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 DESCRIPTION FORM

**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.)

<table>
<thead>
<tr>
<th>Pre-requisite:</th>
<th>nil</th>
<th>Co-requisite:</th>
<th>nil</th>
<th>Exclusion:</th>
<th>nil</th>
</tr>
</thead>
</table>

**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 valance 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 ensure that students learn and reflect continuously, Continuous Assessment is an important element and students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components. The continuous assessment comprises of assignments, in-class quizzes and tests. The assignments are used to assist the students to reflect and review on their progress. The end-of-semester examination is used to assess the knowledge acquired by the students and their ability to apply and extend such knowledge.
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;
3. apply the techniques of statistics to model and solve problems in science and engineering;
4. undertake continuous learning.

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; Sampling; Hypotheses testing and estimations.

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 ensure that students learn and reflect continuously, Continuous Assessment is an important element and students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components. The continuous assessment comprises of assignments, in-class quizzes and tests. The assignments are used to assist the students to reflect and review on their progress. The end-of-semester examination is used to assess the knowledge acquired by the students and their ability to apply and extend such knowledge.
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. 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.

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.
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.

### Method of Assessment:

- Continuous Assessment: 40%
- Examination: 60%

To ensure that students learn and reflect continuously, Continuous Assessment is an important element and students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components. The continuous assessment comprises of assignments, in-class quizzes and tests. The assignments are used to assist the students to reflect and review on their progress. The end-of-semester examination is used to assess the knowledge acquired by the students and their ability to apply and extend such knowledge.
Reference List:

SUBJECT DESCRIPTION FORM

Subject Title: College Physics I  
Subject Code: AP101  
Number of Credits: 3  

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
9. explain the properties of materials in relation with bonding and crystal structure.

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; Molecular bonds; Structure of solids; Mechanical properties of solids; Electric properties of solids.

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: Understanding the Hong Kong Community
Subject Code: APSS184

Number of Credits: 3
Hours Assigned: Lecture 24 hours
Seminar 18 hours

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

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 behavioral 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.

In striving to achieve the two interrelated objectives, attention will be given to developing confidence and competence in the use of grammar, vocabulary and academic writing conventions.

Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in an English medium university contexts through

1. organising, writing and revising project reports,
2. discussing issues in written texts such as editorials, and
3. organising and writing correspondence to request assistance for study-related work.

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

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

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 subject is designed to introduce students to the use of grammar and vocabulary in writing a variety of text types. Activities to further develop speaking and listening skills will be integrated into the interactive and project-based work throughout the course.

The study method by which the content is delivered is primarily seminar-based. 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. 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’ 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 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.

In striving to achieve the two interrelated objectives, attention will be given to enhancing confidence and competence in grammar, vocabulary and pronunciation.

Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in an English medium university contexts through

1. delivering effective oral presentations,
2. summarising and paraphrasing materials from written and spoken sources, and
3. planning, writing and revising expository essays.

Content:
The content is indicative. The balance of the components, and the corresponding weighting, 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; reading and listening for different purposes.

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

Teaching and Learning Approach:
The subject 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.

The study method is primarily seminar-based. Activities will include discussions, role-plays and individual and group activities. 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: 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 subject aims to further enhance the written and spoken English communication skills that students will need to function effectively in their university studies.

Learning Outcomes:
By the end of the subject, students should be able to communicate effectively in an English medium university contexts through

1. participating effectively in group discussions,  
2. organising and composing descriptive writing, and  
3. planning and writing argumentative essays.

Content:
The content is indicative. The balance of the components, and the corresponding weighting, 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 subject is designed 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.

The study method is primarily seminar-based. Activities will include discussions, role-plays and individual and group activities. 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 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 and Student Presentation 14 hours

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

Objectives:
The subject aims to introduce the students to some fundamental knowledge engineering mathematics. The emphasis will be on application of mathematical methods to solving practical engineering problems.

Learning Outcomes:
The subject aims to introduce the students to some fundamental knowledge engineering mathematics. The emphasis will be on application of mathematical methods to solving practical engineering problems.

Upon satisfactory completion of the subject, students are expected to 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 solving problems;
5. undertake continuous learning.

Syllabus:
1. Algebra of Complex Number
   Complex numbers; Geometric representation; n-th roots of complex numbers.
2. Linear Algebra
   Matrices and determinants; Vector space; Elementary algebra of matrices; Eigenvalues and eigenvectors; Normalization and orthogonality.
3. Calculus of One Variable
   Elementary functions; 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:
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 ensure that students learn and reflect continuously, Continuous Assessment is an important element and students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components. The continuous assessment comprises of assignments, in-class quizzes and tests. The assignments are used to assist the students to reflect and review on their progress. The end-of-semester examination is used to assess the knowledge acquired by the students and their ability to apply and extend such knowledge.
Textbooks and Reference Books:

SUBJECT DESCRIPTION FORM

Subject Title: Mathematics II
Subject Code: AMA228
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 subject aims to provide students with some basic probabilistic and statistical concepts and methods. The emphasis will be on application of statistical methods to solving practical problems.

