelling and design systems that are used in commercial applications.

Method of Assessment:
Continuous Assessment: 60%       Examination: 40%

Textbook:

Reference Books:
SUBJECT DESCRIPTION FORM

Subject Title: Middleware and Distributed Objects        Subject Code: COMP436
Number of Credits: 3            Hours Assigned: Lecture 42 hours
                          Seminar/Laboratory 7 hours

Pre-requisite: Principles of Programming (COMP201) or Co-requisite: nil
Object-Oriented Design and Programming (EIE320)
Exclusion: Internet System Integration (COMP403)

Objectives:
1. To present an integrated view of the basic building blocks of a distributed system and how middleware can help developers to more easily satisfy the requirements of building distributed systems.
2. To provide the foundation knowledge of middleware, particularly object-oriented middleware.
3. To provide training in using CORBA as middleware to build practical distributed systems.

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

Category A: Professional/academic knowledge and skills
1. understand the basic structure of distributed systems;
2. understand the motivation of using middleware;
3. understand the basic theories underlying the design of middleware;
4. learn to make judgment in choosing a suitable middleware for application problems;
5. understand the basic concepts of CORBA;
6. develop distributed object-based systems using CORBA.

Category B: Attributes for all-roundedness
7. apply the technical knowledge learned to solve real-life practical problems;
8. appreciate and evaluate existing and new technologies.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 2: This subject contributes to the programme outcomes through the teaching of the related concepts of systems connected by network in a distributed environment, assessing their knowledge with programming assignments and examination.
- Programme Outcomes 3 and 4: This subject contributes to the programme outcomes through programming assignments with careful design and implementation.

Syllabus:
1. Principles of object-oriented middleware (3 hours)
   Role of middleware in distributed systems; types of middleware; object-oriented middleware; local versus distributed objects; developing systems with object-oriented middleware.

2. Fundamentals of CORBA (9 hours)
   Architecture; Interface definition language (IDL); system development using CORBA.

3. Communication paradigms of CORBA (6 hours)
   Synchronous requests; oneway requests; deferred synchronous requests; asynchronous requests; dynamic invocation; CORBA event service; pros and cons of different communication paradigms of CORBA.

4. Portable Object Adaptor (POA) (12 hours)
   Objects vs. servants; lifecycle of objects; request invocation via POA; servant activator and servant locator.

5. Case study 1: load balancing (6 hours)
   Using POA to implement various load balancing solutions for distributed systems.

6. Case study 2: resource management (6 hours)
Using CORBA to implement facilities for resource management in distributed systems, e.g. resource lookup, resource acquisition; CORBA naming service.

**Laboratory Experiment:**
In the laboratory session, students will learn how to develop distributed systems using an implementation of CORBA, called VisiBroker (or the Borland Enterprise Server – VisiBroker Edition), using Java as the programming language.

**Case Study:**
Case studies on load balancing and resource management with CORBA.

**Method of Assessment**
Continuous Assessment: 55%    Examination: 45%

**Textbook:**

**Reference Books:**
4. Articles from journals, magazines, and conference proceedings, including ACM TOCS, IEEE TPDS, IEEE TSE, IEEE TOC, CACM, IEEE Computer, ICDE, DOA.
SUBJECT DESCRIPTION FORM

Subject Title: Mobile Computing  
Subject Code: COMP437

Number of Credits: 3  
Hours Assigned: 
Lecture 42 hours 
Tutorial/Laboratory 7 hours

Pre-requisite: Foundations of Database Systems (COMP311) or Co-requisite: nil  
Exclusion: nil

Object-Oriented Design and Programming (EIE320) and 
Computer Networking and Internet Technologies (EIE323) or 
Data and Computer Communications (EIE333) or 
Computer Networks (EIE342)

Objectives:
1. To introduce students the basic concepts and principles of mobile computing;
2. To provide students the knowledge about theoretical and practical aspects of mobile computing;
3. To train students in developing skills for developing solutions and building software for mobile computing applications using standard languages and tools.

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

Category A: Professional/academic knowledge and skills
1. grasp the concepts and features of mobile computing technologies and applications;
2. have a good understanding of how the underlying wireless and mobile communication networks work, their technical features, and what kinds of applications they can support;
3. identify the important issues and the principles of developing mobile computing systems and applications;
4. organize the functionalities and components of mobile computing systems into different layers and learn various related techniques for realizing the functionalities;
5. develop solutions for mobile computing applications by analyzing their characteristics and requirements, selecting the appropriate computing models and software architectures, and applying standard programming languages and tools;
6. organize and manage software built for deployment and demonstration.

Category B: Attributes for all-roundedness
7. analyze requirements and solve problems using systematic planning and development approaches;
8. search for and read critically the information required in solving problems;
9. write and present technical survey papers in well-organized and logical manner;
10. work in teams and collaborate with classmates.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 2: This subject contributes to the programme outcomes through the teaching of the related concepts of systems connected by wireless networks, providing the students with an opportunity to apply their knowledge.
- Programme Outcomes 4 and 9: This subject contributes to the programme outcomes through project development with computer programming with careful design and implementation.

Category B: Attributes for all-roundedness
- Programme Outcomes 4 and 9: This subject contributes to the programme outcomes through project development with computer programming with careful design and implementation.
- Programme Outcomes 8 and 11: This subject contributes to the programme outcomes with group project development and associated report writing.

Syllabus:
1. Introduction to mobile computing (3 hours)
   Motivations, concepts, challenges, and examples of mobile computing; relationship with distributed computing, Internet computing, ubiquitous computing, and pervasive computing.
2. Introduction to wireless communication and networks (9 hours)
   Wireless communication concepts; modulation and multiplexing techniques (spread spectrum, multi-access methods); medium access control; classification of wireless networks: WPAN, WLAN, WMAN, WWAN; evolution of cellular communication systems (1G, 2G, 3G, etc).

3. Mobility management (6 hours)
   Handoff and location management concepts; mobility management in PLMN; mobility management in mobile Internet; mobility management in mobile agent systems; adaptive location management methods.

4. Mobility computing models and application architectures (9 hours)
   Extended client-server model; peer-to-peer model; mobile agent model; wireless Internet; smart client; messaging; mobile data management; mobile OS; WAP, WML, J2ME.

5. Location-based services (6 hours)
   Concepts and applications; mobile positioning techniques; GIS; LBS architecture and protocols.

6. Mobile computing middleware (3 hours)
   Functionalities of mobile computing middleware; reflective middleware; tuple space middleware; context-aware middleware; publication/subscription and other middleware solutions.

7. Ad hoc networks and applications (6 hours)
   Concepts and applications; routing in mobile ad hoc networks; sensor networks.

