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:

1. E. Eldon, C. Frederick and B. David, *Concepts in Biology*, 11th ed., McGraw-Hill, 2005.

Reference List:

1. S. Freeman, *Biological Science*, 2nd ed., Pearson Prentice-Hall, 2005.

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.)

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

Objectives:

This subject educates student with fundamental knowledge in chemistry. It is also a bridging course for students previously learned chemistry in a language other than English.

The subject aims to:

1. provide students with a broad fundamental knowledge in chemistry required for the study of science, technology, engineering or related programme; and
2. help student study chemistry effectively in an English-medium learning environment and to acquaint student with the necessary chemical vocabularies.

Learning Outcomes:

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

1. understand the fundamental principles of chemistry;
2. have sufficient chemical knowledge for their chosen field of study; and
3. understand and appreciate the chemical terms and principles that they may encounter in written and oral communication.

Keyword Syllabus:

1. Atomic Structure
   Electromagnetic radiation, hydrogen spectrum, energy levels, electron spin, quantum numbers, dual properties of matter, wave function and probability, uncertainty principle, charge clouds of s, p, d and f orbits, radial distribution curves, electronic configurations of many-electron atoms, Pauli exclusion principle, Aufbau principle, ionization energy, electron affinity, electronegativity, atomic and ionic radii and periodicity.
2. Chemical Bonding
   Ionic bonds, covalent bonds, dative bonds, metallic bonds, van der Waals forces, hydrogen bonds, concepts of 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
   Simple concept of orbital hybridisation of carbon: sp, sp2 and sp3. Naming of compounds containing carbon chains and rings. Isomerism, regioisomer and optical isomer. A preliminary study of the functional group: alkane, alkene, alcohol, aldehyde, ketone, carboxylic acid, ester. Direct and simple functional group transformations.

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:

1. R. Chang, *Chemistry*, 7th ed., McGraw-Hill, 2002.

SUBJECT DESCRIPTION FORM

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. 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:

1. D. Varberg, E.J. Purcell and S.E. Rigdon, *Calculus*, 8th ed., Prentice-Hall, 2000.
2. Dept. of Applied Math., *Foundation Mathematics*, HK PolyU, 2004
3. F.R. Giordano, M.D. Weir and R.L. Finney, *Calculus for Engineers and Scientists*, Addison-Wesley, 1988.

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. 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:

1. R.E. Walpole & R.H. Myers, S.L. Myers & K.Y. Ye, *Probability and Statistics for Engineers and Scientists,* 7th ed., Prentice-Hall, 2002.
2. Dept. of Applied Math., *Foundation Mathematics*, 2nd ed., HK PolyU, 2004.
3. F.R. Giordano, M.D. Weir and R.L. Finney, *Calculus for Engineers and Scientists*, Addison-Wesley, 1988.

SUBJECT DESCRIPTION FORM

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

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

Objectives:

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

Learning Outcomes:

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

1. demonstrate basic logical reasoning.
2. see the relationship between formal logic and natural language.
3. apply logical reasoning in both everyday and academic situations.
4. recognize and refute common logical fallacies.
5. appreciate the axiomatic approach in mathematics.
6. understand why proofs of mathematical statements work
7. apply logical reasoning in problem solving.

Keyword Syllabus:

1. Qualitative Logic:
   Introduction_What is Logic? Logic Puzzles. Some Basic Concepts and Logical Relations. Propositional Logic. Syllogistic Logic. Inductive Reasoning. Some Common Informal Fallacies.
2. Quantitative Logic:
   Sets and propositions; Permutations and combinations; Relations and Functions; Graphs and Trees; Natural Numbers.

Teaching and Learning Approach:

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

Method of Assessment:

Continuous Assessment: 40% Examination: 60%

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:

1. Harry Gensler, *Introduction to Logic*, Routledge, New York, 2002.
2. Alec Fisher, *Critical Thinking*, OUP, Cambridge, 2001.
3. I.M. Copi and C. Cohen, *Introduction to Logic*, 10th ed., Macmillan, New York, 1998.
4. D.L. Johnson, *Elements of Logic via Numbers and Sets*, Springer, 1998.
5. Patrick J. Hurley, *A Concise Introduction to Logic*, Wadsworth Publishing Co., Belmont, 1988.

6. Samuel Guttenplan, *The Languages of Logic: An introduction to formal logic*, Basil Blackwell, Oxford, 1986.
7. W.C. Salmon, *Logic*, 3rd ed., Prentice-Hall, Englewood Cliffs, 1984.
8. Wilfred Hodges, *Logic*, Harmondsworth, 1977.
9. C.L. Liu, *Elements of Discrete Mathematics*, McGraw-Hill, 1985.
10. A. Cupillari, *The Nuts and Bolts of Proofs*, Academic Press, 2001.

SUBJECT DESCRIPTION FORM

Subject Title: College Physics I

Subject Code: AP101

Number of Credits: 3

Hours Assigned:

Classroom teaching and laboratory experiments
Lecture 34 hours
Laboratory 8 hours

Multimedia teaching/learning and other activities
Virtual Laboratory 12 hours
Self-study 60 hours

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

Objectives:

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

Learning Outcomes:

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

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

Keyword Syllabus:

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

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

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

4. Waves
   Longitudinal and transverse waves; Travelling wave; Doppler effect; Acoustics.

Teaching and Learning Approach:

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

Method of Assessment:

Continuous Assessment: 40% Examination: 60%

Essential Reading and CD-ROM:

1. Knight, *Physics for Scientists and Engineers with Modern Physics*, Pearson, 2004.
2. *Physics CAI* in CD-ROM, USTC, 2000.
3. *Computer Simulation System for College Physics Experiment*, Version 2.0 for Windows, USTC, 2000.

Reference List:

1. Halliday, Resnick and Walker, *Fundamentals of Physics,* 7th ed., Wiley. 2005.
2. Young and Freedman, *University Physics,* 11th ed., Pearson, 2004.
3. Giancoli, *Physics for Scientists and Engineers,* 3rd ed., Prentice-Hall, 2000.
4. Giambattista, Richardson and Richardson, *College Physics,* 2nd ed., MaGraw-Hill, 2007.
5. Jewett and Serway, Serway's, *Principles of Physics*, 4th ed., Thomson, 2006.

SUBJECT DESCRIPTION FORM

Subject Title: College Physics II

Subject Code: AP102

Number of Credits: 3

Hours Assigned:

Classroom teaching and laboratory experiments
Lecture 34 hours
Laboratory 8 hours

Multimedia teaching/learning and other activities
Virtual Laboratory 12 hours
Self-study 60 hours

Pre-requisite: 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:

1. Knight, *Physics for Scientists and Engineers with Modern Physics*, Pearson, 2004.
2. *Physics CAI* in CD-ROM, USTC, 2000.
3. *Computer Simulation System for College Physics Experiment*, Version 2.0 for Windows, USTC, 2000.

Reference List:

1. Giancoli, *Physics for Scientists and Engineers,* 3rd ed., Prentice-Hall, 2000.
2. Young and Freedman, *University Physics,* 11th ed., Pearson, 2004.
3. Halliday, Resnick and Walker, *Fundamentals of Physics,* 7th ed., Wiley. 2005.
4. Giambattista, Richardson and Richardson, *College Physics,* 2nd ed., MaGraw-Hill, 2007.
5. Jewett and Serway, Serway's, *Principles of Physics*, 4th ed., Thomson, 2006.

SUBJECT DESCRIPTION FORM

Subject Title:	Understanding the Hong Kong Community	**Subject Code:**	APSS184
Number of Credits:	3	**Hours Assigned:**	Lecture 28 hours Seminar 14 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. describe the historical development of the pre-1841 Hong Kong;
2. understand the social life of the pre-1841 Hong Kong;
3. depict the historical trajectory of the colonial Hong Kong;
4. analyze the social, cultural and political aspect of the colonial Hong Kong;
5. understand the social life of the post-1997 Hong Kong.

Keyword Syllabus:

1. Pre-1841 Hong Kong: Wall Communities and the Form of Living.
2. Visit: Markets at Yuen Long, Fanling and Sheung Shui.
3. Domestic Villages and the Survival Strategies.
4. Visit: Tai O- a fishing Village.
5. 1841: The Coming of the Colonial Hong Kong.
6. Visit: Central and Sheung Wan.
7. The Chinese Communities.
8. Visit: Wan Chai.
9. Post-1950's Hong Kong: the Minimally Integrated Social and Political System.
10. Visit: Hong Kong Museum of History.
11. The Development and the Future of Social Service in Hong Kong.
12. Hands-on Participation in Community Service Project.
13. Modern City Life of Hong Kong: Shopping Malls.
14. Residence Patterns of Hong Kong People: Public Housing and Home Ownership.
15. Landscape of Hong Kong: Disney World, Tourism and Economic Development.
16. Hong Kong's Tomorrow.

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 arranged to participate in community service projects to reinforce their hands-on understanding in the community. Students are required to attend seven tutorials 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. Mid-term paper on fieldtrips reflection (20%)
2. End-of term paper on social life of HK (35%)
3. Participation (seminars/fieldtrips/service) (15%)
4. Presentation on service reflection (30%)

Essential Reading:

1. 謝均才（編）,《我們的地方，我們的時間: 香港社會新編》, 香港, 牛津大學出版社, 2002.

Reference List:

1. Jeffrey W. Cody and James R. Richardson, *Urbanizing Forest and Village Trees in Hong Kong's Shatin Valley, 1976-1997*, Traditional Dwellings and Settlements Review, 9: 21-33, 1997.
2. Agnes Ku, *Narratives, Politics, and the Public Sphere: Struggles over Political Reform in the Final Transitional Years in Hong Kong (1992-1994)*, Aldershot, Brookfield USA, Ashgate, Chapter 2, pp. 18-48, 1999.
3. Benjamin K.P. Leung, *Perspectives on Hong Kong Society*, Hong Kong: Oxford University Press, 1996.
4. S.K. Lau, et al., *Indicators of Social Development: Hong Kong*, Hong Kong: Hong Kong Chinese University Press, Various Years.
5. Benjamin K.P. Leung, *Social Issues in Hong Kong*, Hong Kong: Oxford University Press, 1990.
6. *The Other Hong Kong Report*, Hong Kong: Hong Kong Chinese University Press, Various Years.
7. 蔡榮芳,*《香港人之香港史：1841-1945》*, 香港, 牛津大學出版社, 2001.
8. 王宏志,*《歷史的沉重：從香港看中國大陸的香港史論述》*, 香港, 牛津大學出版社, 2000.
9. 呂大樂,*《唔該，埋單！》*, "I.故事": 17-46, 1997.
10. 陳冠中,*《香港未完成的實驗》*: 23-30, 2001.
11. 陳墳慶編,*《諸神嘉年華: 香港宗教研究》*, 香港: 牛津大學出版社, 2002.
12. 潘毅、余麗文（編）,*《書寫城市: 香港的身份與文化》*, 香港, 牛津大學出版社, 2003.