Learning Outcomes:
This subject aims to provide students with some basic probabilistic and statistical concepts and methods. The emphasis will be on application of statistical methods to solving practical problems.

Upon satisfactory completion of the subject, students are expected to 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;
5. undertake continuous learning.

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:
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 ensure that students learn and reflect continuously, Continuous Assessment is an important element and students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components. The continuous assessment comprises of assignments, in-class quizzes and tests. The assignments are used to assist the students to reflect and review on their progress. The end-of-semester examination is used to assess the knowledge acquired by the students and their ability to apply and extend such knowledge.

Textbooks and Reference Books:
**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 過）

**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:**

<table>
<thead>
<tr>
<th>第一單元</th>
<th>簡介香港粵語的特點</th>
<th>粵語的拼音方案，粵語的語音</th>
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<tbody>
<tr>
<td>第二單元</td>
<td>介紹</td>
<td>重點學習：常見姓氏</td>
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<td></td>
<td></td>
<td>“先”字的句式</td>
</tr>
<tr>
<td>第三單元</td>
<td>問候</td>
<td>重點學習：香港人常用的問候方式</td>
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<td></td>
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<td>比較格式</td>
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<td>第四單元</td>
<td>介紹電話交談的方式</td>
<td>重點學習：香港人電話交談的方式雙實語句式</td>
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<td>第五單元</td>
<td>約會</td>
<td>重點學習：簡單式語氣助詞</td>
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<tr>
<td>第六單元</td>
<td>問候</td>
<td>重點學習：方位表達法</td>
</tr>
<tr>
<td>第七單元</td>
<td>購物</td>
<td>重點學習：算錢的方式</td>
</tr>
<tr>
<td>第八單元</td>
<td>交通</td>
<td>重點學習：粵語“定”的動補結構式</td>
</tr>
<tr>
<td>第九單元</td>
<td>天氣</td>
<td>重點學習：天氣的表達</td>
</tr>
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<td>第十單元</td>
<td>飲食</td>
<td>重點學習：天氣的表達</td>
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<td>第十五單元</td>
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<td>重點學習：表達同意的方式</td>
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<td>第十六單元</td>
<td>購買</td>
<td>重點學習：表達可能的方式</td>
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<td>第十七單元</td>
<td>購買</td>
<td>重點學習：買房的表達方式</td>
</tr>
</tbody>
</table>
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>評估項目</th>
<th>百分比</th>
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<tr>
<td>課堂表現</td>
<td>10%</td>
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<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（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，《科技写作简明教程》，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 laboratory hours)

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 of multimedia technologies.

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 fundamentals of electronic 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.

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: Composite video signals
Method of Assessment:
Continuous Assessment: 40%       Examination: 60%

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

Textbooks:

Reference books:
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 laboratory hours)

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

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:
After completing the subject, the students will be able to have:

1. An ability to apply the fundamental knowledge of digital systems and associated technologies appropriate to the degree discipline
2. An ability to design and conduct experiments for simple logic components
3. An ability to design a digital system to meet realistic specification
4. An ability to aware different design issues of digital system
5. An ability to use the EDA tools for digital design
6. An ability to present their ideas and observation effectively
7. An ability to work in a team and collaborate effectively with others

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:
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 9 hours

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

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

Student Learning Outcomes:

Professional/academic knowledge and skills
Upon completion of this course, students are expected to be able
1. To understand the underlying basic theory of analogue & digital electronics and multimedia technologies,
2. To understand the basic building blocks of electronics & multimedia systems,
3. To conduct experiments in basic electronics and multimedia systems,
4. To appreciate the applications of electronics technologies in multimedia systems.

Attributes for all-roundedness
5. To be able to learn independently.
7. To appreciate the importance of creativity and critical thinking, and to realize the impact and applications of electronics and multimedia technology.
8. Case studies allow students to develop a fuller understanding of social and community issues related to the application of electronic and multimedia systems.

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 short experiments using Electronic Project Kit to appreciate the applications of (i) analogue electronic circuits and (ii) 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 and to appreciate the applications of electronic technologies in multimedia systems.

Assessment Methods
Continuous Assessment: 40% Examination: 60%
The continuous assessment consists of a number of short quizzes, assignments, the case study, laboratory reports and tests. The assessment criteria will be made known to the students prior to conducting the assessment.

Textbooks:

Reference Book:
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.

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.

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:**
Subject Title: University English II  
Subject Code: ELC2502  
Number of Credits: 2  
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.

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:

**SUBJECT DESCRIPTION FORM**

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Information Technology</th>
<th>Subject Code:</th>
<th>ENG224</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Credits:</td>
<td>3</td>
<td>Hours Assigned:</td>
<td>Lecture/Tutorial 42 hours, Laboratory 9 hours</td>
</tr>
</tbody>
</table>

**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:**

**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.

**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:

### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Computer Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code:</td>
<td>ENG236</td>
</tr>
<tr>
<td>Number of Credits:</td>
<td>3</td>
</tr>
<tr>
<td>Hours Assigned:</td>
<td>Lecture/Tutorial/Laboratory 42 hours</td>
</tr>
</tbody>
</table>

**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++, such as variables and expressions, looping, arrays and pointers, 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.