Tutorials: 3 hours

Laboratory Experiment:
1. WAP programming, (1 hour)
2. J2ME programming, (3 hours)

Method of Assessment
Continuous Assessment: 55%   Examination: 45%

Textbook:

Reference Books:
**SUBJECT DESCRIPTION FORM**

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Principles of Virtual Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code:</td>
<td>EIE408</td>
</tr>
<tr>
<td>Number of Credits:</td>
<td>3</td>
</tr>
<tr>
<td>Hours Assigned:</td>
<td>Lecture/Tutorial 33 hours</td>
</tr>
<tr>
<td></td>
<td>Laboratory 9 hours</td>
</tr>
<tr>
<td></td>
<td>(Equivalent to 27 hours spent</td>
</tr>
<tr>
<td></td>
<td>by student in laboratory)</td>
</tr>
<tr>
<td>Pre-requisite:</td>
<td>nil</td>
</tr>
<tr>
<td>Co-requisite:</td>
<td>nil</td>
</tr>
<tr>
<td>Exclusion:</td>
<td>nil</td>
</tr>
</tbody>
</table>

**Objectives:**
To provide the theoretical and practical knowledge about virtual reality technologies and the fundamental concepts involved in building and displaying virtual worlds.

**Student Learning Outcomes:**
Upon completion of this course, students are expected to be able to:

**Category A: Professional/academic knowledge and skills**
1. Understand the underlying enabling technologies of VR systems,
2. Design and create a basic virtual environment, and
3. Design an appropriate virtual reality solution for an application.

**Category B: Attributes for all-roundedness**
4. Learn independently.
5. Acquire team work and presentation skills.
6. Appreciate the importance of creativity and critical thinking, and to realize that there is no perfect virtual reality system for any particular situation and that engineers have to find "optimal" solutions, or make practical designs.
7. Develop a fuller understanding of social and community issues related to the application of virtual reality systems form case studies.

**Programme Outcomes:**

**Category A: Professional/academic knowledge and skills**
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of the fundamentals of VR technology and providing the students with an opportunity to practice the application of knowledge.
- Programme Outcome 2: This subject contributes to the programme outcome through designing of simple VR systems and providing the students with an opportunity to conduct experiments and solve practical problems through mini-projects.

**Category B: Attributes for all-roundedness**
- Programme Outcome 11: This subject contributes to the programme outcome through student mini-projects.
- Programme Outcome 12: This subject contributes to the programme outcome through tutorial discussion and exchange of design idea.
- Programme Outcome 13: This subject contributes to the programme outcome by providing opportunity for the students to understand practical VR system in a number of site visits.

**Syllabus:**
1. **Introduction to Virtual Reality**
   1.1 Historical development of Virtual Reality
   1.2 The benefits of Virtual Reality
   1.3 Generic Virtual Reality Systems
   1.4 Real-time computer graphics, virtual environments: visual feedback, tactile feedback, acoustic feedback
2. **3D Computer Graphics**
2.1 Transformations and the 3D world; Modelling objects, dynamics objects
2.2 Physical modelling: Constraints; Collision Detection, Surface Deformation
2.3 Perspective Views; Stereoscopic Vision

3. Human Factors
3.1 Vision and Display
3.2 Hearing, Tactile and Equilibrium
3.3 Health and Safety Issues

4. VR Hardware
4.1 Computers: Graphics and workstation architectures
4.2 Input Devices: Sensors and transducers, Gloves, 3D mice, 3D trackers, Navigation and Gesture Interfaces
4.3 Output Devices: 3D Sound, Graphics; Haptic Displays, Force feedback Transducers, HMD

5. VR Software
5.1 VR Software features and web-based VR
5.2 Animation and Virtual Environment: linear and non-linear translations, angular rotation; shape and object inbetweening; free-form deformation
5.3 Modelling virtual worlds; physical simulation; VR toolkits
5.4 Programming of Virtual Environment: Mechanics of VRML; VRML browser; creating VRML environment; 3D moulders; worldbuilding toolkits; VRML utilities

6. VR Applications
6.1 Engineering and Industrial : CAD and CAM techniques
6.2 Training, education and simulations: Flight Simulator, Cab Simulator
6.3 Games and entertainment: PC based games, XBOX and Wii

Laboratory Experiment:
1. VR related Hardware
2. VR related Programming Tools
3. Practical VR Systems

Case Study:
1. Applications of VR/VE in Training
2. Applications of VR/VE in Entertainment
3. Applications of VR/VE in Manufacturing and Product Design
4. Applications of VR/VE in Therapy

Method of Assessment:

Continuous Assessment: 50% Examination: 50%

The continuous assessment consists of a mini-project, a number of site visit and logbooks, case study reports, a number of short quizzes/assignments and a mid-term test.

Textbook:

Reference Books:
Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1</td>
<td>Fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Tutorials, Site visits</td>
<td>5,6,7</td>
<td>These are supplementary to lectures and are conducted with smaller class sizes; students will be able to clarify concepts and to gain a deeper understanding of the lecture material; problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Laboratory sessions Mini-project</td>
<td>1,2,3,4,5</td>
<td>Students will conduct mini-project to better understand in the various practical aspect of VR Systems.</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site visit reports</td>
<td>1,5,6,7</td>
<td>These can measure the students’ understanding of the theories and concepts as well as their comprehension of subject materials.</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>1,2,3,6</td>
<td>End-of-chapter-type problems are used to evaluate the students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and to learn independently in order to come up with an alternative solution to an existing problem.</td>
</tr>
<tr>
<td>Mini-project reports and presentation</td>
<td>2,3,4,5,6</td>
<td>Each group of students are required to produce a written report; the accuracy and presentation of the report will be assessed; oral examination based on the laboratory exercises will be conducted for each group member to evaluate their technical knowledge and communication skills.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Computer Architecture and Systems
Number of Credits: 3

Subject Code: EIE414

Hours Assigned: Lecture/Tutorial 39 hours
Laboratory 3 hours
(Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: Computer System Fundamentals (EIE311) or Computer System Principles (EIE343)
Co-requisite: nil
Exclusion: nil

Objectives:
To provide students with
1. Concepts and design techniques of high performance computer architectures
2. Techniques to analyze performance in time domain

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

Category A: Professional/academic knowledge and skills
1. Understand the fundamental knowledge of microprocessor
2. Design and conduct experiments, as well as to analyze different microprocessors
3. Identify the issues of designing a microprocessor.
4. Write efficient programs along with understanding the limitations and mechanisms of different microprocessors

Category B: Attributes for all-roundedness
5. Present their ideas and observation effectively
6. Think critically and creatively

Programme Outcomes:

Category A: Professional/academic knowledge and skills
• Programme Outcome 1: This subject contributes to the programme outcome through teaching of the fundamentals of different microprocessors and providing the students with an opportunity to practice the application of knowledge.
• Programme Outcome 3: This subject contributes to the programme outcome through providing the students with an opportunity to conduct experiments and analyze the characteristics of different types of microprocessors.
• Programme Outcome 4: This subject contributes to the programme outcome through using simulation tools to evaluate the performance and limitation of different microprocessors.
• Programme Outcome 6: This subject contributes to the programme outcome by providing opportunity for students to identify the issues of designing a microprocessor.