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:

1. D.A.Bernstein, Essentials of Psychology, Boston, MA: Houghton Mifflin (with CD-ROM), 2005.

Reference List:

1. D.A. Bernstein, L.A. Penner, A. Clarke-Stewart & E.J. Roy, *Psychology*, Boston, MA: Houghton Mifflin (with CD-ROM), 2006.
2. K.S. Feldman, *Understanding Psychology*, New York: McGraw-Hill, 2005.
3. D Kardas, *Psychology Resources on the World Wide Web*, Belmont, CA: Wadsworth / Thomson Learning (with CD-ROM), 2000.
4. J.S. Nevid, *Psychology: Concepts and Applications*, Boston, MA: Houghton Mifflin (with CD-ROM & Film DVD/VHS), 2007.
5. R. Plotnik, *Introduction to Psychology*, Belmont, CA: Wadsworth / Thomson Learning (with CD-ROM), 2006.
6. S.E. Wood & E.R. Greenwood, *The World of Psychology*, Boston, NY: Ally & Bacon, 2002.
7. 丹尼斯．庫恩著、鄭钢 等(譯), 《心理學導論 —— 思想與行爲的認識之路》, 北京: 中國輕工業出版社, 2003.
8. 高尙仁 (主編), 《心理學新論》,香港：商務印書館, 1996, 2002.
9. 葉重新, 《心理學》, 台北：心理出版社, 2004.

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 simple script, shell programs etc and appreciate exercising automatic control over the computer and applications.

Method of Assessment:

Coursework: 100%

Reference List:

1. G.B. Shelly, T.J. Cashman and M. Vermaat, *Discovering Computers 2005*, Thomson Course Technology, 2005.
2. P. Toliver, Y. Johnson and S. Wise, *The Select Series: Microsoft Office XP. Volume 1*, Prentice-Hall, 2002.
3. L.E. Long and N. Long, *Computers*, 12th ed., Prentice-Hall, 2005.

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:

1. James O'Brien, *Introduction to Information Systems: Essential for the Business Enterprise*, 13th ed., McGraw-Hill, 2007.
2. K.C. Laudon, et.al., *Management Information Systems: Managing the Digital Firm*, 9th ed., Prentice-Hall, 2006.
3. James O'Brien, *Management Information Systems: Managing Information Technology in the Business Enterprise*, 7th ed., McGraw-Hill, 2006.
4. David S. Linthicum, *Enterprise Application Integration*, Addison-Wesley, 2000.
5. A. Silberschatz, H.F. Korth and S. Sudarshan, *Database System Concepts*, 5th ed., McGraw-Hill.
6. Shelly, Cashman, and Serwatka, *Business Data Communications: Introductory Concepts and Techniques*, 4th ed., Course Technology/Thomson Learning, 2004.

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 tolls 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:

1. Paul K. Andersen, *Just Enough UNIX*, McGraw-Hill, 2003.
2. H. M. Deital and P.J. Deital, *C How to Program*, 5th ed., Prentice-Hall, 2005 .
3. Marty Poniatowski, *UNIX User's Handbook*, 2/E. Prentice-Hall PTR, 2002.
4. John McMullen, *UNIX User's Interactive Workbook*, Prentice-Hall PTR, 1999.
5. Robert Cowart and Brian Knittel, *Using Microsoft Windows XP Professional*, Special ed., Que, 2003.

SUBJECT DESCRIPTION FORM

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

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

Objectives:

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

Learning Outcomes:

On successful completion of this subject, students are expected to be able to use the language and study skills needed to:

1. organize, write and revise academic essays and project reports;
2. organize and write correspondence to request assistance for study-related work; and
3. participate effectively in discussions.

Syllabus:

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

1. Appropriateness and Accuracy of Vocabulary and Grammar
   Collocation and connotation of words; verb forms, prepositions and complex sentences.
2. Coherence and Cohesion in Writing
   Paragraph development; topicalisation and thematisation; cohesive devices including articles, determiners, connectives, pronouns and anaphoric references.
3. Logical Development in Writing
   Organisation in a variety of text types; selection of information; logical development of themes and topics.
4. Language Development and Independent Learning Strategies
   Self-access study tools such as online dictionaries, thesaurus and web concordancers to enhance language proficiency and develop vocabulary; independent language learning strategies such as the use of learning portfolios.

Teaching and Learning Approach:

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

Method of Assessment:

Continuous Assessment: 100%

Reference Books:

1. D. Bunton, *Common English Errors in Hong Kong*, Hong Kong: Longman, 1989.
2. R. Carter, R. Hughes and M. McCarthy, *Exploring Grammar in Context: Upper-Intermediate and Advanced*, Cambridge: Cambridge University Press, 2000.
3. *Collins COBUILD English Dictionary for Advanced Learners*, Glasgow: Collins, 2001.

4. T.T.N. Hung, *Understanding English Grammar: A Course Book for Chinese Learners of English*, Hong Kong: Hong Kong University Press, 2005.
5. C. Madden and T. Rohlck, *Discussion and Interaction in the Academic Community*, Ann Arbor, MI: University of Michigan Press, 1997.
6. M. McCarthy and F. O'Dell, *English Vocabulary in Use: Advanced*, Cambridge: Cambridge University Press, 2002.
7. M. Nettle and D. Hopkins, *Developing Grammar in Context: Intermediate*, Cambridge: Cambridge University Press, 2003.
8. A. Oshima and A. Hogue, *Writing Academic English*, New York: Longman, 1991.
9. A. Oshima & A. Hogue, *Introduction to Academic Writing*, New York: Longman, 1997.
10. M. Swan, *Practical English Usage*, 3rd ed., Oxford: Oxford University Press, 2005.

SUBJECT DESCRIPTION FORM

Subject Title:	English for University Studies I	**Subject Code:**	ELC1004
Number of Credits:	3	**Hours Assigned:**	Seminars 42 hours

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

Objectives:

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

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

Learning Outcomes:

At the end of the course, the students are expected to be able to use the language and study skills needed to:

1. deliver effective oral presentations
2. summarise and paraphrase materials from written and spoken sources
3. plan, write and revise expository essays

Syllabus:

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

1. Spoken Communication
   Developing and practising specific oral skills required to prepare and deliver effective oral presentations; developing awareness of interpersonal communication strategies in different social and cultural contexts.
2. Written Communication
   Analysing and practising common writing functions; improving abilities of writing topic sentences and strategies for paragraph development; understanding common patterns of organisation in writing; taking notes from written and spoken sources; introducing summarising skills; improving coherence and cohesion in writing; developing revision and proofreading skills.
3. Reading and Listening
   Understanding the content and structure of information delivered both orally and in print form; reading and listening for different purposes.
4. Language Development
   Developing relevant grammar, vocabulary and pronunciation skills.

Teaching and Learning Approach:

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

Method of Assessment:

Continuous Assessment: 100%

Reference Books:

1. J. Boyle & L. Boyle, *Common Spoken English Errors in Hong Kong,* Hong Kong: Longman, 1998.
2. B. Brannan, *A Writer's Workshop: Crafting Paragraphs, Building Essays*, Boston, Mass.: McGraw-Hill, 2003.
3. *Collins COBUILD English Dictionary for Advanced Learners*, Glasgow: Collins, 2001.
4. S. Cunningham & P. Moor, *Cutting Edge (Advanced)*, Pearson: Longman, 2005.
5. M. Hancock, *English Pronunciation in Use,* Cambridge: Cambridge University Press, 2003.
6. T.T.N. Hung, *Understanding English Grammar: A Course Book for Chinese Learners of English,* Hong Kong: Hong Kong University Press, 2005.
7. A. Jay and R. Jay, *Effective Presentation,* London: Prentice-Hall, 2000.
8. M. McCarthy and F. O'Dell, *English Vocabulary in Use: Upper-Intermediate*, Cambridge: Cambridge University Press, 2001.
9. S. Redman, *English Vocabulary in Use: Pre-Intermediate and Intermediate*, Cambridge: Cambridge University Press, 2003.
10. G. Yule, O*xford Practice Grammar (Advanced)*, Oxford: Oxford University Press, 2006.

SUBJECT DESCRIPTION FORM

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

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

Objectives:

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

Learning Outcomes:

At the end of the course, students are expected to be able to use the language and study skills needed to:

1. participate effectively in formal and informal discussions.
2. organise and compose descriptive writing.
3. plan and write argumentative essays.

Keyword Syllabus:

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

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

2. Written Communication
   Writing descriptive texts; understanding 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 both orally and in print form; reading and listening for different purposes.

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

Teaching and Learning Approach:

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

Method of Assessment:

Continuous Assessment: 100%

Reference List:

1. R. Barrass, *Students Must Write: A Guide to Better Writing in Coursework and Examinations,* 3rd ed., London: Routledge, 2005.

2. R. Carter, R. Hughes and M. McCarthy, *Exploring Grammar in Context: Upper-Intermediate and Advanced*, Cambridge: Cambridge University Press, 2000.
3. *Collins COBUILD English Dictionary for Advanced Learners*, Glasgow: Collins, 2001.
4. C.G. Madden and T.N. Rohlck, *Discussion and Interaction in the Academic Community*, Ann Arbor, MI: University of Michigan Press, 1997.
5. M. McCarthy and F. O'Dell, *English Vocabulary in Use: Advanced*, Cambridge: Cambridge University Press, 2002.
6. A. Oshima and A. Hogue, *Writing Academic English*, New York: Longman, 1991.
7. A. Oshima and A. Hogue, *Introduction to Academic Writing*, New York: Longman, 1997.
8. J.T. Wood, G.M. Philips and D.J. Pederson, *Group Discussion: A Practical Guide to Participation and Leadership,* 4th ed., Long Grove, Ill: Waveland Press, 2007.