### 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)

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**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.

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**Textbook:**


**Reference Book:**

SUBJECT DESCRIPTION FORM

Subject Title: Practical Training

Subject Code: IC291

Number of Credits: 5

Hours Assigned: 5 weeks
(Refer to Training Pattern)

Pre-requisite: nil

Co-requisite: nil

Exclusion: nil

Objectives:
The objective of this course is to train student with hands-on electronic practice, multimedia electronic product prototype fabrication techniques and practical computing skill. Practical Training will be conducted in Industrial Centre (IC) of the university.

Student Learning Outcomes:
Category A: Professional/academic knowledge and skills
1. Practise and learn the basics for best practice in computer operation with client-server computing on contemporary data network for professionals in engineering and technology.
2. Practise and learn the basics of de facto scientific computing software for professionals in engineering and technology.
3. Practise and learn professional practice in printed circuit board assembly fabrication so as to enable the construction, troubleshooting and testing of simple printed circuit board assembly.
4. Practise and learn the essence of multimedia electronic product prototype fabrication techniques so as to enable the construction of simple multimedia electronic product prototype.
5. Practise and create web site for project presentation across Internet.

Category B: Attributes for all-roundedness
6. Practise technical communication skill, produce training log and report.
7. Cultivate personnel ability and attitude by working in project group under an industrial environment.
8. Understand the variation of different personalities of members within a project group, practise adaptation so as to work in harmony with other group members while focusing on the effective delivery of project commitment.
9. Nourish leadership ability and creativity in group work
10. Demonstrate critical thinking and creativeness in electronic project development and prototype fabrication under an industrial environment.

Syllabus:
1. IC 1106 - Electronic Practice for Electronic and Information Engineering (1 week)
   a. 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.
   b. 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.
   c. Training and practice in programming PC interface control.
   d. Training and practice in embedded device programming.
2. IC 1109 – Advanced Electronic Practice with Multimedia Application (2 weeks)
   a. Training in design modification from circuit prototype for multimedia application.
   b. Embedded device programming practice for multimedia electronic product
   c. Multimedia electronic product prototype fabrication
   d. Testing and troubleshooting techniques in multimedia electronic product
   e. Project presentation using Internet
3. IC3003 - Basic Scientific Computing (30 hours)
   a. Approach and techniques in using the MATLAB Development Environment
   b. Mathematical Operations, matrices, linear algebra, polynomials and interpolation, data analysis and statistics, function functions, differential equations
   c. Programming, M-files programming and application examples, flow control statements, function files
d. Graphical user interface, data structures, input/output, and object-oriented capabilities

e. Graphics, data plotting, formatting, basic printing and exporting interfaces with examples in basic scientific applications, pie chart, bar chart, area chart, linear and log plots, 3D-View plot experiment with fitting curves to data

4. IC3004 - General Computer and Network Skills (30 hours)

a. General skills on installing software from Internet; file decompressing; general troubleshooting in PC; virus scan and cleaning; creating PDF documents, Installing, upgrading, configuring, managing and troubleshooting Microsoft Windows (contemporary version)

b. Managing access to resources, system configuring and data, files and disks management

c. Network Configuration, TCP/IP addressing, name resolution and IP routing

d. Remote access configuring and mobile computing

Training Pattern:
IC3003 Year 1 term time; IC3004 Year 1 term time or summer as elected by student; training in electronic practice in Year 1 Summer.

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:-

(i) Training in electronic 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 IC1106, 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.

For module IC1109, 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 application. 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) Computer training is delivered through a series of instructor led hands-on training courses. Students are required to complete two computer training modules that are essential to their studies in multimedia technology. Tutorials and practical assignments will be given in class so as to enable learning through practical work. Test will be conducted at the end of individual module. Computer training aims to guarantee student with an adequate level of practical computer skills for academic studies and later in their professional lives.
Method of Assessment:
Assessment is comprised of 100% continuous assessment in practical assignment, report, presentation and test. The weighting of assessment components are tabulated as follows:

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical Assignment</td>
<td>50%</td>
</tr>
<tr>
<td>Report and Presentation</td>
<td>30%</td>
</tr>
<tr>
<td>Test</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Reference books:
Role and Purpose:

This subject introduces the basic theories and concepts concerning firstly, the functions of managing a business, secondly, the study of human behaviour and its implications for the management of organisations, and thirdly, the importance of social responsibility and ethics in managing organisations. The subject will also develop students’ critical thinking and communication skills, both oral and written.

Student Learning Outcomes:

On completion of this subject, students will:

Category A: Professional/academic knowledge and skills
1. Be able to identify the nature of managerial work in a variety of forms of organisation, and assess the impact of the external environment on managers’ jobs.
2. Be able to explain and analyse the functions of management – planning, organising, leading, and controlling.
3. Understand the essence of human behaviour and be able to assess the implications for the management of organisations and businesses.
4. Be able to evaluate the arguments surrounding social responsibility and ethical behaviour in organisations and businesses, and in so doing have an enhanced awareness of the importance of such issues.