Category B Attributes for all-roundedness
• Programme Outcome 8: This subject contributes to the programme outcome through report writings.
• Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically and creatively in conducting experiments.

Syllabus:
1. Introduction to Computer Architectures
   1.1 Revision on different computer architectures: ISA and HAS, Von Neumann, RISC and CISC
   1.2 Performance issues
2. Basic Processor Designs
   2.1 Data path: Data movement
   2.2 Control path: Instruction decode and branching
3. Pipelined Processors
   3.1 Pipelined data-paths
   3.2 Pipelined control
   3.3 Data hazards
   3.4 Branch hazards

4. Superscalar Processing
   4.1 Parallel decoding
   4.2 Superscalar instruction issue: shelving and register renaming
   4.3 Speculative execution: preserving processor consistency

5. Branching Processing
   5.1 Branch checking
   5.2 Branch processing: delayed branching and multi-way branching
   5.3 Speculative execution: early detection and prediction

6. Cache Organization
   6.1 Cache mapping: direct mapping and associative mapping
   6.2 Replacement algorithm
   6.3 Cache miss and performance
   6.4 Cache coherence

7. Memory System
   7.1 Memory system hierarchy
   7.2 Paging
   7.3 Segmentation
   7.4 Virtual memory

Laboratory Experiments:
1. Superscalar simulation tool.
2. Tracing the operation of superscalar CPU by simulation.

Method of Assessment:
Continuous Assessment: 50%  Examination: 50%

The continuous assessment will consist of assignments, tests and a mini-project.

Reference Books:
Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<tr>
<td>Tutorials</td>
<td>1, 3, 4, 5, 6</td>
<td>Conducted with smaller class size Students will be able to clarify concepts and to have a deeper understanding of the lecture material Problems and exercises are given and discussed</td>
</tr>
<tr>
<td>Mini-project</td>
<td>1, 2, 3, 4, 5, 6</td>
<td>Students will make use of the software VSIM to simulate various types of Superscalar processors and critically compare their features and performance</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments, tests and examination</td>
<td>1, 3, 4, 5, 6</td>
<td>Analytical problems are used to evaluate students’ ability in analyze performance issues Students need to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Mini-project</td>
<td>1, 2, 3, 4, 5, 6</td>
<td>Each student is required to give demonstrations and produce a written report Accuracy and the presentation of the report will be assessed Oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Distributed Systems and Network Programming

Subject Code: EIE424

Number of Credits: 3

Hours Assigned: Lecture/Tutorial 36 hours
Laboratory 6 hours
(Equivalent to 18 hours spent by student in laboratory)

Pre-requisite: For 42070 and 05005 Object Oriented Design and Programming (EIE320)

For 42077 Principles of Programming (COMP201) or Object Oriented Design and Programming (EIE320)

For 61024 and 61031 Principles of Programming (COMP201)

Co-requisite: nil
Exclusion: nil

Objectives:

This subject will provide students with the principles of distributed systems. It enables students to master the development skills for providing and constructing distributed services on the Web. Through a series of lab exercises, students will be able to develop interoperable and distributed Web applications.

Student Learning Outcomes:

On successful completion of this subject, the students will be able to:

Category A: Professional/academic knowledge and skills
1. Understand the concepts of distributed computing and distributed systems.
2. Be able to identify the key components in distributed systems.
3. Be able to apply Java to build distributed systems.
4. Understand the advantages and limitations of different distributed system architectures.
5. Understand the enabling technologies for building distributed systems.
6. Understand the different components of Web Services.
7. Be able to set up and configure a standard Web Service system and develop simple Web Service applications.

Category B: Attributes for all-roundedness
8. Think critically.
9. Learn independently.
10. Work in a team and collaborate effectively with others.
11. Present ideas and findings effectively.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1: This subject contributes to the programme outcome through the teaching of the knowledge of distributed computing and distributed systems and through providing the students with an opportunity to apply their knowledge.
- Programme Outcomes 4: This subject contributes to the programme outcome by providing the opportunity for students to solve practical software engineering problems pertaining to the field of distributed systems and network programming.
- Programme Outcome 5: This subject contributes to the programme outcome by providing students with the software development tools and internet programming techniques for building web applications and distributed systems.

Category B: Attributes for all-roundedness
- Programme Outcome 8, 11: This subject contributes to the programme outcome by providing students with the opportunity to write technical reports and software documentation.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the development of various distributed systems.

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Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of distributed software and systems.

Syllabus:

1. Introduction to Distributed Systems and Distributed Computing
   1.1 Operating systems. Multithreading.
   1.2 Computer networking. Internet protocol.
   1.3 Examples of distributed systems and distributed computing

2. Distributed Computing Paradigms

3. Enabling Tools and Techniques for Building Distributed Systems
   3.1 Socket API and socket programming. Datagram sockets. Stream-mode sockets.

4. Distributed Services on the Web: Web Services
   4.2 XML-RPC.
   4.4 Web Services Description Language (WSDL). Role of WSDL in Web services, WSDL documents, remote web-services invocation using WSDL.
   4.5 Universal Description, Discovery and Integration (UDDI). Role of UDDI in Web services. UDDI registries. Discovery technologies.

Laboratory Experiment:

Practical Works
1. Socket API
2. Remote Method Invocation (RMI)
3. Extensible Markup Language (XML)
4. XML-RPC
5. SOAP
6. WSDL

Method of Assessment:

Coursework: 40%   Examination: 60%

The continuous assessment consists of assignments, laboratory reports and tests.

Textbooks:


Reference Books:

3. IEEE Internet Computing.
4. IEEE Distributed Systems Online.
Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1,2,4,5,6</td>
<td>Fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1,3,4,5,6,8,9</td>
<td>Supplementary to lectures and are conducted with smaller class size; Students will be able to clarify concepts and to have a deeper understanding of the lecture material; Programming exercises will be provided to strengthen students’ hands-on experiences.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>3,6,7,8,10,11</td>
<td>Students will go through the development process of various distributed systems and evaluate their performance.</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short quizzes</td>
<td>1,2,4,5,6</td>
<td>Mainly objective tests conducted to measure the students’ understanding of the theories and concepts as well as their comprehension of subject materials</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>1,2,4,5,6,8,9</td>
<td>End-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom. Students need to think critically and creatively in order to come with an alternate solution for an existing problem.</td>
</tr>
<tr>
<td>Laboratory sessions, mini-project</td>
<td>3,6,7,8,10,11</td>
<td>Each group of students is required to produce written reports. For some of the practical works, students are required to make demonstration to illustrate their understanding of the related technical knowledge and skills.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Artificial Intelligence and Computer Vision
Subject Code: EIE426

Number of Credits: 3
Hours Assigned: Lecture/Tutorial 39 hours
Laboratory/Demonstration 3 hours
(Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
1. To introduce the student the major ideas, methods, and techniques of Artificial Intelligence (AI) and computer vision;
2. To develop an appreciation for various issues in the design of intelligent systems; and
3. To provide the student with programming experience from implementing AI techniques, simple knowledge systems, and computer vision applications.