SUBJECT DESCRIPTION FORM

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

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

Objectives:

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

Learning Outcomes:

On completion of the subject, students will

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

Seminar Topics:

Typical Topics of the Seminars

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

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

Teaching and Learning Approach:

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

Method of Assessment:

Continuous Assessment: 100%

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

SUBJECT DESCRIPTION FORM

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

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

Objectives:

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

Learning Outcomes:

On completion of the subject, students will

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

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

Aims:

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

Learning Outcomes:

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.

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:

1. H. Anton, *Elementary Linear Algebra*, 8th ed., John Wiley & Sons, 2000.
2. G.B. Thomas, R.L. Finney, J.R. Hass and F.R. Giordano, *Thomas' Calculus*, 11th ed., Addison-Wesley, 2004.
3. E. Kreyszig, *Advanced Engineering Mathematics*, 8th ed., John Wiley & Sons, 1999.
4. A. Croft, R. Davison and M. Hargreaves, *Engineering Mathematics*, 3rd ed., Prentice-Hall, 2001.

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

Aims:

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

Learning Outcomes:

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.

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:

1. M.R. Middleton, *Data Analysis Using Microsoft Excel: Updated for Office XP*, 3rd ed., Duxbury Press, 2003.
2. R.E. Walpole, R.H. Myers, S.L. Myers and K.Y. Ye, *Probability and Statistics for Engineers and Scientists*, 7th ed., Prentice-Hall, 2002.

SUBJECT DESCRIPTION FORM

Subject Title: Elementary Cantonese 基礎粵語 **Subject Code:** CBS2050

Number of Credits: 3 **Hours Assigned:** 每週 4 小時（共 10.5 週）

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

Objectives:

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

Learning Outcomes:

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

Keyword Syllabus:

第一單元 簡介香港粵語的特點
粵語的拼音方案、粵語的語音
第二單元 介紹
重點學習：常見姓氏
"先"字的句式
第三單元 問候
重點學習：香港人常用的問候方式
比較格式
第四單元 打電話
重點學習：香港人電話交談的方式雙賓語句式
第五單元 約會
重點學習：簡單式語氣助詞
第六單元 問路
重點學習：方位表達法
第七單元 購物
重點學習：算錢的方式
第八單元 交通
重點學習：粵語"定"的動補結構式
第九單元 天氣
重點學習：天氣的表達
第十單元 飲食
重點學習："之嘛"等複合式語氣助詞
第十一單元 香港
重點學習：將字句
第十二單元 買餸
重點學習：單音節形容詞的重疊式
第十三單元 睇醫生
重點學習：意願的表達方式
第十四單元 工作——搵工跳槽
重點學習：表達同意的方式
第十五單元 報紙
重點學習：表達可能的方式
第十六單元 旅遊——海洋公園
重點學習：囑咐的表達方式
第十七單元 電視文化
重點學習：責備的表達方式

第十八單元 香港廟宇——黃大仙
重點學習：安慰的表達方式

Teaching and Learning Approach:

本課程採取情境教學法，共有十八個單元，讓學生在模擬的情境中對話，自然地學習語言。本課程也著重講解在每個情境中所使用的粵語各個成分，包括語音、詞匯和語法，讓學生全面地和更有效地掌握香港粵語，以進行基本的語言交際，包括課堂上的一般討論。

Method of Assessment:

課堂表現		: 10%
測試	一. 課堂練習測驗	: 20%
	二. 個人短講	: 30%
	三. 期末小組口頭報告	: 40%
		: 100%

Essential Reading:

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

Reference List:

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

SUBJECT DESCRIPTION FORM

Subject Title:	Chinese for Electronic and Information Engineering	**Subject Code:**	CBS2065
Number of Credits:	2	**Hours Assigned:**	28 hours

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

Role and Purpose:

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

Learning Outcomes:

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

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

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

Indicative Content:

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

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

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

Forms of learning and teaching:

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

Method of Assessment:

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

Reading List:

1. 司有和 ，《科技寫作簡明教程》，安徽教育出版社，1984。
2. 香港貿易發展局中文事務組編 ，《中國貿易應用文》，香港三聯書店，1994。
3. 于成鯤，《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 electronics systems and the associated technologies.
2. Solve problems and design simple electronics systems related to multimedia technologies.
3. Apply theory to practice by doing laboratory experiments on important electronics techniques.
4. Appreciate the importance of creativity and critical thinking in the creation of ubiquitous electronics systems in a modern society, and to realize that there is no unique solution for any particular situation and that engineers have to find “optimum” solutions, or make optimum designs.

Category B: Attributes for all-roundedness

5. Present ideas and findings effectively.
6. Think critically.
7. Learn independently.
8. Work in a team and collaborate effectively with others.

Syllabus:

1. Introduction to electronics systems
   Overview of the fundamental components in electronics systems: analog and digital subsystems and their components. Basic relation between human sensory organs and audiovisual signals. Need for amplification and filtering. Need for logic manipulation and actuation.
2. Analog subsystems
   DC power supplies and regulators. Characteristics and applications of practical operational amplifiers. The basic concept of negative feedback and their effects on circuits. Feedback oscillators. Characteristics and classification of power amplifiers. Basic filter principle and approximations. Frequency response and realization of analog filters: passive and active filters. Brief introduction to discrete-time implementation of analog filters: SC filters.
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:

1. Tom Floyd, *Fundamentals of Analog Circuits*, 2nd ed., Upper Saddle River, N.J: Prentice-Hall, 2002.
2. R. Schaumann and M.E. Van Valkenburg, *Design of Analog Filters*, Oxford University Press, 2001.

Reference books:

1. P.R. Gray and R.G. Meyer, *Analysis and Design of Analog Integrated Circuits,* 4th ed., New York, N.Y: Wiley, 2001.
2. Jan M. Rabaey, *Digital Integrated Circuits: A Design Perspect*ive, 2nd ed., Upper Saddle River, N.J : Pearson Education International, 2003.

SUBJECT DESCRIPTION FORM

Subject Title:	Introduction to Logic Design	**Subject Code:**	EIE214
Number of Credits:	3	**Hours Assigned:**	Lecture/tutorial 36 hours Laboratory 6 hours (Equivalent to 18 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:

Category A: Professional/academic knowledge and skills

1. Understand the fundamentals of digital systems and associated technologies.
2. Solve problems and design simple system related to digital logic.
3. Apply theory in real cases by using logic design techniques to develop simple digital systems.
4. Appreciate the importance of creativity and critical thinking, and to realize that there is no perfect digital system for any particular situation and engineers have to find “good” solutions, or make good 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. 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 Binary multipliers
   - 2.5 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 HDL representations of sequential systems
   5.7 Case Study: Sequential number recognizer and traffic light

6. Memory and Programmable Logic Devices
   6.1 RAM: Write and read operations, timing waveforms, RAM integrated circuits, three-state buffers, DRAM ICs
   6.2 Programmable logic technologies
   6.3 ROM, PLA and PAL
   6.4 VLSI programmable logic devices: Xilinx FPGA

7. Micro-operations in Microprocessors
   7.1 Registers and register transfers
   7.2 Serial arithmetic operations
   7.3 Shift operations
   7.4 HDL representations

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:

1. M.M. Mano and C.R. Kime, *Logic and Computer Design Fundamentals*, 3rd ed., Upper Saddle River, NJ: Prentice-Hall, 2004.

Reference Books:

1. T.L. Flody, *Digital Fundamentals with VHDL*, Upper Saddle River, NJ: Prentice-Hall, 2003.
2. V. P. Nelson, H. T. Nagle, B. D. Carroll and J. D. Irwin, *Digital Logic Circuit Analysis & Design*, Prentice-Hall, 1997.

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

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

To understand the underlying basic theory of analogue & digital electronics and multimedia technologies,
To understand the basic building blocks of electronics & multimedia systems,
To conduct experiments in basic electronics and multimedia systems,
To appreciate the applications of electronics technologies in multimedia systems.

Attributes for all-roundedness
To be able to learn independently.
Team Work and Presentation Skills.
To appreciate the importance of creativity and critical thinking, and to realize the impact and applications pf electronics and multimedia technology.
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:

1. Thomas L. Floyd, *Electronics Fundamentals: Circuits, Devices and Applications*, 7/e, Addison-Wesley, 2006.
2. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, Prentice-Hall, 2004.

Reference Book:

1. R. Steinmetz and K. Nahrstedt, *Multimedia: Computing, communications and Applications*, Prentice-Hall, 2002.

SUBJECT DESCRIPTION FORM

Subject Title:	University English I	**Subject Code:**	ELC2501
Number of Credits:	2	**Hours Assigned:**	2 hours/week (Semester 1, 1st Year)
Group Size:	20 (maximum)		

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

Objectives:

In general, to help students study effectively in the University's English medium learning environment. More specifically, to help students to improve and develop their English language proficiency for effective communication within an academic context.

Learning Outcomes:

Having completed the subject, students should be able to:

1. employ effective reading and listening skills in an English-medium learning environment
2. deliver informative presentations confidently and effectively
3. use appropriate referencing skills

Keyword Syllabus:

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

The syllabus comprises four interrelated strands:

1. Spoken Academic Communication
   Recognising the purposes of, and differences between spoken and written communication in English in academic contexts; preparing and delivering oral presentations.
2. Written Academic Communication
   Identifying and employing functions common in written academic discourse; understanding and applying principles of academic text structure in short essays and reports; developing paraphrasing, summarising and referencing skills.
3. Reading and Listening in Academic Contexts
   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 enable students to communicate effectively in English within the University's academic contexts. The main emphasis is on improving students' confidence and competence in using English in these contexts. As far as possible, the subject will address students' specific language needs in their subject disciplines.

The study method is primarily based on seminars and these will include interactive learning techniques such as discussions and role-plays. Use will also be made of video and audio recordings, relevant Web-based materials/activities and the ELC's Centre for Independent Language Learning. Students in need of additional help will be asked to attend enhancement English programmes organised by the English Language Centre.

Method of Assessment:

Continuous Assessment: 100%

Students' speaking and writing skills will be evaluated through assessment tasks related to the outcome areas. Students will be assessed on the accuracy as well as the appropriacy of the language used in fulfilling the assessment tasks.

Reference List:

1. A. Jay and J. Ros, *Effective Presentations*, London: Prentice-Hall, 2000.
2. H. Gelfand, *Mastering APA Style: Student's Workbook and Training Guide*, American Psychological Association, 2001.
3. I. Leki, *Academic Writing: Exploring Processes and Strategies*, Cambridge: Cambridge University Press, 1998.
4. M. Waters and W. Alan, *Study Tasks in English*, Cambridge: Cambridge University Press, 1995.
5. R. Carter, R. Hughes and M. McCarthy, *Exploring Grammar in Context: Upper-intermediate and Advanced*, Cambridge: Cambridge University Press, 2000.
6. *Collins COBUILD English Dictionary for Advanced Learners*, Glasgow: Collins, 2001.
7. M. McCarthy and F. O'Dell, *English Vocabulary in Use: Upper-intermediate*, Cambridge: Cambridge University Press, 2001.

SUBJECT DESCRIPTION FORM

Subject Title: University English II	**Subject Code:** ELC2502
Number of Credits: 2	**Hours Assigned:** 2 hours/week (Semester 2, 1st Year)
Group Size: 20 (maximum)	

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

Objectives:

To further develop those English language skills required by students to study effectively in the University's English medium learning environment.

Learning Outcomes:

Having completed the subject, students should be able to:

1. evaluate and produce an academic text
2. deliver persuasive presentation confidently and effectively
3. participate in an academic discussion

Keyword Syllabus:

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

The syllabus comprises four interrelated strands:

1. Spoken Academic Communication
   Recognising the purposes of, and differences between spoken and written communication in English in academic contexts; identifying and practising interactional and linguistic aspects of participation in seminar discussions; discussing issues requiring the development and application of creative and critical thinking; preparing and delivering oral presentations.
2. Written Academic Communication
   Note-taking from reading and listening inputs; evaluating an academic text, improving editing and proofreading skills; achieving appropriate tone and style in academic writing; writing persuasive and argumentative essays.
3. Reading and Listening in Academic Contexts
   Understanding the content and structure of ideas delivered both orally and in print form; distinguishing between 'fact' and 'opinion'.
4. Language Development
   Improving and extending relevant features of students' grammar, vocabulary and pronunciation.

Teaching and Learning Approach:

The study method is primarily based on seminars which will include discussions, role-play, individual and group activities. In addition to learning materials specially prepared by English Language Centre staff, use will be made of information technology and the ELC's Centre for Independent Language Learning. Teachers will also recommend additional reference material as required.

Method of Assessment:

Continuous Assessment: 100%

Students' speaking and writing skills will be evaluated through assessment tasks related to the outcome areas. Students will be assessed on the accuracy as well as the appropriacy of the language used in fulfilling the assessment tasks.

Reference List:

1. H. Gelfand, *Mastering APA Style: Student's Workbook and Training Guide*, American Psychological Association, 2001.
2. S. Lebauer, *Learn to Listen, Listen to Learn: Academic Listening and Note-taking*, New York: Pearson ESL, 1999.
3. I. Leki, *Academic Writing: Exploring Processes and Strategies*, Cambridge: Cambridge University Press, 1998.
4. C.G. Madden and T. Rohlck, *Discussion and Interaction in the Academic Community*, Ann Arbor, MI: University of Michigan Press, 1997.

SUBJECT DESCRIPTION FORM

Subject Title:	Information Technology	**Subject Code:**	ENG224
Number of Credits:	3	**Hours Assigned:**	Lecture/Tutorial 33 hours Laboratory 6 hours (Equivalent to 18 laboratory hours)

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

Objectives:

To provide the foundation knowledge in computer engineering, computer networking and data processing that is essential to modern information system design;
To provide training in using information technologies to solve practical problems in engineering.

Student Learning Outcomes:

Category A: Professional/academic knowledge and skills
1. Be able to identify different components of a computer system and understand their features.
2. Understand the basic structure and functions of a computer operating system and be able to use the services it provided for manipulating computer resources.
3. Be able to set up and configure a simple computer system.
4. Understand the basic structure and limitations of the Internet.
5. Have the ability to understand a Web document and be able to develop the client-side and the server-side programs required for a Web application.
6. Understand the basic structure of a database system and be able to set up and configure a simple database system.
7. Be able to design and develop a web-based system with database connectivity at the server side
8. Learn to make reasonable judgment in choosing suitable technologies for the implementation of an information system.
9. Be able to identify different components and technologies used in a digital network and understand their features.
10. Be able to set up and configure a simple computer network.

Category B: Attributes for all-roundedness
11. Solving problems using systematic approaches.
12. Learn independently and be able to search for the information required in solving problems.

Syllabus:

1. Introduction to computers and computing
   Evolution and applications of computers. Microprocessors – internal structure, fetch and execute cycles, instruction set, basic assembly language programming. Other major computer hardware components: Memory and I/O. Software components – applications, utilities and operating systems. Case study: Linux – background, architecture, user interfaces, file management and storage, process management. Internet and Internet services. Multi-tier Internet model. Internet programming case studies – XHTML, PHP/ASP. (13 hours)
2. 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. Case study: Database management using Microsoft Access/MySQL. Introduction to Information systems. System development life cycle. Structured tool for system analysis and design. Workflow management. (11 hours)
3. Networking Essentials
   Introduction to computer networking – LAN and WAN technologies, clients and servers, networking topologies. Networking models – OSI 7-layer model, IEEE 802 model. Network protocol case studies: Ethernet – cabling, topology, access methods; TCP/IP – application layer message passing, message assembling, port multiplexing, IP addressing, subnetting, routing and address resolution. Networking devices – modem, hub, bridge, switch, and router. (9 hours)

Laboratory Experiments and other Practical Work (18 hours):

1. Installation and use of Linux
2. Setting up a Web site with Apache/IIS and XHTML
3. Server-side programming with PHP/ASP
4. Database management using Microsoft Access / MySQL
5. Structured network cabling
6. Network Address Translation and IP Routing

Method of Assessment:

Continuous Assessment: 40% Examination: 60%

The continuous assessment consists of assignments, laboratory reports and tests. The assessment criteria will be made known to the students prior to conducting the assessment.

Reference Books:

1. P. Norton, *Introduction to Computers*, 3rd ed., McGraw-Hill, 1999.
2. S.M. Sarwar, *Linux, the Textbook,* 1st ed., Addison-Wesley, 2002.
3. H.M. Deitel, P.J. Deitel and T.R. Nieto, *Internet and World Wide Web: How to Program,* Prentice-Hall, 2002
4. W. Redmond, *MCSE Training Kit: Networking Essentials Plus*, Microsoft Press, 2000.
5. C.J. Date, *An Introduction to Database Systems,* 5th ed., Addison-Wesley, 2000.
6. K.C. Laudon and J.P. Laudon, *Management Information Systems,* 6th ed., Prentice-Hall, 2000.

SUBJECT DESCRIPTION FORM

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

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

Objectives:

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

Student Learning Outcomes:

Category A: Professional/academic knowledge and skills
After taking this subject, the students should be able to develop a good computer program using C/C++ programming language. To be specific, the students should be able to achieve the following:

1. Familiarize themselves with at least one C/C++ programming environment.
2. Be proficient in using the basic constructs of C/C++, 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
   Structured program design. Improving program readability. Flow chart. Modular programming – static library. Programming bugs, errors, mistakes and code rot. Exceptions and debugging. Case study: Using Visual C++ debugger. (4.5 hours)
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
   The stack and free store. Create and delete objects in free store. Pointer arithmetic. Passing function arguments by pointer. Returning values by pointer. Array of Objects. Multidimensional array. Array and pointer. Array of pointers. Pointer of array. Character array – Strings. Command line processing. (9 hours)

7. Stream I/O
   Input and Output. Input using cin. Output using cout. File I/O using streams. (6 hours)
8. Using C/C++ in Engineering Applications
   Solving numerical problems using C/C++. Developing graphical user interfaces for Engineering applications. Control I/O devices using C/C++. (7.5 hours)

Method of Assessment:

Continuous Assessment: 100%

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

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

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

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

Textbook:

1. J. Liberty and D.B. Horvath, *Sams Teach Yourself C++ in 24 hours*. Sams Publishing, 2005.

Reference Book:

1. H.M. Deitel and P.J. Deitel, *C++ How To Program*, 5th ed., Prentice-Hall, 2005.
2. I. Horton, *Ivor Horton's Beginning Visual C++ 2005,* Wiley Publishing, 2006.

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:-

Assessment Component	Weighting
Practical Assignment	50%
Report and Presentation	30%
Test	20%
Total	100%

Reference books:

1. Robert S. Villanucci and Alexander W. Avtgis, et al., *Electronic Techniques: Shop Practices and Construction*, 6th ed., Prentice-Hall, 1999.
2. Ronald K. Jurgen., *Digital Consumer Electronics Handbook*, McGraw-Hill, New York, 1997.
3. Michael H. Tooley, *Electronic Circuits: Fundamentals and Applications*, 2nd ed., Newnes, Oxford, Boston, 2002.
4. D. Joseph Stadtmiller, *Applied Electronic Design*, Prentice-Hall, N.J., 2003.
5. Martin O'Hara, *EMC at Component and PCB Level*, Newnes, Oxford , 1998
6. Charles A. Harper, *Electronic Packaging and Interconnection Handbook*, 4th ed., McGraw-Hill, 2005.
7. R.J. Klein Wassink, *Soldering in Electronics: A Comprehensive Treatise on Soldering Technology for Surface Mounting and Through-hole Techniques*, 2nd ed., Electrochemical Publications Limited, Ayr, Scotland, 1989.
8. Perry L. Martin, *Electronic Failure Analysis Handbook: Techniques and Applications for Electronic and Electrical Packages, Components and Assemblies*, McGraw-Hill, New York, 1999.
9. Victor Meeldijk, *Electronic Components: Selection and Application Guidelines*, Wiley, New York, 1996.
10. George Loveday, *Electronic Fault Diagnosis*, 4th ed., Pitman, London, 1994.
11. *Microsoft Official Curriculum in Windows*, Microsoft, Redmond.

SUBJECT DESCRIPTION FORM

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

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

Exclusion: Introduction to Management (MM201)
Organisational Behaviour (MM211)
Organisation and Management (MM202/MM302)
People and Management (MM2191)

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 Contents:

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
   Foundations of planning. Decision making and problem solving. Strategic management.
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
   Foundations of control. Operations and quality management. Controlling for organisational performance.

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.

Method of Assessment:

Coursework: 50% Final Examination: 50%

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

Indicative Reading:

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

Recommended Textbook:

1. S.P. Robbins and M. Coulter, *Management,* 9th ed., Prentice-Hall, 2007.

References:

1. Certo, *Modern Management,* 10th ed., Prentice-Hall, 2006.
2. Jones, *Contemporary Management*, 4th ed., McGraw-Hill, 2006.
3. Kinicki & Williams, *Management: A Practical Introduction,* 2nd ed., McGraw-Hill, 2006.
4. McShane, *Organizational Behavior,* 3rd ed., McGraw-Hill, 2005.
5. Robbins, *Essentials of Organizational Behavior,* 8th ed., Prentice-Hall, 2005.
6. J.R. Schermerhorn, *Management*, 8th ed., John Wiley & Sons, 2005.
7. Sieren, Boos and Boos, *China Management Handbook,* MacMillan, 2003.

Current journal articles, periodicals & newspapers will also be assigned for study.

SUBJECT DESCRIPTION FORM

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

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

Role and Purpose:

This core subject introduces the basic principles and concepts of Marketing. It 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:

1. P. Kotler and G. Armstrong, *Principles of Marketing*, New Jersey, Prentice-Hall, 2004.

References:

1. E.L. Boone and L.D. Kurtz, *Contemporary Marketing*, Thomson, South-Western, 2004.
2. M.J. Etzel, B.J. Walker and W.J. Stanton, *Marketing*, McGraw-Hill /Irwin, 2004.
3. Lamb Hair McDaniel, *Marketing*, Thomson, South-Western, 2004.

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:

1. P. Alasuutari, *Researching Culture: Qualitative Method and Cultural Studies*, London, Thousand Oaks, New Delhi: Sage Publications, 1995.
2. W.E. Bijker, *Of Bicycle, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*, Cambridge, Mass., London: The MIT Press, 1995.
3. D. Mackenzie, *Green Design: Design for the Environment*, 2nd ed., London: Laurence King, 1997.
4. D.A. Norman, *The Design of Everyday Things*, London: The MIT Press, 1998.
5. Victor V. Papanek, *The Green Imperative: Ecology and Ethics in Design and Architecture*, New York: Thames & Hudson, 1995.
6. N. Stanton, *Human Factors in Consumer Products*, London: Taylor & Francis, 1998.
7. P. Sparke, *An Introduction to Design and Culture: 1900 to the Present*, London: Routledge, 2004.
8. N. Whiteley, *Design for Society*, London: Reaktion Books, 1993.

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:

1. Barry B. Brey, *The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processor: Architecture, Programming and Interfacing*, 6th ed., Prentice-Hall, 2003.

Reference Books:

1. C. Hamacher, Z. Vranesic and S. Zaky, *Computer Organization*, 5th ed., McGraw-Hill, 2002.
2. Hans-Peter Messmer, *The Indispensable PC Hardware Book*, 4th ed., Addison-Wesley, 2002.
3. Silberschatz and P.B. Galvin, *Operating System Concepts*, 5th ed., John Wiley & Son, 1999.
4. W. Stallings, *Operating Systems: Internals and Design Principles,* 3rd ed., Prentice-Hall, 1998.

SUBJECT DESCRIPTION FORM

Subject Title:	Object-Oriented Design and Programming	**Subject Code:**	EIE320
Number of Credits:	3	**Hours Assigned:**	Lecture/Tutorial 36 hours Laboratory 6 hours (Equivalent to 18 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)
   Purposes of modeling. Structural Modeling: classes, relationships, class Diagrams, interfaces, packages, and object diagrams. Behavioral modeling interactions, use cases, use case diagrams, interaction diagrams, activity diagrams, events, signals, processes and threads. Architectural modeling: components, deployment, collaborations, patterns, frameworks, component diagrams, and deployment diagrams. Mapping UML diagrams to Java Code.

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:

1. G. Booch, I. Jacobson and J. Rumbaugh, *The Unified Modeling Language User Guide*, Addison-Wesley, 1999.
2. D.J. Barnes and M. Kolling, *Objects First with Java: A Practical Introduction using BlueJ*, Prentice-Hall, 2003.

Reference Books:

1. H.M. Deitel and P.J. Deitel, *Java: How To Program*, 5th ed., Prentice-Hall, 2002.
2. R.C. Lee and W.M. Tepfenhart, *Practical Object-Oriented Development with UML and Java*, Prentice-Hall, 2003.
3. J. Rumbaugh, I. Jacobson and G. Booch, *The Unified Modeling Language Reference Manual*, Addison-Wesley, 1999.
4. http://java.sum.com.

SUBJECT DESCRIPTION FORM

Subject Title:	Interface and Embedded Systems	**Subject Code:**	EIE322
Number of Credits:	3	**Hours Assigned:**	Lecture/Tutorial 37 hours Laboratory 5 hours (Equivalent to 15 laboratory hours)

Pre-requisite: Computer System Fundamentals (EIE311) **Co-requisite:** nil **Exclusion:** nil

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. Identify and model real-time requirements of products.
2. Apply embedded software techniques to satisfy functional and response-time requirements.
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.
6. Design under tradeoffs among various constraints such as manpower, program size and hardware complexity.

Category B: Attributes for all-roundedness
7. Pursue life-long learning through searching and reading technical materials.
8. Design and solve problems in general.
9. Present ideas and findings effectively.
10. Think critically.

Syllabus:

1. Embedded System Hardware
   Microcontroller-based, microprocessor-based and PC-based approaches
   The details of a typical microcontroller architecture, e.g. the 8051 or AVR family
2. Programming with Embedded System
   Timers/counters, serial port communications and interrupt handling
3. I/O Interfacing
   Introduction to different I/O interfacing techniques such as output-pin driving limitations, current driving, inductive load driving; pulse generation and measurement; keyboard multiplexing, display multiplexing, driving LCD controllers, analog signals sensing, motor control and measurements
4. Sytstem Bus and Memory Interfacing
   Concepts of system bus
   Discussion on memory device interfaces
5. Embedded Software Development and Real-time Operating System (RTOS)
   Discussion on the embedded software issues including tasks and events, interrupt system, inter-task communication and the shared-variables problem and solutions
   Introduction to RTOS: Kernel services, semaphores, priority inversion, task priority and scheduling
6. Industrial I/O Standards
   Timing specifications and arbitration of different industrial I/O standards, e.g. RS485, SPI, I^2C, CAN and USB

Laboratory Experiments:

1. Serial I/O and timer-based baud rate generation
2. Timer-based pulse width measurement
3. Interrupt handling
4. Pulse-Width-Modulated output generation.

Method of Assessment:

Continuous Assessment: 50% Examination: 50%

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

Reference Books:

1. M. A. Mazidi, J. G. Mazidi and R. D. Mckinlay, *The 8051 Microcontroller and Embedded Systems Using Assembly and C*, Prentice-Hall, 2006.
2. A. Deshmukh, *Microcontrollers: Theory and Application*, McGraw-Hill, 2005.
3. Rai Kamal, *Embedded Systems: Architecture, Programming and Design*, McGraw-Hill, 2004.
4. S. R. Ball, *Analog Interfacing to Embedded Microprocessors: Real World Design*, 2nd ed., 2004.
5. M. J. Pont, Embedded C, Addison-Wesley, 2002.

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
   Line coding. Digital modulation: ASK, FSK, PSK, QAM. Analogue modulation: amplitude modulation. Pulse-code modulation, uniform and non-uniform quantization.
4. Data Link Control
   Propagation delay, effective throughput. Sliding window protocol. Flow and Error Control, stop-and-wait ARQ, selective reject ARQ, performance. Data link control protocols, characteristics, basic frame structure, operations.
5. Data Communication Interface. Multiplexing and Switching
   Asynchronous and synchronous transmission. Line configurations, simplex, duplex and half-duplex. Interfacing. Clock synchronization. Frequency division multiplexing. Synchronous time division multiplexing. Code division multiplexing. Multiplexing hierarchies, T1, E1, T2 and T3 carrier systems. SONET and SDH transmission systems. Overview of Circuit and Packet 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:

1. W. Stallings, *Data and computer communications*, 7th ed., Prentice-Hall, 2004.

Reference Books:

1. L. Leon-Garcia and I. Widjaja, *Communication Networks,* McGraw-Hill, 2000.
2. B. Forouzan, Data Communications and Networking, McGraw-Hill, 2002.

SUBJECT DESCRIPTION FORM

Subject Title:	Digital Signal Processing for Multimedia Applications	**Subject Code:**	EIE328
Number of Credits:	3	**Hours Assigned:**	Lecture/Tutorial 33 hours Laboratory 9 hours

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

Objectives:

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

Student Learning Outcomes:

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. Understand, describe, the technologies for streaming multimedia content over the Internet.
6. Appreciate the architectures and technologies of various multimedia products, such us DVD player, digital video camera, MP3 player, etc.

Category B: Attributes for all-roundedness
7. Communicate effectively.
8. Think critically and creatively.
9. 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. Image and video coding standards. Audio coding standards.

3. Tools for Multimedia Integration
   Synchronized Multimedia Integration Language (SMIL), Virtual Reality Modelling Language (VRML), and MPEG-4 Multimedia Standard.

4. 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: Video conferencing - standards, multimedia multiplexing and synchronization. Multimedia streaming - streaming servers and players, standards, and protocols.

5. Digital Signal Processors for Multimedia Applications
   Digital signal processors - SIMD techniques, MMX technologies, Symmetric Multiple processor (SMP) technologies.

6. Digital Signal Processing for Multimedia Products
   To discuss not less than one of the following topics
   DVD player

Digital video cameras
Digital video cassette recorder
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. Developing Advanced 3D multimedia applications using VRML

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:

1. M. Mandal, *Multimedia Signals and Systems*, Kluwer Academic Publishers, 2003.
2. F. Halsall, *Multimedia Communications: Applications, Networks, Protocols and Standards*, Addison-Wesley, 2001.
3. Z.N, Li and Mark S. Drew, *Fundamentals of Multimedia*, Prentice-Hall, 2004.
4. C.H. Wu and J.D. Irwin, *Emerging Multimedia Computer Communication Technologies*, Prentice-Hall, 1998.
5. B. Furht, S.W. Smoliar and H.J. Zhang, *Video and Image Processing in Multimedia Systems*, Kluwer Academic Publishers, 1995.

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
   Impulse Representation and Convolution, Linear Time-Invariant Systems. Properties of Systems: Causality, Time Invariance, Linearity, Systems with Memory. LTI Systems: Convolution Representation, Difference Equation Representation.
3. Fourier Representations for Signals
   Reviews on Periodic and Nonperiodic Signals, Continuous and Discrete Signal, Fourier Series and Transform, Frequency Spectra. Properties of Fourier Representations, Time Functions, and Signal Frequency Spectrum., Sampling. Discrete-Time Fourier Transform, Discrete Fourier Transform,.
4. System Analysis

   Frequency Response of LTI systems, System Frequency Response, Applications, Linear and Circular Convolution, Ideal Filters
5. Laplace Transform
   Definition and Properties of Laplace Transform, Inversion of Laplace Transform,. Transform Analysis of LTI Systems, Poles and Zeros. Relationship of Laplace Transform and Fourier 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:

1. Ed. Kamen and Bonnie Heck, *Fundamentals of Signals and Systems Using the Web and Matlab*, 2/e, Prentice-Hall, 2000.
2. Simon Haykin and Barry Van Veen, *Signals and Systems*, Wiley, 2003.
3. M.J. Roberts, *Signals and Systems: Analysis Using Transform Methods and MATLAB*, McGraw-Hill, 2003.
4. Charles L. Phillips, et al., *Signals, Systems, and Transforms,* 3/e, Prentice-Hall, 2003.

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
   Evolution of networking and switching technologies. Protocols and services. Layered network architectures: OSI 7-layer model, TCP/IP architecture, digital transmission, local area networks.
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
   Connectionless (datagram) packet switching and virtual-circuit switching. Routing in packet networks.
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:

1. Douglas Comer, *Computer Networks and Internets: with Internet Applications*, 4th ed., Pearson/ Prentice-Hall, 2004 (PolyU Call No.: TK5105.5 .C5897 2004).

Reference Books:

1. William Stallings, *Data and Computer Communications*, 7th ed., Pearson/Prentice-Hall, 2004 (PolyU Call No.: TK5105 .S73 2004).
2. Tanenbaum, Andrew S., *Computer Networks*, 4th ed., Prentice-Hall, 2003 (PolyU Call No.: TK5105.5 .T36 2003).
3. Alberto Leon-Garcia, *Communication Networks: Fundamental Concepts and Key Architectures*, 2nd ed., New York: McGraw-Hill Higher Education, 2004 (PolyU Call No.: TK5101 .L46 2004).
4. Dimitri P. Bertsekas, *Data Networks*, 2nd ed., Prentice-Hall, 1992 (This reference is selected as a classics) (PolyU Call No.: TK5105 .B478 1992).

SUBJECT DESCRIPTION FORM

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.
3. Critically evaluate the cost-performance benefits of available components.
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.

INSIGHT	as evidenced by how well issues are understood and resolved [1,2,3,4]
DRIVE	as evidenced by initiative, diligence and tenacity [5,6,9,10]
CREATIVITY	as evidenced by ingenuity and imagination [5,8,9,10]
COMMUNICATION	as evidenced by an ability to express ideas clearly and succinctly [7]

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:

Assessment type	***Weighting***	***Number of times***
Attendance	10 %	≥ 5
Quiz/Test	10 %	≥ 2
Progress Demonstrations	20 %	≥ 2
Logbook & Presentation	20 %	≥ 2
Progress& Final Reports	20 %	≥ 2
Final Demonstration	20 %	1

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:**	2 hours/week (Semester 2, 2nd Year)
Group Size:	20 (maximum)		

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

Co-requisite: nil

Exclusion: nil

Objectives:

To enhance those English language skills required of students to communicate effectively in their workplaces.

Learning Outcomes:

Having completed the subject, students should be able to:
1. write effective job-related correspondence.
2. write workplace reports.
3. take part in an English job interview.

Keyword Syllabus:

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

1. Language Development and Appropriacy
   Introducing the use of context-sensitive language in both spoken and written English; improving students' pronunciation; extending students' repertoire of language skills.
2. Written Communication
   Selecting and using relevant content, appropriate style and format, and structure and layout in workplace and job-search documents.
3. Spoken Communication
   Providing practice in the specific oral skills (e.g. telephoning skills) required in workplace interactions and job interviews.
4. Language Development
   Developing relevant grammar, vocabulary and pronunciation skills.

Teaching and Learning Approach:

The subject is designed to introduce students to the communications skills, both oral and written, that they may need to function effectively in their future professions. These skills will be necessary for successful employment in any organisation where internal and/or external communication is conducted in English.

The study method is primarily based on seminars which will include discussions, role-play, individual and group activities. In addition to learning materials specially prepared by English Language Centre staff, use will be made of information technology and the ELC's Centre for Independent Language Learning. Teachers will also recommend additional reference material as required.

Method of Assessment:

Continuous Assessment: 100%

Students' speaking and writing skills will be evaluated through assessment tasks related to the outcome areas. Students will be assessed on the accuracy as well as the appropriacy of the language used in fulfilling the assessment tasks.

Reference List:

1. L.S. Baugh, M. Fryar & D.A. Thomas, *How to Write First-Class Business Correspondence*, Illinois: NTC Publishing Group, 1995.
2. M.E. Guffey, *Essentials of Business Communication*, 6th ed., Mason, Ohio: South-Western College Pub., 2004.
3. J. Potter, *Common Business English Errors in Hong Kong*, Hong Kong: Longman, 1992.
4. A. White, *Interview Styles and Strategies*, Mason, Ohio: South-western/Thomson Learning, 2003.

SUBJECT DESCRIPTION FORM

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

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

Brief Description and Aims:

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

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

Learning Outcomes:

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:

1. *Design: Education, Culture and Technology*, Taipei: Asia-Pacific Books Publisher, 1997.
2. *Design Issues*. The MIT Press. (Journal)
3. *Design Management Journal*. The Design Management Institute. (Journal)
4. *Design Studies*. Elsevier Science. (Journal)
5. T.E. Graedel, *Industrial Ecology*, 2nd ed., Upper Saddle River, NJ: Prentice-Hall, 2003.
6. P.W. Jordan, *Putting the Pleasure into Products*, IEE Review, 249-252, November 1997.
7. J.Y.C. Kwok, (Ed.), *(Re)-Discovering Design: A Critical Consideration of the Hong Kong Culture of Design*, Hong Kong: A Better Tomorrow Workshop Ltd., 1997.
8. D. Mackenzie, *Green Design: Design for the Environment*, 2nd ed., London: Laurence King, 1997.
9. D.A. Norman, *The Invisible Computer: Why Good Products can Fail, the Personal Computer is so Complex and Information Appliances are the Solution*, Cambridge, Mass., London: The MIT Press, 1998.
10. D.A. Norman, *The Design of Everyday Things*, London: The MIT Press, 1998.
11. H. Roqueta, *Product Design*, London: Te Neues, 2002.
12. N. Stanton, (Ed.), *Human Factors in Consumer Products*, London: Taylor & Francis, 1998.
13. K.T. Ulrich, *Product Design and Development*, 3rd ed., New York, NY: McGraw-Hill/Irwin, 2004.
14. N. Whiteley, *Design for Society*, London: Reaktion Books, 1993.
15. J. Zeisel, *Inquiry by Design*, Reprinted ed., Cambridge: Cambridge University Press, 1997.

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:

1. Tomas Moller, *Real-Time Rendering*, A.K. Peters, 1999. (T385.M635 1999)
2. James D. Foley, *Computer Graphics: Principles and Practice*, 1996. (T385 .F63 1995)
3. Alan Watt, *3D Games: Real-time Rendering and Software Technology*, Addison-Wesley, 2001. (QA76.76.C672 W39 2001)
4. Rick Parent, *Computer Animation: Algorithms and Techniques*, Morgan Kaufmann, 2001. (TR897.7 .P34 2002)
5. David M. Bourg, *Physics for Game Developers*, O'Reilly, 2002. (QC23.2 .B68 2002)
6. Ahmed A. Shabana, *Computational Dynamics*, Wiley, 2001. (QA845 .S44 2001)
7. Patrick Henry Winston, *Artificial Intelligence*, Addison-Wesley, 1992. (Q335.W56 1992)
8. Steve Rabin, *AI Game Programming Wisdom*, Charles River Media, 2002. (QA76.76.C672 A53 2002)
9. Steve Rabin, *AI Game Programming Wisdom 2*, Charles River Media, 2002. (QA76.76.C672 A532 2004)
10. Todd Barron, *Multiplayer Game Programming*, Prime Tech, 2001. (QA76.76.C672 B37 2001)
11. Andrew Mulholland, *Developer's Guide to Multiplayer Game*, WordWare Publishing Inc, 2002. (QA76.76.C672 M85 2002)
12. Gregory Junker, *Pro Ogre 3D Programming*, APress, 2006 (QA76.76.C672 J86 2006)
13. R. Fernando, M. J. Kilgard, *The Cg Tutorial*, Addison-Wesley, 2003 (T385.F46 2003)
14. Stefan Zerbst, *3D Game Engine Programming*, Thomson Course Technology, 2004 (QA76 76.C672 Z47 2004)
15. Alan Watt, Fabio Policarpo, *3D Games: Real-Time Rendering and Software Technology*, v1, Addison-Wesley, 2001 (QA76.76.C672 W39 2001)

SUBJECT DESCRIPTION FORM

Subject Title:	Computer Game Development I	**Subject Code:**	SD3984
Number of Credits:	3	**Hours Assigned:**	Lectures/Tutorials 36 hours Laboratory 28 hours

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

Objectives:

1. To provide a broad overview of fundamental elements and concepts in computer games design and development, and in their production process
2. To provide students with hands-on experience in designing and developing a computer game

Learning Outcomes:

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:

1. Andrew Rollings, Dave Morris, Game *Architecture and Design*, New Riders Publishing, 2003. (QA76.76.C672 R654 2004)
2. Katie Salen, Eric Zimmerman, *Rules of Play: Game Design Fundamental*, 2004. (QA76.76.C672 S25 2004)
3. Francois Dominic Laramee, *Game Design Perspectives*, Charles River Media, 2002. (QA76.76.C672 G34 2002)
4. John Scott Lewinski, *Developer's guide to Computer Game Design*, WordWare Publishing Inc, 2000. (QA76.76.C672 L49 2000)
5. Kevin Oxland, G*ameplay and Design*, Addison Wesley, 2004. (QA76.76.C672 O95 2004)
6. Chris Crawford, *The Art of Computer Game Design*, 1982. Available on line at URL: http://www.vancouver.wsu.edu/fac/peabody/game-book/Coverpage.html
7. Heather Chandler, *The Game Production Handbook,* Charles River Media, 2006. (QA76.76.C672 C446 2006)
8. Erik Bethke, *Game Development and Production*, WordWare Publishing Inc, 2003. (QA76.76.C672 B47 2003)
9. David Michael, *The Indie Game Development Survival Guide*, Charles River Media, 2003. (QA76.76.C672 M53 2003)
10. Ernest Pazera, *Focus on SDL*, Premier Press, 2003. (QA76.575.P39 2003eb)
11. IGDA (www.igda.org)
12. SDL (www.libsdl.org)

SUBJECT DESCRIPTION FORM

Subject Title:	Computer Graphics	**Subject Code:**	COMP407
Number of Credits:	3	**Hours Assigned:**	Lecture 42 hours Laboratory 7 hours

Pre-requisite: Data Structures and Algorithms (COMP305) **Co-requisite:** nil **Exclusion:** nil

Objectives:

This subject allows students to:
learn basic and fundamental computer graphics techniques;
learn image synthesis techniques;
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:

1. Hill, F.S. Jr., *Computer Graphics Using Open GL*, 2nd ed., Prentice-Hall, 2001.

Reference Books:

1. Angel, E.S., *Interactive Computer Graphics, A top-down approach with OpenGL*, 2nd ed., Addison-Wesley, 2000.
2. Angel, E.S., *OpenGL: A Primer*, Addison-Wesley, 2000.
3. Watt, A., *3D Computer Graphics*, 3rd ed., Addison-Wesley, 2000.
4. Hearn, D. and Baker, M., *Computer Graphics*, 2nd ed., Prentice-Hall, 1994.

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 Object-Oriented Design and Programming (EIE320) **Co-requisite:** nil

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:

1. W. Emmerich, *Engineering Distributed Objects*, Wiley, 2000.

Reference Books:

1. F. Bolton, *Pure CORBA*, Sams, 2002.
2. R. Orfali, D. Harkey and J. Edwards, *Client/Server Survival Guide*, 3rd ed., Wiley, 1999.
3. IEEE Distributed Systems Online, http://dsonline.computer.org.
4. Articles from journals, magazines, and conference proceedings, including ACM TOCS, IEEE TPDS, IEEE TSE, IEEE TOC, CACM, IEEE Computer, ICDE, DOA.

SUBJECT DESCRIPTION FORM

Subject Title:	Mobile Computing	**Subject Code:**	COMP437
Number of Credits:	3	**Hours Assigned:**	Lecture 42 hours Tutorial/Laboratory 7 hours

Pre-requisite: Foundations of Database Systems (COMP311) or Object-Oriented Design and Programming (EIE320) and Computer Networking and Internet Technologies (EIE323) or Data and Computer Communications (EIE333) or Computer Networks (EIE342)

Co-requisite: nil

Exclusion: nil

Objectives:

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

Student Learning Outcomes:

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

7. analyze requirements and solve problems using systematic planning and development approaches;
8. search for and read critically the information required in solving problems;
9. write and present technical survey papers in well-organized and logical manner;
10. work in teams and collaborate with classmates.

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 cellar 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)

Method of Assessment

Continuous Assessment: 55% Examination: 45%

Textbook:

1. Martyn Mallick, *Mobile and Wireless Design Essentials*, Wiley Publishing, 2003.

Reference Books:

1. H.M. Deitel, P.J. Deitel, T.R. Nieto and K. Steinbuhler, *Wireless Internet & Mobile Business – How to Program*, Prentice-Hall, 2002.
2. J. Schiller, *Mobile Communications*, 2nd ed., Pearson Education, 2003.
3. D.P. Agrawal and Q.-A. Zeng, *Introduction to Wireless and Mobile Systems*, Brooks/Cole, Thomson Learning, 2003.
4. J. Burkhardt, H. Henn, S. Hepper, K. Rindtorff and T. Schaeck, *Pervasive Computing: Technology and Architecture of Mobile Internet Applications*, Addison-Wesley, 2002.
5. Evaggelia Pitoura and George Samaras, *Data Management for Mobile Computing*, Kluwer Academic Publishers, 1998.

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 team work and presentation skills.
6. Appreciate the improtantce 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 preactical desgins.
7. Develop a fuller understanding of scoial and community issues related to the application of virtual reality systems form 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:

1. Grigore C. Burdea and Philippe Coiffet, *Virtual Reality Technology*, 2nd ed., Wiley Interscience, 2003.
2. John Vince, *Introduction in Virtual Reality*, Springer, 2004.
3. John Vince, *Virtual Reality Systems*, 1st ed., Addison-Wesley, 1995.

Reference Books:

1. IEEE Proceedings in the 2nd *International Workshop on Haptic, Audio and Visual Environments and their Applications – HAVE 2003*, Ottawa, Canada, 2003.
2. IEEE Proceedings in 2003 *IEEE International Symposium on Virtual Environments, Human-Computer Interfaces and Measurement Systems*, Lugano, Switzerland, 2003.
3. R Earnshaw, R Guedj, A Dam, and J Vince (Eds), *Frontiers of Human-Centred Computing, Online Communities and Virtual Environments*, Springer, 2001.
4. John Vince, *Essential Reality Fast*, Springer, 1998.
5. M.L. McLaughlin, J.P. Hespanha, and G.S.(Eds.), *Touch in Virtual Environments*, IMSC, 2002.
6. Stephen N. Matsuba and Bernie Roehl, *Using VRML*, QUE, 1996.
7. Richard Brice, *Multimedia and Virtual Reality Engineering*, Newnes, 1997.
8. MEDIA LAB at MIT, http://www.media.mit.edu/.
9. Electronic Visualization Laboratory at the University of Illinois in Chicago, http://www.evl.uic.edu/EVL/index.html.
10. Augmented Reality Links http://www.se.rit.edu/~jrv/research/ar/index.html.
11. Virtualized Reality at CMU http://www.cs.cmu.edu/~VirtualizedR/.
12. Augmented Reality & Computer Augmented Environments http://www.csl.sony.co.jp/project/ar/ref.html.
13. Virtual Reality, Augmented Reality, Tele-robotics, http://gypsy.rose.utoronto.ca/bookmarks.html#vr.
14. Virtual Reality in Medicine, http://www.psicologia.net/pages/links.htm.
15. WorldToolKit by Sense8, http://www.sense8.com/index.html.
16. Visualization and Virtual Reality for manufacturing http://ovrt.nist.org/.

SUBJECT DESCRIPTION FORM

Subject Title: Computer Architecture and Systems **Subject Code:** EIE414

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

Pre-requisite: Computer System Fundamentals (EIE311) **Co-requisite:** nil **Exclusion:** nil

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Objectives:

To provide students with
1. concepts and design techniques of high performance computer architectures and
2. techniques to analyse performance in time domain.

Student Learning Outcomes:

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

Category A: Professional/academic knowledge and skills
1. Appreciate the techniques deployed in the design of modern high performance computers.
2. Develop analytical ability in the concurrency domain.
3. Identify and resolve problems arising from concurrent hardware functional units.
4. Identify and resolve problems arising from the concurrent execution of cooperating software structures.
5. Critically evaluate the performance of computers and real-time embedded systems.

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. Taxonomy of Computer Architectures
   - 1.1 Revision on the classifications of computer architectures: ISA and HAS, Von Neumann, RISC and CISC.
   - 1.2 Performance issues, examples of evaluation using simulators.
2. Memory System
   - 2.1 Memory system hierarchy: locality principles; cache organizations, replacement policies and write policies; virtual memory, disk latencies and thrashing.
   - 2.2 Memory management: Logical and physical space; address translation, protection and sharing; paging and segmentation; replacement policies.
3. Pipelined Processors
   - 3.1 Pipelined ILP organization: classifications, instruction pipeline, arithmetic pipelines and pre-fetch buffers.
   - 3.2 Dependencies: data dependencies, control dependencies and resource dependencies.
4. Superscalar Processors
   - 4.1 Concurrent instruction execution: decode, issue and dispatch stages; pre-decoding; out-of-order issue and dispatch; operand availability; shelving; register renaming.
   - 4.2 Speculative execution: preserving processor consistency; the reorder buffer.
   - 4.3 Branch processing: detection, speculation and recovery schemes.
5. Concurrent Real-Time Systems
   - 5.1 Mutual exclusion and process synchronization.
   - 5.2 RTOS: Tasks and scheduling; inter-task communication methods; events; memory management user-ISR;
   - 5.3 RTOS services: Case study e.g. uC/OSII.

6. Application-Oriented Processors for Advanced Embedded Systems
   6.1 High performance embedded processors e.g. ARM
   6.2 Embedded DSP and media processors e.g. TMS 320Cxxxx & Nexperia
7. Multiprocessor Systems
   7.1 Cache coherence and memory consistency.
   7.2 Multiprocessor bus; Case study e.g. PCI.

Laboratory Experiments:

1. Superscalar simulation tool.
2. Tracing the operation of superscalar CPU by simulation.
3. Multitasking under a RTOS.
4. Handling user's hardware interrupts under a RTOS.

Method of Assessment:

Continuous Assessment: 40% Examination: 60%

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

Reference Books:

1. D. Sima, T. Fountain and P Kasuk, *Advanced Computer Architectures*, Addison-Wesley, 1997.
2. J.L. Hennessy and D.A. Patterson, *Computer Architecture - A Quantitative Approach*, Morgan Kaufmann, 1996.
3. A. Siberschatz and P. Galvin, *Operating System Concepts*, 5th ed., Addison-Wesley, 1999.
4. John Paul Shen and Mikke H. Lipasti, *Modern Processor Design – Fundamentals of Superscalar Processors,* McGraw-Hill, 2004.

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 Object Oriented Design and Programming (EIE320) **Co-requisite:** nil **Exclusion:** nil

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

4. SOAP
5. WSDL
6. UDDI

Method of Assessment:

Coursework: 40% Examination: 60%

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

Textbooks:

1. M.L. Liu, *Distributed Computing: Principles and Applications*, Addison-Wesley, 2003.
2. C. Ethans, *Web Services Essential,* O. Reilly, 2002.

Reference Books:

1. R. Nagappan, *Developing Java Web services : Architecting and Developing Secure Web services using Java*, Wiley Pub., 2003.
2. U. Wahli, G.G. Ochoa, S.Cocasse, and M.Muetschard*, Websphere Version 5.1 Application Developer 5.1.1 Web Services Handbook*, IBM, 2nd ed., 2004.
3. P. Pacheco, *Parallel Programming with MPI*, Morgan Kaufmann, 1998.
4. S. Graham, etal*, Building Web Services with Java*, Sams, 2nd ed., 2004.

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
   Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Avoiding Repeated States, Searching with Partial Information, Informed (Heuristic) Search Strategies, Heuristic Functions, Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Online Search Agents and Unknown Environments.

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
   Forms of Learning, Inductive Learning, Learning Decision Trees, Computational Learning Theory, Machine Learning Techniques for Intelligent Information Processing and Data Mining.

7. Computer Vision
   Imaging and Representation, Image Preprocessing, Extracting 3-D Information, Object Recognition, Using Vision for Manipulation and Navigation, Concepts of Virtual Reality, Applications.

8. Robotics
   Robot Hardware, Robotic Perception, Planning to Move, Planning Uncertain Movements, Robotic Software Architectures, Entertainment Robots, Engineering Applications.

9. Culture and Society Impacts
   Understanding Intelligence: Issues and Directions, the Ethics and Risks of Developing Artificial Intelligence.

Method of Assessment:

Coursework: 45% Examination: 55%

Recommended Textbooks:

1. S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 2nd ed., Prentice-Hall, 2003.
2. L.G. Shapiro and G. Stockman, *Computer Vision*, Prentice-Hall, 2001.

Reference Books:

1. G.F. Luger and W.A. Stubbefield, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, 4th ed., Addison-Wesley Longman, 2002.
2. P.H. Winston, *Artificial Intelligence*, 3rd ed., Addison-Wesley, 1993.
3. T. Dean, J. Allen and Y. Aloimonos*, Artificial Intelligence: Theory and Practice,* Addison-Wesley Publishing, 1995.

SUBJECT DESCRIPTION FORM

Subject Title: Multimedia Communications **Subject Code:** EIE428

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

Pre-requisite: Data and Computer Communications (EIE333) or Computer Networks (EIE342) **Co-requisite:** nil **Exclusion:** nil

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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:

1. K.R. Rao, Z.S. Bojkovic and D.A. Milovanovic*, Multimedia Communication Systems: Techniques, Standards, and Networks,* Prentice-Hall PTR, 2002.
2. F. Halsall, *Multimedia Communications: Applications, Networks, Protocols, and Standards*, Addison-Wesley, 2001.
3. Jon Crowcroft, Mark Handley and Ian Wakeman, *Internetworking Multimedia*, Morgan Kaufmann, 1999.
4. J. K. Kurose, *Computer Networking: A Top-down Approach Featuring the Internet*, 2nd ed., Addison-Wesley, 2003.
5. S. Vegesna, *IP Quality of Service*, Prentice-Hall PTR, 2001.
6. Colin Perkins, *RTP: Audio and Video for the Internet*, Addison-Wesley, 2003.
7. A. Dashti, S.H. Kim, C. Shahabi and R. Zimmermann, *Streaming Media Server Design*, Prentice-Hall PTR, 2002.
8. U. Black, *Voice Over IP*, 2/E, Prentice-Hall PTR, 2002.

SUBJECT DESCRIPTION FORM

Subject Title:	Corporate Networking	**Subject Code:**	EIE429
Number of Credits:	3	**Hours Assigned:**	Lecture/tutorial 39 hours Laboratory 3 hours (Equivalent to 9 laboratory hours)

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

Exclusion: Corporate Communication Networks (EIE439)

Objectives:

Telecommunication and computer networking technologies have been advancing rapidly in recent years. New technologies have been developed, and new economic orders have been built. Against this background, this subject is designed to:

1. Give a practical treatment on the design, implementation and management of multinational corporate networks.
2. Introduce the variety of facilities, technologies and communication systems to meet future needs of network services.
3. Discuss in details network planning, management, marketing, performance and security issues.
4. Evaluate critically the performance of existing and emerging global communication networking technologies and their impact on enterprise and world economy.

Student Learning Outcomes:

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
   Cryptography, firewall, IP Security, Virtual Private Network (VPN).
4. Traffic Theory and Marketing
   Teletraffic theory, tariff and cost analysis, deregulations.

Laboratory Experiments:

1. Voice over IP experiment and softswitch.
2. Virtual Private Network and IP Security.
3. LAN switching management.

Method of Assessment:

Continuous Assessment: 50% Examination: 50%

Textbook:

1. V. Theoharakis, *Enterprise Networking: Multilayer Switching and Applications*, Idea Group Pub., 2002.

Reference Books:

1. Thomas J. Housel, *Global Telecommunications Revolution: The Business Perspective*, McGraw-Hill/Irwin, 2001.
2. R.R. Panko, *Corporate Computer and Network Security,* Prentice-Hall, 2004.
3. D. Cameron, *Global Network Security: Threats and Countermeasures*, Computer Technology Research Corp., 2000.
4. *Handbook of Telecommunications Economics*, Amsterdam; Boston, Mass. : Elsevier, 2002.
5. M. Mueller, *Telecom Policy and Digital Convergence,* City University of Hong Kong Press, 1997.
6. *Global Networks, Linked Cities*, Routledge, 2002.
7. Jean-Jacques, *Competition in Telecommunications*, MIT Press, 2000.
8. D. Minoli, *Enterprise Networking: Fractional T1 to SONET, Frame Relay to BISDN*, Artech House, 1993.

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 35 hours Laboratory 7 hours (Equivalent to 21 laboratory hours)

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

Objectives:

This subject provides a fundamental knowledge both in principles and practices on digital video production, and an in-depth knowledge of some important topics in digital video broadcasting. After the completion of the subject, the student should be able

1. to work on small scale video productions, and
2. to appreciate a wide range of techniques adopted in the movie and video broadcasting industries.

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. Understand the production process and production techniques for small scale digital video production.
3. Work with digital video equipments in video shooting and video editing.
4. Design simple systems related to video broadcasting.
5. Apply theory to practice by doing projects on creating movies and configuring digital production and broadcasting equipments.
6. Facilitate students for further development in advanced digital video production and broadcasting.

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

Syllabus:

1. Fundamental of Video Production:
   Production process, pre-production, production and post-production.
2. Pre-Production:
   Story and Script writing. Visualization and storyboarding. Production schedule and budgeting.
3. Production:
   Working with camera and lighting. Location sound production.
4. Post-Production:
   Digital video editing. Digital audio editing.
5. Introduction to Digital Video Broadcasting:
   Video broadcasting services in Hong Kong. Introduction to digital video broadcasting. Video broadcasting standards and current development.
6. Video Broadcasting Techniques:
   Analog video broadcasting techniques. Digital video broadcasting: MPEG-2 systems and multiplexing, programme specific information (PSI) and service information (SI), error control in digital video, digital modulation technique and conditional access for digital TV.

7. Implementation Issues on Digital Video Broadcasting:
   Video broadcasting equipments. Consumer products related to DVB: set-top design, dgital video cassette recorder, etc.

Laboratory Experiments:

1. Digital video production project
2. Case study on digital video broadcasting

Method of Assessment:

Continuous Assessment: 60% Examination: 40%

The continuous assessment will consist of one production project, laboratory reports, a number of short quizzes, assignments, the case study and two tests.

Reference Books:

1. U. Reimers, *DVB: The Family of International Standards for Digital Video Broadcasting*, Springer, 2005.
2. Richard Brice, *Newnes Guide to Digital TV*, Newnes, 2003.
3. Gerald Millerson, *Television Production*, Focal Press, 2001

SUBJECT DESCRIPTION FORM

Subject Title:	Web Systems and Technologies	**Subject Code:**	EIE432
Number of Credits:	3	**Hours Assigned:**	Lecture/Tutorial 36 hours Laboratory 6 hours (Equivalent to 18 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).
   - 2.2 Server Side Web Programming: Approaches to server-side programming based on PHP, Java servlet technologies, Active Server pages (ASP) and/or Java Server Pages (JSP). Benefits and limitations of server-side web programming. Development framework for server-side programming based on PHP/servlet/JSP
   - 2.3 Web application development. Development of a web application based on client-side and server-side side programming.
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.
6. Web database Applications.

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:

1. M. Hall, *Core Web Programming*, Prentice, 2003.
2. D.M. Kroenke, *Database Processing Fundamentals, Design and Implementation*, 8/e., Prentice-Hall, 2001.

Reference Books:

1. F.J. Cooper et al., *Implementing Internet Security*, New Riders, 1995.
2. Peter Rossbach and Hendrik Schreiber, *Java Server and Servlets*, Addison-Wesley, 2000.
3. Jason Hunter and William Crawford, *Java Servlet Programming*, 2nd ed., O'Reilly, 2001.
4. Susan Boardman, Melanie Caffrey, Solomon Morse and Benjamin Rosenzweig, *Oracle Web Application Programming for PL/SQL Developers*, Prentice-Hall, 2003.
5. Michael V. Mannino, *Database, Design, Applications Development, & Administration*, 2nd ed., McGraw-Hill, 2004.

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 converion; 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:

1. R.C. Gonzalez and R.E. Woods, *Digital Image Processing*, 2nd ed., Prentice-Hall, 2002.
2. Ken C. Pohlmann, *Principles of Digital Audio*, 4th ed., McGraw-Hill, 2000.

Reference Books:

1. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, Pearson Prentice-Hall, 2004.
2. M. Mandal*, Multimedia Signals and Systems,* Kluwer Academic Publishers, 2003.