Category B: Attributes for all-roundedness
5. Have further developed their critical thinking, and oral and written communication skills.

Indicative Content

1. Managers and Management
   Define the nature of managerial work taking into account the impacts of the external environment in modern society. Provide an overview of the evolution of management thoughts.

2. Management Functions
   The major elements of the management functions: planning, organising, leading, and controlling, and their importance for the effective management of business organisations.

3. Planning

4. 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.

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

6. Controlling
7. **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:**
In the lectures the general principles of the syllabus topic will be presented and developed. In the seminars, students will develop and apply the general principles of the topic in student-centred activities.

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

Minimum Pass Grade:  
Coursework: (D)  
Final Examination: (D)

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**Indicative Reading:**
*Individual subject lecturer may prescribe different textbooks for the course.*

**Recommended Textbook:**

**References:**

*Current journal articles, periodicals & newspapers will also be assigned for study.*
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 provides an analytical foundation for further study of Marketing and also contributes to the Learning Outcomes for all students in two ways. First, the content directly addresses the creation of value, ethics, cultural diversity and globalization. Second, the classroom activities and assessments develop students' teamwork, ability to communicate in English, creative thinking and learning to learn.

Learning Outcomes:
On successfully completing this subject, students will be able to:
1. Understand the role and value of marketing in today's increasingly competitive, dynamic and turbulent environment.
2. Analyse market situations in different cultural / global environments, identifying marketing opportunities and threats; and understand organisations' response process to these environments.
3. Synthesise the process of marketing planning and the process of corporate planning.
4. Formulate marketing mix strategies and programmes and implement them.
5. Apply marketing theories, models, and information technology to practical marketing situations.
6. Establish the relationship between marketing & society in the context of social responsibility and marketing ethics.

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 placing.
5. Introduction to the Marketing Mix  
   Product, Pricing, Promotion and Placing.
6. Marketing and society  
   Social and Marketing ethics: marketing impacts on individual consumers, society and other businesses.

Teaching/Learning Approach:
Keynote lectures, requiring the active engagement of students, will provide them with the conceptual frameworks required for the analysis of Marketing issues. Classroom work will involve teams of students working together to prepare and give 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%

Minimum Pass Grade:  Coursework (D)  Final Examination (D)

Indicative Reading:
Recommended Textbook:

References:
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:

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

Transferable skills
7. To 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: Computer System Fundamentals  
Subject Code: EIE311

Number of Credits: 3  
Hours Assigned: Lecture/Tutorial 39 hours  
Laboratory 3 hours  
(Equivalent to 9 laboratory hours)

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

Objectives:
To provide a broad treatment of the fundamentals of computer systems.

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 fundamentals of computer systems and associated technologies.
2. Solve problems and design simple systems related to computer systems.
3. Apply different important computer interfacing techniques in designing a computer system.
4. Develop a simple assembly program with an assembler.

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.

Syllabus:
1. Microprocessors and Microcomputers
   The following topics will be discussed in detail with references to one or two well-established (contemporary) microprocessor systems.
   1.1 CPU architecture; memory space and I/O space; instruction fetch and execution; pipelining; essential assembly language instruction types; working principle of assembler; assembler directives/pseudocodes; examples of assembly language programs.
   1.2 Memory interface: Memory devices; address decoding; memory interface; banking; bus buffering and driving; wait state, bus cycle, instruction cycle.
   1.3 Basic I/O interface: Memory-mapped I/O; I/O port address decoding; programmable peripheral interface; handshaking.
   1.4 Interrupts: polling, programmed I/O, interrupt I/O; Basic interrupt processing, software interrupt, expanding the interrupt structure, interrupt controller.
   1.5 Serial interface: Asynchronous/synchronous interface, RS232C serial interface and handshaking.
   1.6 Direct memory Access and DMA-controlled I/O: Basic DMA operation, DMA controller, shared-bus operation, disk memory systems, video displays.
   1.7 Cache memory: mapping, associativity; replacement policies; write policies; performance.

2. Disk Operating System
   2.1 Roles of basic input/output system (BIOS) and basic disk operating system(DOS); power-up sequence; bootstrap; command processor; system control, automatic program execution (e.g. batch file); operating system calls via software interrupts; system utilities; file operating commands; device driver.
   2.2 File system: space management e.g. file allocation table; File management; directory entry and file control block.
2.3 Multitasking and time-sharing: time-slicing; process states and process control block; context-switching mechanism; scheduling schemes and process priorities.

3. Computer Arithmetic
   3.1 Data formats: signed/unsigned numbers, binary/decimal/BCD numbers, ASCII, fixed/floating point numbers, IEEE standard; Arithmetic algorithms: Fast addition, multiplication and division algorithms.