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

Category A: Professional/academic knowledge and skills
1. Understand the benefits and limitations of current AI techniques, its culture and society impacts, and possible future development.
2. Implement major game search techniques for simple computer games.
3. Apply machine learning techniques to information processing and data mining.
4. Develop simple expert systems for internet and engineering applications.
5. Explore robotics and computer vision techniques, and their applications to entertainment and engineering domains.

Category B: Attributes for all-roundedness
6. Present ideas and findings effectively.
7. Think critically.
8. Learn independently.
9. Work in a team and collaborate effectively with others.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 3, and 5: This subject contributes to the programme outcomes through teaching of the theories and concepts of artificial intelligence and computer vision and through providing the students with an opportunity to apply their knowledge.
- Programme Outcomes 2, 3, and 4: This subject contributes to the programme outcomes by providing the students with laboratory exercises to simulate search techniques, to construct simple knowledge systems using a knowledge system shell, and to apply machine learning techniques to practical problems.
- Programme Outcomes 2, 3, 4, 5, and 7: This subject contributes to the programme outcomes through a group mini-project to develop a simple intelligence system.
- Programme Outcomes 2 and 7: This subject contributes to the programme outcomes through the teaching of useful tools for building artificial intelligence and computer vision systems

Category B: Attributes for all-roundedness
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about various artificial intelligence and computer vision methodologies.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of artificial intelligence and computer vision.
Programme Outcomes 8, 9, 10, and 11: This subject contributes to the programme outcomes by providing students with an opportunity to work as a team in developing a simple intelligence system.

Programme Outcome 13: This subject contributes to the programme outcome through a discussion on the culture and society impacts of artificial intelligence techniques.

Syllabus:

1. **Introduction**
   The Definitions and Foundations of AI, the History of AI, and the State of the Art.

2. **Intelligent Agents**
   Agents and Environments, the Concept of Rationality, the Nature of Environments, the Structure of Agents, Applications.

3. **Blind and Informed Search Methods**

4. **Game Playing**
   Games, Optimal Decisions in Games, Alpha-Beta Pruning, Imperfect Decisions, Games That Include an Element of Chance, State-of-the-Art Game Programs.

5. **Knowledge Systems**
   Rule-Based Deduction Systems, Rule-Based Reaction Systems, Forward and Backward Chaining, the Knowledge Engineering Process, Analysis of Typical Knowledge Systems.

6. **Machine Learning**

7. **Computer Vision**

8. **Robotics**

9. **Culture and Society Impacts**
   Understanding Intelligence: Issues and Directions, the Ethics and Risks of Developing Artificial Intelligence Solutions.

Method of Assessment:

Coursework: 45%  
Examination: 55%

Recommended Textbooks:


Reference Books:

**Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:**

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 2, 3, 4, 5</td>
<td>fundamental principles and key concepts of the subject are delivered to students; guidance on further readings, applications and implementation is given</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 3, 4, 5, 7, 8</td>
<td>supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>2, 3, 4, 7, 8, 9</td>
<td>students will make use of the software tools to develop simple computer games and simple expert systems</td>
</tr>
<tr>
<td>Mini-project</td>
<td>2, 3, 4, 6, 9</td>
<td>students in groups of 3-4 are required to work on an intelligent system</td>
</tr>
</tbody>
</table>

**Alignment of Assessment and Learning Outcomes:**

<table>
<thead>
<tr>
<th>Assessment Method, test and examination</th>
<th>Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments, test and examination</td>
<td>1, 2, 3, 4, 5, 6, 7, 8</td>
<td>end-of chapter type problems used to evaluate students' ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Laboratory sessions, mini-project</td>
<td>2, 3, 4, 6, 7, 8, 9</td>
<td>each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed; oral examination based on the laboratory and mini-project reports will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
</tr>
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</table>
**SUBJECT DESCRIPTION FORM**

<table>
<thead>
<tr>
<th><strong>Subject Title:</strong></th>
<th>Multimedia Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Credits:</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Subject Code:</strong></td>
<td>EIE428</td>
</tr>
<tr>
<td><strong>Hours Assigned:</strong></td>
<td></td>
</tr>
<tr>
<td>Lecture/Tutorial</td>
<td>39 hours</td>
</tr>
<tr>
<td>Laboratory</td>
<td>3 hours</td>
</tr>
<tr>
<td>(Equivalent to 9 hours spent by student in laboratory)</td>
<td></td>
</tr>
</tbody>
</table>

**Pre-requisite:** Data and Computer Communications (EIE333) or **Co-requisite:** nil  
**Exclusion:** nil  
Computer Networks (EIE342)

**Objectives:**
To study the technical issues and system solutions for providing multimedia communications on the Internet.

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

**Category A: Professional/academic knowledge and skills**
1. Understand the current state-of-the-art developments in Internet technologies for multimedia communications.
2. Appreciate the principles used in designing multimedia protocols, and so understand why standard protocols are designed the way that they are.
3. Understand the system design principles of multimedia communications systems.
4. Solve problems and design simple networked multimedia systems.

**Category B: Attributes for all-roundedness**
5. Present ideas and findings effectively.
6. Think critically and learn independently.

**Programme Outcomes:**

**Category A: Professional/academic knowledge and skills**
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of Internet technologies and multimedia communications systems.
- Programme Outcomes 2: This subject contributes to the programme outcome through the teaching of the knowledge of multimedia communications and through providing the students with an opportunity to apply their knowledge.
- Programme Outcomes 3, 5, 6: This subject contributes to the programme outcome by providing the opportunity for students to solve practical engineering problems pertaining to the field of multimedia communications.