Laboratory Experiment:
Six of the following topics or others.
1. Memory manipulation & Data representation
2. Serial communication
3. Parallel communication
4. Interrupt I/O
5. DMA I/O
6. BIOS
7. Device driver
8. Power-up procedures
9. User interface

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

The continuous assessment consists of short quizzes, assignments, laboratory reports and tests.

Textbook:

Reference Books:
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 laboratory hours)

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 the programming language Java in object oriented software development.
3. Apply the tool UML in object oriented software modeling.
4. Develop a simple software application using the object oriented approach.

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.

Syllabus:

1. Introduction to Software Engineering
   Software products; the software process; process models; process visibility.

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, HTML applet tag syntax, passing information from Web pages to applets. 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:

SUBJECT DESCRIPTION FORM

Subject Title: Telecommunication Technologies  
Subject Code: EIE325

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

Pre-requisite: Information Technology (ENG224) and  
Linear Systems (EIE312) or  
Signals and Systems (EIE341)  
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:
On successful completion of this subject, the 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.

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:
**SUBJECT DESCRIPTION FORM**

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Digital Signal Processing for Multimedia Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Code:</td>
<td>EIE328</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>Pre-requisite:</td>
<td>nil</td>
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<tr>
<td>Co-requisite:</td>
<td>nil</td>
</tr>
<tr>
<td>Exclusion:</td>
<td>nil</td>
</tr>
</tbody>
</table>

**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:**

On successful completion of this subject, the 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.

**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 modeling of multimedia sources. Error resilience and concealment. Application example:
7. **Case Studies**
   DVD player, Digital video cameras, Digital video cassette recorder, and 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:**

**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 laboratory hours)

**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:**

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

**Category A: Professional/academic knowledge and skills**
1. Understand the representations and classifications of the signals and systems.
2. Model linear systems using time and frequency domain approaches for both continuous-time and discrete-time models.
3. Analyze signals and systems using both time domain and frequency domain techniques.
4. Understand the generation of a discrete-time signal by sampling a continuous-time signal.
5. Understand the principles of filters.
6. Apply software tools, particularly MATLAB, to laboratory exercises for experimenting with theories, and to the analysis and design of signals and systems.
7. Appreciate the advantages and disadvantages of using the different representations and modeling approaches.

**Category B: Attributes for all-roundedness**
8. Present ideas and findings effectively.
9. Think critically.
10. Learn independently.
11. Work in a team and collaborate effectively with others.

**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%

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

**Reference Books:**
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 laboratory hours)

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

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

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

Category A: Professional/academic knowledge and skills
1. Describe the services, functions, and inter-relationship of different components within 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 networking technology.

Category B: Attributes for all-roundedness
5. Take up new knowledge by reading related magazines, journal papers, and trade brochure, and by analyzing new situations while taking into account various constraints.
6. Describe how rapid progress of computer and communication technology can impact on the society in various aspects, such as culture and economics.

Syllabus:
1. Communication 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 control protocols.
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, 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, Internet2, High Speed Router design … 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: 50%          Examination: 50%

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:
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 laboratory hours)

Pre-requisite: Computer System Fundamentals (EIE311) or Computer System Principles (EIE343)  
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:
On successful completion of this subject, the students will be able to:

Category A: Professional/academic knowledge and skills
1. Understand the fundamental knowledge of embedded systems
2. Apply programming techniques to satisfy functional and response-time requirements of embedded systems
3. Apply circuit and computer knowledge onto product design
4. Practice self-learning through reading of manuals and component specifications
5. Demonstrate practical skills in the construction of prototypes

Category B: Attributes for all-roundedness
6. Pursue life-long learning through searching and reading technical materials
7. Think critically
8. Work in a team and collaborate effectively with others

Programme Outcomes

Category A: Professional/academic knowledge and skills
Programme Outcome A1: 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 A3: This subject contributes to the programme outcome by providing opportunity for students to design a simple embedded system to meet realistic specification.
Programme Outcome A4: This subject contributes to the programme outcome by providing opportunity for students to formulate and evaluate the performance of different embedded systems.
Programme Outcome A5: 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 A7: This subject contributes to the programme outcome providing opportunity for students to applying modern development tools for virtual prototyping.

Category B Attributes for all-roundedness
Programme Outcome B3: This subject contributes to the programme outcome through the practice of reading manuals and component specifications.
Programme Outcome B4: This subject contributes to the programme outcome by providing the students with an opportunity to practice working in a team.
Programme Outcome B5: This subject contributes to the programme outcome through teaching of key elements of embedded systems and providing the students with an opportunity to develop and evaluate prototypes according to the specification.
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:**

Subject Title: Integrated Project

Subject Code: EIE360

Number of Credits: 3

Hours Assigned: Lecture 24 hours
Laboratory 36 hours
Mini-project Work 60 hours
Total 120 hours

Pre-requisite: Electronics Design (EIE210)
Computer Systems Fundamentals (EIE311)

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 mainly be placed on the technical challenges that may encompass component evaluation, circuit design, software development and troubleshooting, students will also be given opportunities to face various non-technical difficulties behind the implementation/fabrication of electronic/information products.