**Category B: Attributes for all-roundedness**
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about and practice the different multimedia communication techniques for different applications.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of multimedia communications.
Syllabus:

1. **Terminal/Codec Support for Multimedia Communications**
   - Scalable Coding: SNR Scalability, Spatial Scalability, Temporal Scalability and Fine Granularity Scalability (FGS)
   - Error Control: Error Propagation, Error Resilience Coding Techniques
   - Rate Control: Concepts for Rate Control, MPEG TM5 Rate Control Algorithms

2. **Network Layer Support for Multimedia Communications**
   - IP Multimedia: Internet Multicast Model, Internet Group Management Protocol (IGMP), Group Shared Tree and Source Based Tree, Multicast Routing Algorithms

3. **Transport Layer Support for Multimedia Communications**
   - TCP congestion control, TCP Delay Analysis, TCP Throughput Analysis, Bandwidth Allocation
   - Media transport protocols: Real Time Protocol (RTP) and Real Time Control Protocol (RTCP);
     - Signalling Protocols: Real-Time Streaming Protocol (RTSP)

4. **Quality of Services (QoS)**
   - Integrated services (intserv): Architecture and Service Model, Resource Reservation Protocol (RSVP), Packet Scheduling Disciplines in the Internet
   - Differentiated Services (diffserv): Framework and Concept, Assured and Expedited Services, Packet Classification, Routers Internals and Packet Dropping Techniques

5. **Multimedia Streaming Systems**
   - Streaming architecture: Real-time Streaming and On-demand Streaming, Congestion Control, Scalable Transmission, Streaming Server Design, Buffering and Scheduling Techniques, Data Sharing Techniques, Support of Interactive Operations, Case Studies on Video on Demand and IPTV

**Laboratory Experiments:**

1. Simulation study on congestion control
2. Multimedia networking
3. Multimedia streaming

**Method of Assessment:**

Continuous Assessment: 40%  Examination: 60%

The continuous assessment will consist of a number of assignments, quizzes and two tests.

**Reference Books:**

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<tr>
<td>Lectures</td>
<td>1, 2, 3</td>
<td>fundamental principles and key concepts of the subject are delivered to students</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 3, 4, 6</td>
<td>supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>4, 5, 6</td>
<td>students will make use of network simulators to simulate various types of communication networks and evaluate their performance</td>
</tr>
</tbody>
</table>

Alignment of Assessment and Learning Outcomes:

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<tr>
<th>Assessment Method</th>
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<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Short quizzes</td>
<td>1, 2</td>
<td>mainly objective tests (e.g., multiple-choice questions, true-false, and matching items) conducted to measure the students’ ability to remember facts and figures as well as their comprehension of subject materials</td>
</tr>
<tr>
<td>Assignments, tests and examination</td>
<td>3, 4, 5, 6</td>
<td>end-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>4, 5, 6</td>
<td>each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed.</td>
</tr>
</tbody>
</table>
SUBJECT DESCRIPTION FORM

Subject Title: Corporate Networking
Subject Code: EIE429
Number of Credits: 3
Hours Assigned:
- Lecture/tutorial: 39 hours
- Laboratory: 3 hours
  (Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: nil
Co-requisite: nil
Exclusion: Corporate Communication Networks (EIE439)

Objectives:
Telecommunication and computer networking technologies have been advancing rapidly in recent years. New technologies have been developed, and new economic orders have been built. Against this background, this subject is designed to:

1. Give a practical treatment on the design, implementation and management of multinational corporate networks.
2. Introduce the variety of facilities, technologies and communication systems to meet future needs of network services.
3. Discuss in details network planning, management, marketing, performance and security issues.
4. Evaluate critically the performance of existing and emerging global communication networking technologies and their impact on enterprise and world economy.

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

Category A: Professional/academic knowledge and skills
1. Describe the operational, marketing, functional attributes of different components of enterprise networks.
2. Evaluate critically the design, implementation, and performance of enterprise networks with regard to different criteria.
3. Design enterprise networking solutions by taking into account various constraints and requirements.

Category B: Attributes for all-roundedness
4. Develop a global outlook by recognizing the effect of advancement in communication technologies on business opportunity and world economic, social and cultural development.
5. Think and evaluate critically.
6. Take up new technology for life-long learning.
7. Present ideas and findings effectively.
8. Work in a team, and collaborate effectively with other members.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through teaching of the new telecommunication and computer network technologies, and providing the students with an opportunity to identify the different aspects of Internet and multimedia systems.
- Programme Outcome 2: This subject contributes to the programme outcome through the study of a network simulator and the performance investigation of IP phones, and providing the students with an opportunity to identify, analyze and solve technical problems related to Internet and multimedia technologies.
- Programme Outcome 6: This subject contributes to the programme outcome by providing opportunity for students working on self-study projects to appreciate and identify factors/issues related to product/industrial design; and generate and evaluate design solutions to solve a specific problem.
Category B: Attributes for all-roundedness

- Programme Outcome 8: This subject contributes to the programme outcome through the presentations and report writing in self-study projects to communicate effectively, and present ideas and findings clearly in oral and written forms.
- Programme Outcome 9: This subject contributes to the programme outcome through teaching of the new telecommunication and computer network technologies, and providing the students with an opportunity to think critically and creatively.
- Programme Outcome 10: This subject contributes to the programme outcome through taking up new technology to demonstrate self-learning and life-long learning capability.
- Programme Outcome 11: This subject contributes to the programme outcome by providing the opportunity for students working on self-study projects to collaborate effectively with other members in a team, and demonstrate leadership capability.

Syllabus:

1. Communication Networks and their Features
2. Protocols and Technologies
   - WAN protocols, Virtual Local Area Network, IP Switching and MPLS, Metro Ethernet WAN, Voice over IP, Softswitch.
3. Network Security
4. Traffic Theory and Marketing
   - Teletraffic theory, tariff and cost analysis, deregulations.

Laboratory Experiments:

1. Voice over IP experiment and softswitch.
3. LAN switching management.

Method of Assessment:

Continuous Assessment: 50% Examination: 50%

Textbook:


Reference Books:

## Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
<th>Learning Outcome</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Lectures, supplemented with interactive questions and answers, and short quizzes</td>
<td>1,2</td>
<td>In lectures, students are introduced to the knowledge of the subject, <em>comprehension</em> is strengthened with interactive Q&amp;A and short quizzes. They will be able to <em>explain</em> and <em>generalize</em> complex structure of knowledge (e.g. relationship between different players in the telecommunication market).</td>
</tr>
<tr>
<td>Tutorials where case studies are conducted, and problems are given to students for them to solve</td>
<td>3,5,6</td>
<td>In tutorials, students <em>apply</em> what they have learnt in analyzing the cases and solving the problems given by the tutor. They will <em>analyze</em> the given information, <em>compare</em> and <em>contrast</em> different scenarios (e.g. the pros and cons of using different networking technologies in different situations) and propose solutions or alternatives.</td>
</tr>
<tr>
<td>Three laboratory exercises, where students will perform hands-on tasks in different topics. After the laboratory, they will have to write a report to reflect on what they have learnt and the experience and knowledge they have derived.</td>
<td>4-8</td>
<td>Students perform hands-on tasks in laboratory to either strengthen what they have learnt or explore new frontiers. They will be able to <em>synthesize</em> a structure of knowledge by designing and planning the tasks, and <em>relate</em> the observation to theories and principles. They will also <em>evaluate</em> outcomes of the tasks they perform and <em>interpret</em> the data they gather (e.g. the security features afforded by VPN routers, and their pros and cons).</td>
</tr>
<tr>
<td>Assignment and Homework, solving end-of-chapter problems</td>
<td>1-6</td>
<td>Through working assignment and homework, and end-of-chapter problems in text books, students will develop a firm understanding and <em>comprehension</em> of the knowledge taught. They will <em>analyze</em> given information and <em>apply</em> knowledge in solving problem. For some design type of questions (e.g. designing an Intranet for a company), they will have to <em>synthesize</em> solutions by <em>evaluating</em> different alternatives.</td>
</tr>
</tbody>
</table>
### Alignment of Assessment Strategies with Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Learning Outcome</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment/Homework/Case study reports</td>
<td>1-6</td>
<td>Assignment/Homework and case study reports are given to students to assess their competence level of knowledge and comprehension, ability to analyze given information, ability to apply knowledge and skills in new situation, ability to synthesize structure, and ability to evaluate given data to make judgment. The criteria (i.e. what to be demonstrated) and level (i.e. the extent) of achievement will be graded according to six levels: (A+ and A), Good (B+ and B), Satisfactory (C+ and C), Marginal (D) and Failure (F). These will be made known to the students before an assignment/homework is given. Feedback about their performance will be given promptly to students to help them improvement their learning.</td>
</tr>
<tr>
<td>Laboratory works and reports</td>
<td>4, 5, 6</td>
<td>Students will be required to perform three laboratory works and write three laboratory reports. The emphasis is on assessing their ability to apply, synthesize and evaluate. Expectation and grading criteria will be given as in the case of assignment/homework.</td>
</tr>
<tr>
<td>Mid-semester test</td>
<td>1-6</td>
<td>There will be a mid-semester test to evaluate students’ achievement of all the learning outcomes and give feedback to them for prompt improvement. Expectation and grading criteria will be given as in the case of assignment/homework.</td>
</tr>
<tr>
<td>End-of-semester test and Examination</td>
<td>1-6</td>
<td>There will be an end-of-semester test and examination to assess students’ achievement of all the learning outcomes. These are mainly summative in nature. Expectation and grading criteria will be given as in the case of assignment/homework.</td>
</tr>
</tbody>
</table>
Subject Title: Honours Project  
Subject Code: EIE430  
Number of Credits: 6  
Hours Assigned:  
- Structured Study 84 hours  
- Self-work/Guided Study 168 hours  
- Total 252 hours  

Pre-requisite: nil  
Co-requisite: nil  
Exclusion: nil

Objectives:

Engineering is the science of the applying scientific principles and technology to improve human life. This may take the form of invention, design, implementation, so on and so forth. The objective is to come up with solutions to existing problems while considering various constraints. Hence the students studying in a curriculum will be most benefited from doing a project in order to have the chance to practise hands-on application of the knowledge the student has learned throughout the curriculum, while producing something useful or valuable. Against this background, there is a final year project (FYP) component in the curriculum with the objectives:

1. To provide the opportunity to the student so that he/she can apply what he/she has learnt in previous stages in a real-life engineering context
2. To enable the student to acquire and practise project management skills and discipline while pursuing the FYP
3. To enable the student to apply engineering knowledge in analysis of problems and synthesis of solution while considering various constraints

Student Learning Outcomes:

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

Category A: Professional/academic knowledge and skills
1. Understand, take up, and master the basic knowledge and skills related to the specific project
2. Understand the background, the requirements, objectives, and deliverables to be produced
3. Integrate and apply knowledge learnt in present and previous stages (vertical integration) and across different subjects (horizontal integration)
4. Apply various professional skills in electronic and information engineering to achieve the objectives of the project
5. Learn to use new tools and facilities, and to gather new information, for the conduction of the project

Category B: Attributes for all-roundedness
6. Work under the guidance of a supervisor while exercising self-discipline to manage the project
7. Review critically the student’s own achievement and other related works
8. Communicate effectively with related parties (supervisor, peers, vendors)
9. Work with others (team partners, outsource company, technical support staff) collaboratively
10. Realize different constraints, and to make appropriate compromise, when designing a solution to an engineering problem
11. Disseminate effectively the results and knowledge learnt in the project
12. Transfer the knowledge and skills learnt in the project.

Programme Outcomes

Category A: Professional/academic knowledge and skills
- Programme Outcomes 1, 2, 3, 4, 5, 6, 7: In working through the final-year project, the students will need to draw on all the professional and academic skills developed throughout the programme. The students will learn how to apply knowledge of mathematics, science, and engineering in designing engineering solutions to a problems with consideration of professionalism and realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability factors. They also will learn how to make use of appropriate Internet and multimedia tools with an understanding of their processes and limitations in the course of the conducting the project. While each project is
individual the broad range of skills and knowledge required to successfully complete the final year project is drawn from the same pool.

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

- **Programme Outcome 8:** In this subject, the students will learn how to conduct effective written or verbal communication with various parties. They will use different media such as texts, mathematics, graphics, images, video, animation...etc. They will learn how to use different communication tools such as log book, project proposal, final-year project report, presentation, and demonstration to communicate their ideas, the project design, the underlying theory, and the project results to various audiences in the suitable context.

- **Programme Outcome 9:** The students will be given the chance to exercise creativity and innovation by designing something new (a new software, a new hardware, a new process, a new method) to solve a given problem as required by the project.

- **Programme Outcome 11:** In the final-year project, the student will learn how to work with others (supervisor, other students, other teaching staff, technicians, vendors, industrialists...etc.) to accomplish the project tasks and to produce the deliverables. They will need to communicate/consult people in other disciplines, cooperate with others in the use or acquiring of resources. The students will be given the chance to learn how to exercise leadership when working in a team project or group project that requires collaboration among different students.

- **Programme Outcomes 10, 12 and 13:** In this subject, the students will learn how to gather information about the background or frontier of their projects and related subject matters. They will learn how to stay abreast of contemporary issues by reading and information gathering. They will recognize the need for life-long learning.

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**Syllabus:**

The progression of the project will be guided by a framework, which consists of the following indicative stages. The specific details will vary from project to project.