Student Learning Outcomes:

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

Category A: Professional/academic knowledge and skills
1. Integrate and apply knowledge acquired in previous subjects.
2. Design under cost constraints and with component limitations/tolerances in mind.
4. Locate and resolve problems, in both circuits and software.

Category B: Attributes for all-roundedness
5. Search, self-learn and try untaught solutions.
6. Exercise discipline and time-planning to meet deadlines.
7. Present ideas and findings effectively.
8. Think critically.
9. Learn independently.
10. Work in a team, collaborate effectively with others, and exercise leadership.
11. Exercise entrepreneurship while designing the project by addressing cost effectiveness, market position, entry barrier, user acceptance…etc.

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

Syllabus / Operation:

The project(s) shall be of engineering development in nature [1,2,3,4,5,6,9,11] with objectively defined milestones (or Subtasks). The scope to be covered shall include embedded software development and circuit design, but does not exclude the possibilities of extending into areas such as DSP or RF. The project(s) shall not be close-ended in nature [2,3,5,8] and shall provide ample headroom for the more enthusiastic students to excel. Students shall work in groups of two or three [10]. Each Subtask will be given a certain period of time to complete. Each student will take turn in serving as the Team Leader [11] to lead the group to complete a subtask assigned. Progress will be measured by functional Demonstrations, and one or two written Progress Reports [7]. Upon the completion of the project, each group should give a demonstration/presentation [7] of the completed product and submit a Final Report [7]. Students are required to individually keep a Logbook [7] 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 logbook will be collected and graded.

Lectures:

Lectures are to be conducted during the first half of the semester. During these lectures, the instructor shall give clear explanation on the functional and technical requirements [2,3], with a schedule for
submitting deliverables [6]. 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 shall also be strengthened [4]. Copies of supplementary/reference material shall be distributed, or, links to on-line material shall be provided for self-paced learning [5].

Guided Laboratory Experiments:
The project will normally require the students to learn to use specific tools and/or equipment [4]. Laboratory demonstrations and exercises will be arranged in the early weeks. Below are some examples:
1. Troubleshooting and measurement techniques using typical equipment.
2. Use of project-specific development tools, software and hardware.
3. Use of specialized equipment for project-specific measurements.

Self-Paced Work:
The class could well be composed of a good mix of students with different timetables. Multiple sessions of laboratory, inevitably some evening slots, will be scheduled to cater for self-paced work in the laboratory, particularly during the second half of the semester.

Method of Assessment:
Continuous assessment: 100%
Throughout the project, the subject lecturer will conduct periodic interview discussions with the student groups. On these occasions, assessment on individual student’s ability and contribution will be conducted, according to the attributes detailed below.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSIGHT</td>
<td>as evidenced by how well issues are understood and resolved [1,2,3,4]</td>
</tr>
<tr>
<td>DRIVE</td>
<td>as evidenced by initiative, diligence and tenacity [5,6,9,10]</td>
</tr>
<tr>
<td>CREATIVITY</td>
<td>as evidenced by ingenuity and imagination [5,8,9,10]</td>
</tr>
<tr>
<td>COMMUNICATION</td>
<td>as evidenced by an ability to express ideas clearly and succinctly [7]</td>
</tr>
</tbody>
</table>

At the completion of each subtask, one member of a team will be asked to give a demonstration to the assessor. Based on the presentation and response to questions addressed to the members, the assessor shall rate the contribution, achievement, and performance of each member. [2,4,6,7,8]

Below is a recommended assessment scheme:

<table>
<thead>
<tr>
<th>Assessment type</th>
<th>Weighting</th>
<th>Number of times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>10 %</td>
<td>≥ 5</td>
</tr>
<tr>
<td>Quiz/Test</td>
<td>10 %</td>
<td>≥ 2</td>
</tr>
<tr>
<td>Progress Demonstrations</td>
<td>20 %</td>
<td>≥ 2</td>
</tr>
<tr>
<td>Logbook &amp; Presentation</td>
<td>20 %</td>
<td>≥ 2</td>
</tr>
<tr>
<td>Progress &amp; Final Reports</td>
<td>20 %</td>
<td>≥ 2</td>
</tr>
<tr>
<td>Final Demonstration</td>
<td>20 %</td>
<td>1</td>
</tr>
</tbody>
</table>

Reference Books:
To be specified by the subject lecturer for each project.
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 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:

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
   - Manufacturer and marketing relations
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:

2. Design Issues. The MIT Press. (Journal)
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:
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 modeling, skeleton, texturing and materials, animation.
3. Audio
   3D and multi-channel audio; modeling 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), behavioral modeling, artificial life.
6. Network
   Multiplayer game architecture, networking, protocols, topologies, security, database; online game systems.

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

Reference Books:
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:
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 color, 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

Laboratory Experiment:
Case study:

Method of Assessment:
Laboratory: 20%    Miniproject: 80%
Reference books:

11. IGDA (www.igda.org)
12. SDL (www.libsdl.org)
Subject Title: Computer Graphics
Subject Code: COMP407
Number of Credits: 3
Hours Assigned: Lecture 42 hours, Laboratory 7 hours

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:
After taking this subject, the students should 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 modeling, and interactive control of 3D computer graphics applications;
4. enhance their perspective of modern computer system with modeling, 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.

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 modeling 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 modeling 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, modeling objects, color and interactive animation.

Case Study:
If applicable, case studies may be conducted on modeling 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:
After taking this subject, the students should 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.

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 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:
To introduce students the basic concepts and principles of mobile computing;
To provide students the knowledge about theoretical and practical aspects of mobile computing;
To train students in developing skills for developing solutions and building software for mobile computing applications using standard languages and tools.

Student Learning Outcomes:
After taking this subject, the students should 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
analyze requirements and solve problems using systematic planning and development approaches;
search for and read critically the information required in solving problems;
write and present technical survey papers in well-organized and logical manner;
work in teams and collaborate with classmates.

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:** 2 hours

**Laboratory Experiment:**
1. WAP programming. (2 hours)
2. J2ME programming. (3 hours)

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**Method of Assessment**
Continuous Assessment: 55%   Examination: 45%

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**Textbook:**

**Reference Books:**
SUBJECT DESCRIPTION FORM

Subject Title: Principles of Virtual Reality
Subject Code: EIE408
Number of Credits: 3
Hours Assigned: Lecture/Tutorial 33 hours
Laboratory 9 hours
(Equivalent to 27 laboratory hours)

Pre-requisite: Computer Graphics (COMP407)
Co-requisite: nil
Exclusion: nil

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 teamwork 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 from case studies.

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; the benefits of virtual reality.

2. 3D Computer Graphics
   2.1 Transformations and the 3D world
   2.2 Modeling objects, dynamics objects
   2.3 Physical modeling: Constraints; Collision Detection, Surface Deformation
   2.4 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 Modeling virtual worlds; physical simulation; VR toolkits.
   5.4 Programming of Virtual Environment: Mechanics of VRML; VRML browser; creating VRML environment; 3D modelers; worldbuilding toolkits; VRML utilities.

6. VR Applications
   6.1 Engineering and Industrial: CAD and CAD 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 logbook, case study report, a number of short quizzes/assignment and a mid-term test.

Textbooks:

Reference Books:
Subject Title: Computer Architecture and Systems
Subject Code: EIE414

Number of Credits: 3
Hours Assigned: Lecture/Tutorial 39 hours
Laboratory 3 hours
(Equivalent to 9 laboratory hours)

Pre-requisite: Computer System Fundamentals (EIE311)
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:
On successful completion of this subject, the students will be able to have:

1. An ability to apply knowledge of microprocessor appropriate to the degree discipline
2. An ability to design and conduct experiments, as well as to analyze different microprocessors
3. An ability to identify and evaluate the performance of different microprocessors.
4. An ability to write efficient programs along with understanding the limitations and mechanisms of different microprocessors
5. An ability to present their ideas and observation effectively

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
   2.3 Multi-cycle Implementation
   2.4 Microprogramming
   2.5 Exception
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
Laboratory Experiments:
1. Superscalar simulation tool.
2. Tracing the operation of superscalar CPU by simulation.

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

The continuous assessment will consist of assignments, tests and a mini-project.

Reference Books:
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 laboratory hours)

Pre-requisite: Principles of Programming (COMP201) or
Co-requisite: nil
Exclusion: nil

Object Oriented Design and Programming (EIE320)

Objectives:
This subject will provide students with the principles and practical programming skills of developing distributed systems. It enables students to master the development skill for providing distributed services on the Web. Through a series of lab exercises, students will have the chance of developing 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 enabling technologies for building distributed systems.
2. Understand the different components for developing Web Services.
3. Set up and configure a standard Web Service system and develop simple Web Service applications.

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

Syllabus:
1. Introduction to Distributed Systems
   1.1 Characteristics. Design goals. Architecture examples.
2. Enabling Tools and Techniques for Building Distributed Systems
   2.1 Networked Computing
       TCP/IP protocol suite. Socket programming.
   2.2 Component-based Software Development
       Component models. JavaBeans; CORBA; Remote Method Invocation (RMI); OM/DCOM; Enterprise JavaBeans (EJB).
   2.3 Extensible Markup Language (XML)
       XML Markup; parser; CDATA sections; XML namespaces. Document Type Definition (DTD); well-formed XML documents; document type declaration; element of type declarations; attribute declarations.
3. Distributed Services on the Web: Web Services
   3.1 Introduction to Web Services.
   3.2 Simple Object Access Protocol (SOAP): SOAP specification; message processing; use of namespaces.
   3.3 Web Services Description Language (WSDL): Role of WSDL in Web services, WSDL documents, remote web-services invocation using WSDL.
   3.4 Universal Description, Discovery and Integration (UDDI): role of UDDI in Web services; UDDI registries; discovery technologies.