**Project Specification**

In this stage, the student will work in conjunction with the project supervisor to draw up a concrete project plan specifying at least the following:

1. Background of the project
2. Aims and objectives
3. Deliverables
4. Methodology to be adopted
5. Schedule

**Project Execution**

This is the major part of the project. After the specification is done, the project will be pursued so that the objectives are to be met; the deliverables are to be produced in accordance with the schedule. The student and the project supervisor will meet constantly to discuss the progress. In particular the following should be demonstrated:

1. Adherence to the schedule
2. Achievement of objectives by the student’s work
3. Initiatives of the students to work, design, and to solve problems
4. Inquisitiveness of the student (e.g. to probe into different phenomena or to try different approaches)
5. Diligence of the students to spend sufficient effort on the project
6. Systematic documentation of data, design, results, ...etc. during the process of working out the project

**Project Report**

After the project is finished, it is important that the student can be able to disseminate the results so that the results can be reviewed by others. Through this dissemination process, project achievements can be communicated, experience can be shared, knowledge and skills learnt can be retained and transferred. The following elements will be important:

1. Project log book
2. Project report (hardcopy and softcopy)
3. Presentation
4. Performance in a Question-and-Answer session
Method of Assessment:
Continuous Assessment: 100%

Reference Books:
To be specified by the project supervisor for each project.
SUBJECT DESCRIPTION FORM

Subject Title: Digital Video Production and Broadcasting
Subject Code: EIE431

Number of Credits: 3
Hours Assigned: Lecture/Tutorial 39 hours
Laboratory 3 hours
(Equivalent to 9 hours spent by student in laboratory)

Pre-requisite: nil
Co-requisite: nil
Exclusion: nil

Objectives:
This subject provides a broad knowledge of digital video production and broadcasting.

Student Learning Outcomes:
On successful completion of this subject, students will be able to:

Category A: Professional/academic knowledge and skills
1. Understand the fundamentals of digital video systems with emphasis on production and broadcasting.
2. Work with digital video editing tools.
3. Understand the system design principles of video broadcasting.
4. Design simple systems related to video broadcasting.
5. Facilitate for further development in advanced digital video production and broadcasting.

Category B: Attributes for all-roundedness

Programme Outcomes:

Category A: Professional/academic knowledge and skills
• Programme Outcomes 1: This subject contributes to the programme outcomes through the teaching of the theories and concepts of digital video production and broadcasting and through providing the students with an opportunity to apply their knowledge.
• Programme Outcome 3: This subject contributes to the programme outcome through teaching the different ways of solving technical problems related to digital video production and broadcasting.
• Programme Outcome 4: This subject contributes to the programme outcome through the teaching of software tools for creating and editing digital video.

Category B: Attributes for all-roundedness
• Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of video broadcasting.

Syllabus:
1. Introduction to Video Production and Broadcasting
   Elements of a video production and broadcasting system. Video services in Hong Kong. Video production and broadcasting standards and current development.

2. Fundamental of Video Production
   Production process, pre-production, production and post-production. Digital video editing.

3. Video Production and Recording Equipments
   Digital camera and video camera, video cassette recorder (VCR), digital video recorder, storage media, VCD, DVD-video. Video player: DVD player and advanced digital video player with full VCR support.
4. Analog Video Broadcasting Standards
   Component video and composite video, NTSC, and PAL.

5. Fundamental of Digital Video Broadcasting
   Digital video coding standards, Video transport layer, and transmission layer.

6. Video Transport Layer
   MPEG-2 systems and multiplexing, programme specific information and service information.

7. Error Control for Digital Video
   Quality of service requirements for video communications. Error resilience and concealment techniques for digital video. Transport protocols for multimedia communications. Video streaming over the Internet.

8. Digital Video Broadcasting Techniques and Standards
   Channel coding for error control in digital TV, Digital modulation technique and conditional access for digital TV.

Laboratory Experiments:
1. Basic video editing tools
2. Digital video editing – visual effects
3. Digital video editing – Layering and keying clips

Method of Assessment:
Continuous Assessment: 40% Examination: 60%

The continuous assessment will consist of laboratory reports, a number of short quizzes, assignments, and tests.

Reference Books:

Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

<table>
<thead>
<tr>
<th>T&amp;L Method</th>
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<tr>
<td>Lectures</td>
<td>1, 3, 4, 5, 6</td>
<td>fundamental principles and key concepts of the subject are delivered to students</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 3, 4, 5, 6</td>
<td>supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed</td>
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<tr>
<td>Laboratory sessions</td>
<td>2, 6</td>
<td>students will make use of digital video editing tools</td>
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## Alignment of Assessment and Learning Outcomes:

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<td>Short quizzes</td>
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<td>mainly objective tests (e.g., multiple-choice questions, true-false, and matching items) conducted to measure the students' ability to remember facts and figures as well as their comprehension of subject materials</td>
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<tr>
<td>Assignments, tests and examination</td>
<td>1, 3, 4, 5, 6</td>
<td>end-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>2, 6</td>
<td>each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed; oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills</td>
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SUBJECT DESCRIPTION FORM

Subject Title: Web Systems and Technologies  
Subject Code: EIE432  
Number of Credits: 3  
Hours Assigned: Lecture/Tutorial 36 hours  
Laboratory 6 hours  
(Equivalent to 18 hours spent by student in laboratory)

Pre-requisite: Information Technology (ENG224)  
Co-requisite: nil  
Exclusion: nil

Objectives:
This subject will provide students with the principles and practical programming skills of developing Internet and Web applications. It enables students to master the development skill for both client-side and server-side programming, especially for database applications. Students will have opportunity to put into practice the concepts through programming exercises based on various components of client/server web programming.

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

Category A: Professional/academic knowledge and skills
1. Understand the enabling technologies for building Internet and Web database applications.
2. Understand the different components for developing client/server applications.
3. Apply the techniques and features of the client/server development languages to construct a database application based on Internet.
4. Develop the web database applications through programming exercises.

Category B: Attributes for all-roundedness
5. Present ideas and findings effectively.
6. Think critically.
7. Learn independently.

Programme Outcomes:

Category A: Professional/academic knowledge and skills
- Programme Outcome 1: This subject contributes to the programme outcome through the teaching of the theories and concepts of web technologies and through providing the students with an opportunity to apply their knowledge.
- Programme Outcome 3: This subject contributes to the programme outcome through teaching the different ways of building Internet and web applications.
- Programme Outcome 4: This subject contributes to the programme outcome by providing the opportunity for students to solve practical problems pertaining to the fields of Internet and Web applications.

Category B: Attributes for all-roundedness
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about the most suitable way to develop Web applications.
- Programme Outcome 10: This subject contributes to the programme outcome by providing students with the foundations for life-long learning and continual professional development in the areas of Web applications.

Syllabus:
1. Introduction to Client/Server Computing
   1.1 The basic principles of client/server computing; Distinguished characteristics of client/server systems and application areas; Comparison of 2 tier versus three tier client/server solutions; Web programming model; Interactive web.
2. **Web Programming**
   2.1 **Client Side Web Programming:** Benefits and limitation of client-side web programming; Byte code versus scripting. Basic concepts and development based on Java applet, Java script & dynamic HTML (DHTML).
   2.2 **Server Side Web Programming:** Approaches to server-side programming. Benefits and limitations of server-side web programming. Development framework for server-side programming based on PHP/servlet/JSP.
   2.3 **Web application development.** Development of a web application using client-side programming, server-side side programming and AJAX techniques.

3. **Web Database**
   3.1 **Introduction to Database:** File and database processing systems; Definition of database; DBMS examples.
   3.2 **Data Modelling:** Entity relationship model; Elements of the E.R. model.
   3.3 **Database Design and Implementation:** Relation model; Mapping an ER model to table model; Mapping entities and attributes; Normalization; Foundations of relational implementation; Defining relational data; Relational data manipulation; Relational algebra; Structured query language; Restricting and sorting data; Displaying data from multiple tables.
   3.4 **Web Database Applications:** Multi-tier architecture; Principle of web database applications: store, manage and retrieve data.

4. **Security on the Web**
   4.1 **Access control and passwords; cryptography; public key encryption; authentication with digital signature; packet filtering; firewalls.**

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**Laboratory Experiments:**

**Practical Works:**
1. Client-side web application programming.
2. Server-side web application programming.
3. Database driven web design.
4. Evaluation of commercially available database management systems.
5. Creating and managing a database.

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**Method of Assessment:**

Coursework: 40%  
Examination: 60%

The continuous assessment consists of a number of short quizzes, assignments, laboratory reports and two tests.

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**Text Books:**

**Reference Books:**
### Alignment of Teaching and Learning (T&L) Methods with Learning Outcomes:

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<td>1, 2, 6</td>
<td>supplementary to lectures; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>3, 4, 6, 7</td>
<td>students will develop client-side and server-side web applications.</td>
</tr>
<tr>
<td>Mini-project</td>
<td>3, 4, 5, 6, 7</td>
<td>students in groups of 2 are required to develop a database driven web application. Each group is required to perform a detailed study and make a presentation.</td>
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<td>Assignments, tests and examination</td>
<td>3, 4, 6, 7</td>
<td>end-of chapter type problems used to evaluate students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem.</td>
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<tr>
<td>Laboratory sessions, mini-project</td>
<td>3, 4, 5, 6, 7</td>
<td>oral examination based on the laboratory exercises will be conducted to evaluate student's technical knowledge and communication skills.</td>
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**Subject Title:** Image and Audio Processing  
**Subject Code:** EIE435  
**Number of Credits:** 3  
**Hours Assigned:**  
- Lecture/tutorial 42 hours  
- Laboratory 3 hours  
  (Equivalent to 9 hours spent by student in laboratory)

**Pre-requisite:** For 42070, 05004 and 05005  
- Linear Systems (EIE312)  

**Co-requisite:** nil  
**Exclusion:** nil  

**Linear Systems (EIE312) or**  
- Signal Processing Fundamentals (EIE327) or  
- Signals and Systems (EIE341)

**Objectives:**
To provide a broad treatment of the fundamentals in image and audio processing.

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

**Category A: Professional/academic knowledge and skills**
1. Understand the fundamentals of image and audio signal processing and associated techniques.
2. Understand how to solve practical problems with some basic image and audio signal processing techniques.
3. Have the ability to design simple systems for realizing some multimedia applications with some basic image and audio signal processing techniques.

**Category B: Attributes for all-roundedness**
4. Present ideas and findings effectively.
5. Think critically and creatively.

**Programme Outcomes:**

**Category A: Professional/academic knowledge and skills**
- Programme Outcomes 2, 5: This subject contributes to the programme outcome through the teaching of the knowledge of image and audio processing and through providing the students with an opportunity to apply their knowledge.
- Programme Outcomes 3, 6: This subject contributes to the programme outcome by providing the opportunity for students to solve practical engineering problems pertaining to the field of image and audio processing.
- Programme Outcome 4: This subject contributes to the programme outcome by providing students with laboratory exercises to process and analyze images and audios.

**Category B: Attributes for all-roundedness**
- Programme Outcomes 8, 11: This subject contributes to the programme outcome by providing students with an opportunity to work in a team.
- Programme Outcome 9: This subject contributes to the programme outcome by providing students with an opportunity to think critically about and practice the different image/audio processing techniques for different applications.

**Syllabus:**

1. **Image processing**
   1.1 Fundamentals of digital image: Digital image representation and visual perception, image sampling and quantization.
1.2 Image enhancement: Histogram processing; Median filtering; Low-pass filtering; High-pass filtering; Spatial filtering; Linear interpolation, Zooming.
1.3 Image coding and compression techniques: Scalar and vector quantizations; Codeword assignment; Entropy coding; Transform image coding; Wavelet coding; Codec examples.
1.4 Image analysis and segmentation: Feature extraction; Histogram; Edge detection; Thresholding.
1.5 Image representation and description: Boundary descriptor; Chaincode; Fourier descriptor; Skeletonizing; Texture descriptor; Moments.

2. Audio processing
2.1 Fundamentals of digital audio: Sampling; Dithering; Quantization; psychoacoustic model.
2.2 Basic digital audio processing techniques: Anti-aliasing filtering; Oversampling; Analog-to-digital conversion; Dithering; Noise shaping; Digital-to-analog Conversion; Equalisation.
2.3 Digital Audio compression: Critical bands; threshold of hearing; Amplitude masking; Temporal masking; Waveform coding; Perceptual coding; Coding techniques: Subband coding and Transform coding.
2.4 Case Study of Audio System/Codecs: MP3; MP3-Pro; CD; MD; DVD-Audio; AC-3; Dolby digital; Surround; SRS Surround system; Digital Audio Broadcasting, etc.

Laboratory Experiments:
1. Image processing techniques
2. Image compression
3. Audio compression
4. Psychoacoustic behaviour

Method of Assessment:
Continuous Assessment: 40% Examination: 60%

The continuous assessment will consist of a number of assignments, laboratory reports, and two tests.

Textbooks:

Reference Books:

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<td>Tutorials</td>
<td>2, 3, 5</td>
<td>These are supplementary to lectures and are conducted with smaller class sizes; students will be able to clarify concepts and to gain a deeper understanding of the lecture material; problems and application examples are given and discussed.</td>
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<tr>
<td>Laboratory sessions</td>
<td>4, 5</td>
<td>Students will make use of software to simulate the various theories and visualize the results.</td>
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<td>These can measure the students’ understanding of the theories and concepts as well as their comprehension of subject materials.</td>
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<td>Assignments, tests and examination</td>
<td>4, 5, 6</td>
<td>End-of chapter type problems are used to evaluate the students’ ability in applying concepts and skills learnt in the classroom; students need to think critically and to learn independently in order to come up with an alternative solution to an existing problem.</td>
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<td>Laboratory sessions</td>
<td>4, 5, 6</td>
<td>Students are required to conduct some laboratory works, and produce the written reports; The accuracy and presentation of the report will be assessed; the emphasis is on assessing the students’ ability to apply knowledge and skills learned in lectures, and their ability to relate the taken data and results to the most relevant theory.</td>
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