Laboratory Experiment:
Practical Works
1. Remote Method Invocation (RMI)
2. Extensible Markup Language (XML)
3. XML-RPC
Method of Assessment:
Coursework: 40%  Examination: 60%

The continuous assessment consists of assignments, laboratory reports and tests.

Textbooks:

Reference Books:
SUBJECT DESCRIPTION FORM

Subject Title: Artificial Intelligence and Computer Vision
Subject Code: EIE426

Number of Credits: 3
Hours Assigned: Lecture/Tutorial/Seminar 39 hours
Laboratory/Demonstration 3 hours
(Equivalent to 9 laboratory hours)

Pre-requisite: Object Oriented Design and Programming (EIE320)
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;
3. To provide the student with programming experience from implementing AI techniques, simple knowledge systems, and computer vision applications.

Student Learning Outcomes:
On successfully completing this 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.

Syllabus:
1. Introduction
   Definitions, the Foundations of AI, the History of AI, 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.

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**Method of Assessment:**
Coursework: 45% Examination: 55%

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**Recommended Textbooks:**

**Reference Books:**
### SUBJECT DESCRIPTION FORM

<table>
<thead>
<tr>
<th>Subject Title:</th>
<th>Multimedia Communications</th>
<th>Subject Code:</th>
<th>EIE428</th>
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<td>Hours Assigned:</td>
<td>Lecture/Tutorial 39 hours</td>
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<td>Laboratory 3 hours</td>
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<td>(Equivalent to 9 laboratory hours)</td>
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**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:**
On successful completion of this subject, the 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.
7. Learn independently.
8. Work in a team and collaborate effectively with others.

**Syllabus:**

1. **Network Layer Support for Multimedia Communications**
   - IP routing, forwarding and switching: IP addressing; Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) protocol; Classless Interdomain Routing (CIDR); IP forwarding, Longest Prefix Match (LPM); Label Switching; Multiprotocol Label Switching (MPLS); IP Multicast, Internet Group Management Protocol (IGMP); IPv6

2. **Transport Layer Support for Multimedia Communications**
   - Media transport protocols: Real Time Protocol (RTP) and Real Time Control Protocol (RTCP); Signaling Protocols: Session Initiation Protocol (SIP), Session Description Protocol (SDP)

3. **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

4. **Multimedia Streaming Systems**
   - Streaming architecture: Real-time Streaming and On-demand Streaming, Congestion Control and Error Control, Scalable Transmission, Streaming Server Design, Buffering and Scheduling Techniques, Data Sharing Techniques, Support of Interactive Operations, Case Studies on Real Networks and Interactive TV

5. **Voice over IP (VoIP)**
   - Business model; VoIP Architecture, H.323 standards; Case Study on Enterprise VoIP applications
Laboratory Experiments:
1. Internet routing
2. Simulation study on congestion control
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:
SUBJECT DESCRIPTION FORM

Subject Title: Corporate Networking
Subject Code: EIE429
Number of Credits: 3

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:
On successful completion of this subject, the 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 [1,2]
2. Evaluate critically the design, implementation, and performance of enterprise networks with regard to different criteria [1,3,4]
3. Design enterprise networking solutions by taking into account various constraints and requirements [1,2,3]

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 [4]
5. Think and evaluate critically [3,4]
6. Take up new technology for life-long learning [2,4]
7. Present ideas and findings effectively [3]
8. Work in a team, and collaborate effectively with other members [4]

Syllabus:

1. Communication Networks and their Features
   Global networks, enterprise networks, private networks, network topology and optimization, network evolution strategy.

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:
SUBJECT DESCRIPTION FORM

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:

On completion of the final year project, the 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.

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 laboratory hours)

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, the 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
5. Think critically.

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.

6. 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.

7. 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:

SUBJECT DESCRIPTION FORM

Subject Title: Web Systems and Technologies  
Subject Code: EIE432 (for 42077)
Number of Credits: 3

Hours Assigned: Lecture/Tutorial 36 hours
Laboratory 6 hours
(Equivalent to 18 laboratory hours)

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:
On successful completion of this subject, the 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.

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).
   2.3 Web application development. Development of a web application using client-side programming, server-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.

**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.

**Method of Assessment:**

Coursework: 40%   Examination: 60%

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

**Text Books:**


**Reference Books:**

SUBJECT DESCRIPTION FORM

Subject Title: Image and Audio Processing  
Subject Code: EIE435

Number of Credits: 3  
Hours Assigned: Lecture/tutorial 42 hours  
Laboratory 9 hours

Pre-requisite: Linear Systems (EIE312) or Signal Processing Fundamentals (EIE327) or Signals and Systems (EIE341)

Co-requisite: nil  
Exclusion: nil

Objectives:

To provide a broad treatment of the fundamentals image and audio processing.

Student Learning Outcomes:

1. To understand the fundamentals of image and audio signal processing and associated techniques.
2. To be able to solve practical problems with some basic image and audio signal processing techniques.
3. To be able to design simple systems for realizing some multimedia applications with some basic image and audio signal processing techniques.

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 behavior
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: