

## Subject Description

<u>Subject Title</u>	:	<b>Economics for Engineers (Compulsory)</b>	
<u>Subject Code</u>	:	AF2617	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lecture	28 hours
		Tutorial	14 hours
<u>Pre-requisites</u>	:	Nil	
<u>Exclusion</u>	:	Economics for Engineers	(AF3901)
<u>Credits</u>	:	3	

### Objectives :

To introduce the fundamental concepts of economics/finance/costing and to explain how these will affect the functioning of an engineering company and contribute to decision making in engineering operations.

### Keyword Syllabus :

1. Introduction to Microeconomics
  - 1.1 Scarcity, Choice and Opportunity Cost; Demand, Supply and Price; Profit-maximizing Objective of a Firm; Cost and Output of a Firm; Depreciation and Cost.
2. Engineering Economic Decisions
  - 2.1 Engineering Projects: Strategic Engineering Economic Decisions; Short-term Operational Economic Decisions.
3. Introduction to Macroeconomics
  - 3.1 The Economic Performance of an Economy; Aggregate Demand and National Income Determination; Investment and Savings; Fiscal and Monetary Policies and their Impacts on Aggregate Demand.
4. Time Value of Money and Project Evaluation
  - 4.1 Economic Equivalence and Interest Formulas; Evaluation of Engineering Projects using Methods of Present Value, Annual Worth, and Internal Rate of Return.
5. Capital Budgeting Decision
  - 5.1 Methods of Financing, Cost of Capital, and Evaluation of Investment Alternatives.

### Textbooks :

1. S. Park Chan, *Contemporary Engineering Economics*, 3<sup>rd</sup> ed., Prentice-Hall.
2. M. Parkin, *Economics*, 5<sup>th</sup> ed., Addison Wesley.

### References :

1. William G. Sullivan, James A. Biontadelli and Elin M. Wicks, *Engineering Economy*, 11<sup>th</sup> ed., Pentice-Hall.
2. Gregory Mankiw, *Principles of Microeconomics*, 2<sup>nd</sup> ed., W.W. Norton and Company Inc.

<u>Method of Assessment :</u>	Coursework	50%
	Examination	50%
	Total	100%

<u>Minimum Component Pass Grade :</u>	Coursework	(D)
	Examination	(D)

### Subject Description

<u>Subject Title</u>	:	<b>Mathematics I (Compulsory)</b>	
<u>Subject Code</u>	:	AMA201	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lecture	28 hours
		Tutorial	14 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

#### Objectives :

To introduce the degree students to the fundamentals of engineering mathematics. The emphasis will be on the application of mathematical methods to solving engineering problems.

#### Keyword Syllabus :

Linear algebra: Matrices and determinants, vector spaces, elementary algebra of matrices, eigenvalues and eigenvectors, normalization and orthogonality.

Ordinary differential equations: First and second order linear ordinary differential equations, Laplace transforms, convolution theorem.

Calculus and functions of several variables: Infinite series, power series, Fourier series, partial differentiation, maxima and minima, Lagrange multiplier, Taylor's theorem.

#### Textbooks :

1. H. Anton, *Elementary Linear Algebra*, 8<sup>th</sup> ed., 2000.
2. G.B. Thomas, R.L. Finney, M.D. Weir, and F.R. Giordano, *Thomas' Calculus*, 10<sup>th</sup> ed., 2000.
3. E. Kreyszig, *Advanced Engineering Mathematics*, 8<sup>th</sup> ed., 1999.

<u>Method of Assessment</u> :	Continuous Assessment	30%
	Examination	70%
	Total	100%

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

### Subject Description

<u>Subject Title</u>	:	<b>Mathematics II (Compulsory)</b>	
<u>Subject Code</u>	:	AMA202	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lecture	28 hours
		Tutorial	14 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
<u>Credits</u>	:	3	

#### Objectives :

To introduce the degree students to the fundamentals of engineering mathematics. The emphasis will be on the application of mathematical methods to solving engineering problems.

#### Keyword Syllabus :

Complex variables: Elementary functions, continuity, complex derivatives and Cauchy-Riemann relations, analytic functions, contour integrations, Cauchy's integral theorem and formula, singularities and residues.

Partial differential equations: Formulation of partial differential equations, method of separation of variables, initial and boundary value problems.

Statistics: Probability and random variables, probability distributions, sampling distributions of means, estimation and hypothesis testing, linear regression.

#### Textbooks :

1. E. Kreyszig, *Advanced Engineering Mathematics*, 8<sup>th</sup> ed., 1999.
2. G. James, *Modern Engineering Mathematics*, 3<sup>rd</sup> ed., 2000.

<u>Method of Assessment</u> :	Continuous Assessment	30%
	<u>Examination</u>	70%
	Total	100%

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

## Subject Description

<u>Subject Title</u>	:	<b>College Chinese (Compulsory)</b>	
<u>Subject Code</u>	:	CLC201	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Seminar	42 hours
<u>Pre-requisite</u>	:	Nil	
<u>Credits</u>	:	3	

### Objectives :

After completing the course, students are expected to:

- (i) master the basic writing skills to produce fluent and precise writings for vocational purposes;
- (ii) be able to apply the relevant language and presentation skills for narrative, descriptive and argumentative writings;
- (iii) be able to write various kinds of practical writing in relation to business planning, promotion, administration and management;
- (iv) possess the ability to read and analyse essays of different styles; and
- (v) be able to learn independently.

### Aims :

This course aims at fostering students' competence in written expression including general and practical writings through practice, commentary and discussion.

### Reading Lists :

1. 胡裕樹主編《大學寫作》，復旦大學出版社，1985。
2. 史文周主編《寫作概論》，陝西師範大學出版社，1991。
3. 劉孟宇，諸孝正主編《寫作大要》，廣州中山大學出版社，1986。
4. 戈弋，劉文義主編《漢語及寫作》，北京語言學院，1987。
5. 張會恩、曾祥芹主編《文章學教程》，上海教育出版社，1995。
6. 張繼緬《寫作技法八講》，中國青年出版社，1986。
7. 陳耀南《書面中文的本質與應用》，香港大學出版社，1991。
8. 陳鍾梁、張振華《說明文寫作指導》，上海教育出版社，1993。
9. 孫元魁、孟慶忠編著《議論文研究與鑒賞》，山東教育出版社，1992。
10. 上海文藝出版社編《中國現代散文》，上下冊，1980。
11. 于成鯤等《現代應用文》，復旦大學出版社，1996。
12. 李欣主編《公務文書寫作概述》，高等教育出版社，1996。
13. 刊授大學《中國實用文體大全》，上海文化出版社，1984。
14. 陳少棠《銀行應用文》，香港三聯書店，1997。
15. 張仁青《應用文》，文史哲出版社，1994。
16. 馮式《現代應用文手冊》，中流出版社，1995。
17. 現代應用文編寫組《現代應用文》，星洲日報、天地圖書有限公司、萬里機構出版有限公司聯合出版，1989。
18. 法定語文事務署《政府公文寫作手冊》，1996。
19. 周錫靚《中文應用寫作教程》，香港三聯書店，1996。

20. 姚里軍《新聞寫作：藝術與技巧》，北京中國廣播電視出版社，1994。
21. 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。
22. 香港管理專業協會編《最新國內商業信札》第二版，香港勤 + 緣出版社，1994。
23. 褚高德譯、黎瑞文校《新聞寫作教程》，北京新華出版社，1986。

<u>Method of Assessment</u> :	Coursework	60%
	<u>Term-end Test</u>	<u>40%</u>
	Total	100%

Attendance :

If attendance of the subject falls below 70%, only 80% of the total mark would be counted towards the final grade.

## Subject Description

<u>Subject Title</u>	:	<b>Elementary Putonghua (Compulsory)</b>
<u>Subject Code</u>	:	CLC211
<u>Level of Study</u>	:	2
<u>Hours Assigned</u>	:	Seminar 42 hours
<u>Pre-requisite</u>	:	Nil
<u>Credits</u>	:	3

### Objectives :

Students are expected to :

- (i) have relevant knowledge in spoken Modern Standard Chinese;
- (ii) be sensitive to major differences between Cantonese and Putonghua;
- (iii) be familiar with the Pinyin system of Mandarin phoneticization;
- (iv) be capable of understanding and expressing themselves in Putonghua for essential daily communication purposes.

### Aims :

This subject aims to acquaint students with basic communication skills in Putonghua.

### Textbook :

1. 香港理工大學中文及雙語學系“通用普通話教程”編寫組編《通用普通話教程》第一、二冊，香港：星河教育出版社，1997。

### Reference :

1. 中國社會科學院語言研究所詞典編輯室編《現代漢語詞典》〔修訂本〕，北京：商務印書館，1996。

### Method of Assessment :

Coursework	60%
Term-end Test	40%
Total	100%

### Attendance :

If attendance of the subject falls below 70%, only 80% of the total mark would be counted towards the final grade.

## Subject Description

<u>Subject Title</u>	:	<b>Logic Design (Compulsory)</b>	
<u>Subject Code</u>	:	EIE211	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

### Objectives :

To provide students with a broad view in both hardware and software aspects of digital systems in general and microprocessor systems in particular, and enable them to gain understanding and skills that will be used in later computer related courses. Emphasis will be placed on topics such as

- (i) Common binary logic components found in a microcomputer system
- (ii) Use and applications of programmable logic devices
- (iii) Structure and organization of microprocessors
- (iv) Basic assembly language programming techniques.

### Keyword Syllabus :

Logic Circuit and ICs  
Memory and Programmable Logic Devices  
Microprocessor  
Assembly Language Programming

### References :

1. M.M. Mano and C.R. Kime, *Logic and Computer Design Fundamentals*, 2<sup>nd</sup> ed., Upper Saddle River, NJ: Prentice-Hall, 2000.
2. N.P. Cook, *Digital Electronics with PLD Integration*, Upper Saddle River, NJ: Prentice-Hall, 2001.
3. T.L. Flody, *Digital Fundamentals with VHDL*, Upper Saddle River, NJ: Prentice-Hall, 2003.
4. B.B. Brey, *The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4*, Upper Saddle River, NJ: Prentice-Hall, 2003.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	<u>60%</u>
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Computer Programming and Basic Software Engineering (Compulsory)</b>
<u>Subject Code</u>	:	ENG221
<u>Level of Study</u>	:	2
<u>Hours Assigned</u>	:	Lecture/Tutorial/Laboratory                      42 hours
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	3

### Objectives :

- (i) To introduce the fundamentals of computer systems and programming languages
- (ii) To equip the students with sound skills in C/C++ languages
- (iii) To equip the students with techniques for writing structured and documented computer programs
- (iv) To familiarize the students with the basic concepts in software engineering

### Philosophy :

The language C/C++ has been selected as the basis for this course as its well defined structure is considered well suited for teaching programming techniques to engineering students. Individual features of the language will be introduced with extensive examples. Program design approaches and techniques will also be discussed extensively in the subject. Problem-based learning approach will be used in teaching the software engineering part of this subject. The students will be expected to spend more than 50% of the assigned time on programming assignments in the tutorial/terminal room.

### Keyword Syllabus :

Introduction to computers and programming. Bolts and nuts of C/C++: operators, variables, expression and statements. Program flow control. Handling programming errors. Object oriented programming: classes and objects, encapsulation, inheritance and polymorphism. Pointer, reference and array. Linked list. Stream I/O: standard I/O, file I/O. Elementary software engineering: software development process, requirement engineering.

### Textbooks :

1. H.M. Deitel and P.J. Deitel, *C++ How To Program*, 2<sup>nd</sup> ed., Prentice-Hall, 1998.
2. J., Liberty, *Teach Yourself C++ in 21 Days*, 3<sup>rd</sup> ed., SAMS, 1999.

<u>Method of Assessment</u> :	Coursework	100%
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## Subject Description

<u>Subject Title</u>	:	<b>Information Technology (Compulsory)</b>
<u>Subject Code</u>	:	ENG224
<u>Level of Study</u>	:	2
<u>Hours Assigned</u>	:	Lecture/Tutorial                      33 hours Laboratory                                      18 hours
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	3

### Objectives :

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

### Philosophy :

The design of this subject emphasizes both the theoretical and practical training. We believe that while it is important to provide the foundation to allow our students to understand the theory behind the modern information technology, it is equally important to let our students to equip with practical skills to related information technology to enhance the work in their own discipline. After satisfactorily completing the subject, the students are expected to have not only the concept of the technologies concerned but also the ability of practically applying such technologies.

### Keyword Syllabus :

Evolution and applications of computers. Major hardware components of computers: Microprocessor, Memory and I/O. Operating system case study: Linux. Internet and Internet services. Internet programming. Introduction to computer networking. Networking models. Network protocols: Ethernet, TCP/IP. Networking devices. Database systems. Relational database concept. Structured Query Language (SQL). Introduction to Information systems. Structured tool for system analysis and design. Workflow management.

### References :

1. P. Norton, *Introduction to Computers*, 3<sup>rd</sup> ed., McGraw-Hill, 1999.
2. S.M. Sarwar, *Linux, the textbook*, 1<sup>st</sup> 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*, 5<sup>th</sup> ed., Addison-Wesley, 2000.
6. K.C. Laudon and J.P. Laudon, *Management Information Systems*, 6<sup>th</sup> ed., Prentice-Hall, 2000.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

## Subject Description

<u>Subject Title</u>	:	<b>Society and the Engineer (Compulsory)</b>	
<u>Subject Code</u>	:	ENG226	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lecture	30 hours
		Tutorial	12 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

### Objectives :

To enable the students to

- (i) appreciate the historical context of modern technology and the nature of the process whereby technology develops.
- (ii) understand the social, political, economic responsibility and accountability of a profession in engineering and the organizational activities of professional engineering institutions.
- (iii) appreciate the relationship between technology and environment and the implied social costs and benefits.
- (iv) be aware of the short-term and long-term effects on the use of technology relating to safety, health and welfare aspects.
- (v) observe the professional conduct, the legal and moral constraints relating to various engineering aspects.

### Keyword Syllabus :

Trend and transfer of technology. Impact of technology on society. Research and development. Innovation and creativity. Quality assurance and product life-cycle.

Environmental protection and related issues. Role of the engineer in energy conservation, ecological balance and sustainable development.

The outlook of Hong Kong's industry, its supporting organizations and impact on development from the China Markets.

Industrial health and safety including the work of the Labour Department and the Occupational Health and Safety Council. Industrial legislation.

The Professional Institutions: both local and overseas. Local and overseas education systems; training of engineers.

Professional ethics, bribery and corruption including the work of the ICAC. Social responsibilities of engineers.

Intellectual property right such as patents and copyright protection. The work of the Intellectual Property Department. Contract law for engineers.

<u>Method of Assessment</u> :	Coursework	45%
	Examination	55%
	Total	100%

## Subject Description

<u>Subject Title</u>	:	<b>Basic Electrical Circuits (Compulsory)</b>
<u>Subject Code</u>	:	ENG231
<u>Level of Study</u>	:	2
<u>Hours Assigned</u>	:	Lecture/Tutorial                      42 hours Laboratory                                      9 hours
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	3

### Objectives :

- (i) Introduce the fundamental concepts of electrical circuits through a balanced, coherent and modern approach.
- (ii) Develop critical and creative approach for solving circuit problems.
- (iii) Acquire the skills and knowledge required for independent learning.
- (iv) Provide sufficient practical demonstrations applicable to all engineering students.
- (v) Appreciate the role of simulation software such as Pspice and/or Electronic Workbench for solving circuit problems.

### Keyword Syllabus :

Circuit components, DC circuits, Kirchhoff voltage and current laws, Circuit theorems, AC circuits, Phasors, Power in AC, Steady-state response, Frequency domain analysis, Fourier series, Filters, Three phase circuits, Transient response, First- and second-order systems.

### Textbook :

1. G. Rizzoni, *Principles and Applications of Electrical Engineering*, McGraw-Hill Higher Education, 2003.

### References :

1. R. A. DeCarlo and P. M. Lin, *Linear Circuit Analysis*, Oxford University Press, 2<sup>nd</sup> ed., 2001.
2. A. H. Robbins and W. C. Miller, *Circuit Analysis: Theory and Practice*, Thomson Learning, 2<sup>nd</sup> ed., 2000.
3. J. David Irwin, *Basic Engineering Circuit Analysis*, MacMillan Publishing Company, 4<sup>th</sup> ed., 1993.
4. E. Hughes, *Electrical Technology*, Addison Wesley Longman Limited, 1997.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

## Subject Description

<u>Subject Title</u>	:	<b>Engineering Science (Compulsory)</b>	
<u>Subject Code</u>	:	ENG232	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lecture	36 hours
		Tutorial	6 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

### Objectives :

To enable students to establish a broad knowledge base on the atomic structure and properties of materials and a few important engineering problems, such as energy, energy use and environmental issues.

### References :

1. W. Bolton, *2001 Engineering Science*, 4<sup>th</sup> ed., Newnes, Oxford.
2. W.D. Callister, Jr, *2001 Material Science and Engineering - an Introduction*, 5<sup>th</sup> ed., Wiley.
3. G. Rogers & Y. Mayhew, *1992 Engineering Thermodynamics, Work & Heat Transfer*, 4<sup>th</sup> ed., John Wiley & Sons, New York.
4. Marquita K. Hill, *1997 Understanding Environmental Pollution*, Cambridge University Press.
5. J. Glynn Henry & G. W. Heinke, *1996 Environmental Science and Engineering*, 2<sup>nd</sup> ed., Prentice-Hall, New Jersey.

<u>Method of Assessment :</u>	Coursework	40%
	Examination	60%
	Total	100%

Coursework may include assignments and short tests.

## Subject Description

<u>Subject Title</u>	:	<b>Basic Electronics (Compulsory)</b>
<u>Subject Code</u>	:	ENG234
<u>Level of Study</u>	:	2
<u>Hours Assigned</u>	:	Lecture/Tutorial                      42 hours Laboratory                                      9 hours
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	3

### Objectives :

To familiarize students with

- (i) common electronic devices and their characteristics;
- (ii) the operating principle of simple BJT and FET amplifiers;
- (iii) DC biasing of BJT and FET circuits;
- (iv) small-signal analysis;
- (v) high frequency response of BJT and FET amplifier circuits;
- (vi) combinational logic circuit design.

### Keyword Syllabus :

Diode circuit analysis; load line concept; diode rectifier circuits; amplifier fundamentals; ideal operational amplifier; DC biasing and large signal model of BJT transistor circuits; small signal model of BJTs and FETs; BJT and FET small signal amplifier circuits; transfer function; poles and zeros; high frequency response; Bode plots; number system; logic functions; Boolean algebra; Karnaugh map; combinational logic circuits.

### Textbook :

1. Giorgio Rizzoni, *Principles and Applications of Electrical Engineering*, Boston, McGraw-Hill, 4<sup>th</sup> ed., 2002.

### References :

1. Donald A. Neamen, *Electronic Circuit Analysis and Design*, Boston, McGraw-Hill, 2<sup>nd</sup> ed., 2002.
2. R.W. Goody, *PSPICE for Windows - A Circuit Simulation Primer*, Englewood Cliff: Prentice-Hall, 1995.

### Method of Assessment :

Coursework	40%
Examination	60%
Total	100%

## Subject Description

<u>Subject Title</u>	:	<b>Manufacturing Technology (Elective) – Add on 11 Nov. 2003</b>	
<u>Subject Code</u>	:	ENG235	
<u>Level of Study</u>	:	2	
<u>Hours Assigned</u>	:	Lectures – 2 hours / week for 14 weeks	28 hours
		Tutorial – 1.5 hours / week for 8 weeks	12 hours
		Tests – 1 hour x 2 weeks	2 hours
<u>Case Studies</u>	:	3 hours / week for 2 weeks	6 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

### Objectives :

This subject provides students with a basic understanding of the:

- (i) Relationship between material properties and manufacturing processes so that they are able to select those that are appropriate taking into consideration green design and environmental issues.
- (ii) Procedures that are currently used for planning and controlling production, recognising demand, capacity, cost, and quality considerations.
- (iii) Causes of variability in production processes and the methods by which it is measured, and controlled to meet specifications of products.

### Teaching and Learning Approach

This subject will be taught through a case-based approach. Students will be presented with a number of typical products that they can directly relate to. The methodology by which they are designed and produced will be developed taking into consideration selection of materials, the types and sequence of manufacturing processes, and the determination of the type of production system that is most appropriate, planning and controlling of production ensuring that cost, delivery, and quality issues are addressed. This will be done both by a selection of case studies where lectures will be given to deliver that basic knowledge appropriate to the case concerned, and by giving case studies through assignments.

### References :

1. *Material Science and Engineering – An Introduction*, 6<sup>th</sup> ed., by William D. Callister, Jr. John Wiley & Sons, Inc., 2003.
2. *Manufacturing with Materials*, by Open University, Butterworths, 1<sup>st</sup> ed., 1990.
3. *Processes and Design for Manufacture*, by Sherif D. El Wakil, PWS Publishing Company, 1998.
4. *The materials selector on CD-ROM [interactive multimedia]*, Edited by Norman A. Waterman and Michael F. Ashby, Chapman & Hall, 1999.
5. *Factory Physics*, by Wallace J. Hopp and Mark L. Spearman, McGraw Hill International, and edition, 2001

Method of Assessment : Coursework 100%

Comprised of assignments, two progress tests (one at mid-semester and one at the end of the semester), and a mini-project.

## Subject Description

<u>Subject Title</u>	:	<b>English for Academic Purposes (Compulsory)</b>
<u>Subject Code</u>	:	ELC205
<u>Level of Study</u>	:	2
<u>Hours Assigned</u>	:	Seminars 42 hours
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	3

### 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 within a framework of academic contexts.

In working towards the achievement of the two interrelated objectives, attention will be given to helping students develop the core competencies identified by the University as vital to the development of effective life-long learning strategies and skills.

### Subject Description :

The subject is designed to enable students to use English effectively in the academic contexts they will encounter in their studies. The main emphasis is on improving students' confidence and competence in using English in these contexts. As far as possible, the subject will address the specific language needs of students' ability levels and subject specialisms.

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 tape recordings, relevant Web-based materials/activities and our Centre for Independent Language Learning. Students in need of additional help will be required to attend a supplementary English programme organised by the English Language Centre.

### Teaching and Learning Materials :

Material specially prepared by English Language Centre staff will be used throughout the course. In addition, teachers will recommend additional reference materials as required.

### 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.

To work towards the accomplishment of its objectives, the syllabus is specified under a single heading consisting of four interrelated strands.

#### **English language development in academic contexts**

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:** identifying and writing functions common in written academic discourse; note-taking from reading and listening inputs; understanding and applying principles of academic text structure; developing paraphrasing, summarising and referencing skills; improving editing and proofreading skills; achieving appropriate tone and style in academic writing.
3. **Reading and listening in academic contexts:** understanding the content and structure of information delivered both orally and in print form; 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.

References :

1. **Spoken Academic Communication**
  - a. Antony Jay and Ros Jay, *Effective Presentations*, London: Prentice-Hall, 2000.
  - b. Carolyn G. Madden and Theresa N. Rohlck, *Discussion and Interaction in the Academic Community*, University of Michigan Press, Ann Arbor, MI, 1997.
2. **Written Academic Communication**
  - a. Harold Gelfand, *Mastering APA Style: Student's Workbook and Training Guide*, American Psychological Association, 2001.
  - b. Ilona Leki, *Academic Writing: Exploring Processes and Strategies*, Cambridge: Cambridge University Press, 1998.
3. **Reading and Listening in Academic Contexts**
  - a. Susan Lebauer, *Learn to Listen, Listen to Learn: Academic Listening and Note-taking*, New York: Pearson ESL, 1999.
  - b. Mary Waters and Alan Waters, *Study Tasks in English*, Cambridge: Cambridge University Press, 1995.
4. **Language Development**
  - a. Ronald Carter, Rebecca Hughes, and Michael McCarthy, *Exploring Grammar in Context: Upper-intermediate and Advanced*, Cambridge: Cambridge University Press, 2000.
  - b. *Collins COBUILD English Dictionary for Advanced Learners*, Glasgow: Collins, 2001.
  - c. Michael McCarthy and Felicity O'Dell, *English Vocabulary in Use: Upper-intermediate*, Cambridge: Cambridge University Press, 2001.

Method of Assessment : Coursework 100%

## Subject Description

<u>Subject Title</u>	:	<b>Industrial Centre Training I (Compulsory)</b>		
<u>Subject Code</u>	:	IC272		
<u>Level of Study</u>	:	2		
<u>Hours Assigned</u>	:	(i)	Technology Training	30 hours/week for 7 weeks
		(ii)	Engineering Drawing & Computer Graphics	46 hours
		(iii)	Industrial Safety	15 hours
<u>Pre-requisites</u>	:	The Hong Kong Polytechnic University entrance requirements for the Degree Programme in Electronic and Information Engineering		
<u>Training Credits</u>	:	9		

### Objectives :

- (i) The integrated training provided by The Hong Kong Polytechnic University Industrial Centre is intended to equip students with practical skills, techniques and technologies which are general and essential in the practice of electronic and information engineering. The integrated training also provides training in computer software. On completion of the training, student should acquire fundamental skills in computer graphics and animations, Web authoring and Internet search, database and spreadsheets, basic scientific computing and general computer and network skills.
- (ii) Engineering Graphics provides an opportunity for student to learn and use technical graphics as a media to communicate, express creative ideas and describe objects. The emphasis is on practicing the principle and interpretation of technical drawing and to communicate design idea using simple sketch and industrial strength computing solution in technical graphics. In addition to technical graphics, students shall familiar with the application of electronic design automation (EDA) environment to create and design electronic circuit boards from sketch.
- (iii) Industrial safety provides students with an understanding of industrial hazards and their control.

### Keyword Syllabus :

Computer software for scientific computing, data processing, presentation, multimedia contents creation, web site creation, computer networking, client-server computing practise; practical electronics; automation and robotics; embedded controller programming, engineering drawing; computer modeling; electronic design automation; industrial safety.

### Method of Assessment :

Please refer to the section on "Assessment of Training"

### Subject Description

<u>Subject Title</u>	:	<b>Computational Methods (Compulsory)</b>	
<u>Subject Code</u>	:	AMA301	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture	28 hours
		Tutorial	14 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
<u>Credits</u>	:	3	

#### Objectives :

The objective of this subject is to provide the student with a firm foundation in mathematical methods for finding numerical approximations to practical problems. Computer implementation of algorithms by students is emphasized.

#### Keyword Syllabus :

Error propagation; linear systems, direct methods and iterative methods; finite difference and interpolation, Lagrange interpolating polynomial, Aitken's interpolating formula; least-squares regression; numerical differentiation and integration, composite rules, Gauss quadrature; roots of nonlinear equation, two-point methods, fixed point iterations; numerical solution of ordinary differential equation, Predictor-corrector method, Runge-Kutta method; unconstrained nonlinear optimization, one-dimensional and multi-dimensional search methods, gradient method.

Computer software, such as Matlab, will be used to solve practical engineering problems. Analysis of errors in the numerical algorithms rather than the derivation of techniques will be emphasized.

#### Textbooks :

1. S.C. Chapra and R.P. Canale, *Numerical Methods for Engineers: with Programming and Software Applications*, 4<sup>th</sup> ed., McGraw-Hill, 2002.
2. G. Recktenwald, *Numerical Methods with Matlab Implementation and Applications*, Prentice-Hall, 2000.
3. C.F. Gerald, *Applied Numerical Analysis*, 6<sup>th</sup> ed., Addison-Wesley, 1999.

<u>Method of Assessment</u> :	Continuous Assessment	45%
	<u>Examination</u>	<u>55%</u>
	Total	100%

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

### Subject Description

<u>Subject Title</u>	:	<b>Advanced Engineering Mathematics (Compulsory)</b>	
<u>Subject Code</u>	:	EIE300	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorials	42 hours
<u>Pre-requisites</u>	:	Mathematics II	(AMA202)
<u>Credits</u>	:	3	

#### Objectives :

The syllabus aims to introduce

- (i) Vector calculus;
- (ii) Special functions and function-space;
- (iii) Stochastic processes and random signals.

At the completion of the subject, the student is introduced to advanced mathematical techniques which are useful in further areas of Electronics and Information Engineering.

#### Keyword Syllabus :

- (i) Vector calculus : multiple integrals, vector differential calculus, and line and surface integrals.
- (ii) Special functions: Poisson and Laplace equation, boundary value problems, orthogonal functions and expansion; Laplace equations in rectangle coordinate and spherical coordinates; Legendre polynomials. Bessel Equation and Bessel function.
- (iii) Probability models and axioms; random variables; transformation of random variables; stochastic process; spectral analysis; Markov chains; Central limit theorem.
- (iv) Dynamical systems : linear and nonlinear systems; phase space dynamics; fixed points, limit cycles, and attractors.

#### References :

1. James Glyn, *Advanced Modern Engineering Mathematics*, 2<sup>nd</sup> ed., Addison-Wesley, 1999.
2. C. Larry Andrews, *Special Functions of Mathematics for Engineers*, 2<sup>nd</sup> ed., McGraw-Hill, 1998.
3. Peyton Z. Peebles, *Probability, Random Variables and Random Signal Principles*, 4<sup>th</sup> ed., McGraw-Hill, 2001.
4. Ephraim Suhir, *Applied Probability for Engineers and Scientists*, McGraw-Hill, 1997.
5. D.K. Arrowsmith, *Dynamical Systems: Differential Equations, Maps, and Chaotic Behavior*, Chapman and Hall, 1992.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Electronic Circuits (Elective)</b>	
<u>Subject Code</u>	:	EIE304	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Basic Electronics	(ENG234)
<u>Credits</u>	:	3	

### Objectives :

To familiarize students with

- (i) Practical Operational Amplifiers and their building blocks;
- (ii) Feedback configurations, stability design concepts and oscillators;
- (iii) Analog filter design.

### Keyword Syllabus :

Current mirror, differential input stage and output stages; operational amplifier design; slew rate limitation; internal compensation; stability of feedback op-amp circuits; operational amplifier. Feedback and stability; magnitude and phase margins; oscillators design. Early effect and output resistance; high-frequency parasitics and Miller effect; hybrid-pi models and high-frequency responses of transistor amplifiers. Basic filter principles, transfer functions for low-pass, band-pass, high-pass, band-stop filters; frequency responses, analog filters, lossless passive realization, active filters using ideal op-amps.

### Textbook :

1. Sergio Franco, *Design with Operational Amplifiers and Analog Integrated Circuits*, 3<sup>rd</sup> ed., McGraw-Hill, 2002.

### Reference :

1. R.W. Goody, *PSPICE for Windows - A Circuit Simulation Primer*, New York: Prentice-Hall 1995.

### Method of Assessment :

Coursework	40%
Examination	60%
Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Integrated Analogue and Digital Circuits (Elective)</b>	
<u>Subject Code</u>	:	EIE305	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	36 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Electronic Circuits	(EIE304)
		Basic Electronics	(ENG234)
<u>Credits</u>	:	3	

### Objectives :

To familiarize students with

- (i) digital circuit families and basic building blocks;
- (ii) introduction to Verilog styles digital design;
- (iii) logic synthesis using FPGA tools;
- (iv) filter design principles and circuit technologies;
- (v) ASIC design methodologies.

### Keyword Syllabus :

Digital circuit families; multi-vibrators and timers; memory circuits; Verilog language, structural and behavioral specification, procedural specification, small module design methodology, different FSM styles, timing issues, low power design, FPGA; filter design principles; active RC filters, SC filters; gm-C filters; ASIC design methodologies; gate arrays; standard cells.

### Textbooks :

1. R. Schaumann and M.E. Van Valkenburg, *Design of Analog Filters*, Oxford University Press, 2001.
2. D.R. Smith and P.D. Franzon, *Verilog Styles for Synthesis of Digital Systems*, Prentice-Hall, 2000.
3. J.P. Hayes, *Introduction to Digital Logic Design*, Reading: Addison-Wesley, 1993.

### References :

1. P.R. Gray and R.G. Meyer, *Analysis and Design of Analog Integrated Circuits*, 3<sup>rd</sup> ed., New York: Wiley, 1993.
2. D. Van den Bout, *The Practical Xilinx Designer Lab Book*, Prentice-Hall, 1999.
3. D.A. Pucknell, *Fundamentals of Digital Logic Design with VLSI Circuit Applications*, New Jersey: Prentice-Hall, 1990.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>IC Technology and Processes (Elective)</b>	
<u>Subject Code</u>	:	EIE306	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	30 hours
		Laboratory	24 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

#### Objectives :

To familiarize students with

- (i) Fundamentals of semiconductors;
- (ii) The operating principles of MOSFETs;
- (iii) CMOS processes and operation of basic CMOS logic gates;
- (iv) Emphasis is placed on hands-on experience in basic IC fabrication processes, students will fabricate MOSFETs in groups of 5.

#### Keyword Syllabus :

Semiconductor materials, carrier concentration, mobility, drift and diffusion current, Einstein relationship, energy band diagram. MOS fundamentals, basic MOSFETs, structure and operation of CMOS logic gates. Basics of device fabrication, oxidation, diffusion, photolithography, thin film deposition, MOSFET fabrication process.

#### Textbook :

1. Robert. F. Pierret, *Semiconductor Device Fundamentals*, Reading, Massachusetts, Addison-Wesley, 1996.

<u>Method of Assessment</u> :	Coursework	50%
	<u>Examination</u>	50%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Integrated Project (Compulsory)</b>
<u>Subject Code</u>	:	EIE310
<u>Level of Study</u>	:	3
<u>Equivalent Hours of Study</u>	:	Lecture 6 hours Laboratory / Demonstration 9 hours Project Work 105 hours (inclusive of other contact hours, private study, etc.)
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	3

### Objectives :

The objectives of this subject encompass not only the technical design and implementation/fabrication of electronic/information products but also the development of a production/marketing strategy. There are three tasks for the subject: Task 1 Market research – Students are required to assess the market needs for the product. Based on the studies students are to derive a suitable marketing strategy. Task 2: Technical design and manufacturability – In this task, students are required to perform the technical design of the product. They are also required to consider the manufacturability and the final cost of the product through careful cost control and component selection to ensure the profitability of the final product. Task 3: Product implementation – the product must be implemented/fabricated for demonstration.

### Operation :

Students will be grouped into groups of three or four. To each group, an academic supervisor will be assigned. Each student will take turn in serving as the Team Leader to lead the group to complete the task assigned. Each task will be allocated a certain period of time to complete. At the end of each task, each group will submit a Task Report and to give a presentation on the work performed during the period. Upon the completion of the project, each group will give a demonstration of the completed product and a final report and presentation. Students are also required to keep a detailed log of the work performed during the entire period. The log-books are to be examined and signed by the supervisor on a monthly basis. At the end of the project, the log-book will be collected and graded.

### Method of Assessment :

Throughout the duration of the project, supervisors make themselves available for discussions with the student groups at the meetings arranged at mutually convenient times. On these occasions, supervisors may, at their discretion, rate and record their impressions and abilities according to the attributes detailed below.

INSIGHT	as evidenced by an ability to understand and appreciate issues
DRIVE	as evidenced by diligence and tenacity
CREATIVITY	as evidenced by ingenuity and imagination
COMMUNICATION	as evidenced by an ability to express ideas clearly and succinctly

At the completion of each task, the Team Leader is required to give an oral presentation. This is assessed by a panel of academic staff. The presentation is rated according to the response to questions aimed at determining for example the appreciation of the relevance of his/her particular part in the activity and of its inter-relation to those of the other members. The extent to which a variety of “solutions” has been proposed and critically examined is also considered, whether it is legitimate to regard any strategy finally proposed as being optimal. A most important element to be assessed is the extent of the awareness of what limitations

there are to any recommendations and proposals made consequent on having access to incomplete information. Where such gaps exist, what effort would be required, what cost involved to rectify these omissions, what would be the attendant benefit to be anticipated from this traditional effort and whether, therefore, it would be worthwhile to undertake it. At this time students are required to submit two reports for the task, a Team Report and a Team Leader's Report.

The Team Report should, where possible segregate the individual contribution of each student since this allows a mark for the individual as well as the team itself. The grade for these will be entered onto the standardised assessment guide mentioned above.

The final grade for each task is computed by:

	Points	Applicability to	
		Team Leader	Team Member
Team Report	45	Yes	Yes
Oral Presentation and Viva	20+10	Yes	Yes (Viva Part)
The Team Leader's Report	10	Yes	No
Team members' assessment of the Team Leader	5	Yes	No
Team Leader's assessment on team members	10	No	Yes

Total points for team leader:           90 points  
Total points for each team member:   65 points

The final grade for the complete project is then computed for each student, which takes into consideration their performance during the three tasks of the project.

The weighing for each task is as follows:

Task 1:           25%  
Task 2:           30%  
Task 3:           45%

## Subject Description

<u>Subject Title</u>	:	<b>Computer System Fundamentals (Compulsory)</b>
<u>Subject Code</u>	:	EIE311
<u>Level of Study</u>	:	3
<u>Hours Assigned</u>	:	Lecture/Tutorial                      33 hours Laboratory                                      9 hours
<u>Pre-requisites</u>	:	Logic Design                                      (EIE211)
<u>Credits</u>	:	3

### Objectives :

This module provides an introduction to the fundamental knowledge of

- (i) the organisation and structure of a small computer system;
- (ii) the important features of an operating system and basic system utilities;
- (iii) the component parts of a digital computer and their inter-relationships; and
- (iv) the microprocessor as a digital computing and/or controlling device.

### Keyword Syllabus :

Computer system configuration: supporting elements; computer arithmetic; microprogramming technique; memory organization; serial and parallel interfacing techniques; interrupt and DMA. Single-user disks operating system: functions and structures; start-up sequence; files and directory; command interpreter; device driver; software interrupts and OS calls; system utilities; file manipulation.

### Textbook :

1. Barry B. Brey, *The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processor: Architecture, Programming and Interfacing*, 4<sup>th</sup> ed., Prentice-Hall, 1997.

### References :

1. C. Hamacher, Z. Vranesic and S. Zaky, *Computer Organization*, 5<sup>th</sup> ed., McGraw-Hill, 2002
2. Hans-Peter Messmer, *The Indispensable PC Hardware Book*, 3<sup>rd</sup> ed., Addison-Wesley, 1997.
3. Silberschatz and P.B. Galvin, *Operating System Concepts*, 5<sup>th</sup> ed., John Wiley & Son, 1999.
4. W. Stallings, *Operating Systems: Internals and Design Principles*, 3<sup>rd</sup> ed., Prentice-Hall, 1998.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

**Subject Description**

<u>Subject Title</u>	:	<b>Linear Systems (Compulsory)</b>	
<u>Subject Code</u>	:	EIE312	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
<u>Credits</u>	:	3	

Objectives :

- (i) to provide students with basic concepts and techniques for the modelling and analysis of linear continuous-time and discrete-time signals and systems;
- (ii) to provide students with an analytical foundation for further studies in Communication Engineering and Digital Signal Processing.

Keyword Syllabus :

Classification of Signals: continuous and discrete-time signals, signals of special importance. Impulse response and convolution, linear time-invariant systems. Fourier series and transform, spectral density functions, sampling and digitalization of signals. Transfer functions, pole-zero plots, natural response, transients and stability. Laplace transform and system responses, poles and zeros. Synthesis of analogue filters, bode plots. Digital networks and z transform, z-plane characterization, mapping between s-plane and z-plane. State-space representation: canonical forms, similarity transformation; relation with transfer function; eigenvalues and system stability; state-transition matrix.

Textbook :

- 1. Ed. Kamen and Bonnie Heck, *Fundamentals of Signals and Systems Using the Web and Matlab*, 2/e, Prentice-Hall, 2000.

References :

- 1. Roger E. Ziemer, et al., *Signals & Systems: Continuous and Discrete*, 4/e, Prentice-Hall, 1998.
- 2. Philip Denbigh, *System Analysis & Signal Processing*, Addison-Wesley, 1998.
- 3. Charles L. Phillips, et al., *Signals, Systems, and Transforms*, 3/e, Prentice Hall, 2003.
- 4. Simon Haykin and Barry Van Veen, *Signals and Systems*, Wiley, 2003.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Data Structures and Databases (Elective)</b>	
<u>Subject Code</u>	:	EIE316	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Practical Work	9 hours
<u>Pre-requisite</u>	:	Computer Programming and Basic Software Engineering	(ENG221)
<u>Credits</u>	:	3	

### Objectives :

To provide fundamental knowledge of data structures and algorithms.

To introduce concepts of data models, principles and practical skills of relational database design, concepts and principles of database management systems.

After the completion of this subject, students should be able to appreciate and to master (i) methods for organizing, reorganizing, moving, exploring, and retrieving data in digital computers, and, (ii) fundamental analysis of those techniques.

### Keyword Syllabus :

Lists; Linked list; indexes; trees; sorting algorithms; Algorithm analysis and design; dynamic programming. File structures; entity-relationship; architecture of database information systems; data models; relational database design (relational algebra and calculus, functional dependency and normalization); data definition and manipulation; structured query language; database administration; concurrency control; database security and recovery. Case studies on features and usage of one or two relational database systems.

### Textbooks :

1. J. Kingston, *Algorithms and Data Structures, 2/e.*, Addison-Wesley, 1998.
2. D.M. Kroenke, *Database Processing Fundamentals, Design, and Implementation, 8/e.*, Prentice-Hall, 2001.

### References :

1. Lewis R. Harry and L. Denenberg, *Data Structures and Their Algorithms*, Harper Collins Publishers, 1991.
2. M.A. Weiss, *Data Structures and Algorithm Analysis In C++*, The Benjamin/Cummings Publishing Company Inc., 1994.
3. T.M. Connolly, C.E. Begg, and A.D. Strachan, *Database Systems – A Practical Approach to Design, Implementation and Management*, Addison-Wesley, 2001.
4. C.J. Date, *An Introduction to Database Systems*, Vol. 1, 5/e., Addison-Wesley, 2000.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	<u>Total</u>	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Object-Oriented Design and Programming (Elective)</b>
<u>Subject Code</u>	:	EIE320
<u>Level of Study</u>	:	3
<u>Hours Assigned</u>	:	Lecture/Tutorial                      33 hours Laboratory                                18 hours
<u>Pre-requisites</u>	:	Computer Programming and Basic Software Engineering            (ENG221)
<u>Credits</u>	:	3

### Objectives :

This course 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.

### Keyword Syllabus :

Software Engineering; software process models; object-oriented paradigm; classes and objects; encapsulation, inheritance and polymorphism; Java technologies; object-oriented Programming with Java; Web Programming with Java; Unified Modeling Language (UML); structural modeling; behavioral modeling; architectural modeling.

### Textbooks :

1. H.M. Deitel and P.J. Deitel, *Java: How To Program*, 5<sup>th</sup> ed., Prentice-Hall, 2002.
2. G. Booch, I. Jacobson and J. Rumbaugh, *The Unified Modeling Language User Guide*, Addison-Wesley, 1999.

### References :

1. R.C. Lee and W.M. Tepfenhart, *Practical Object-Oriented Development with UML and Java*, Prentice-Hall, 2003.
2. J. Rumbaugh, I. Jacobson and G. Booch, *The Unified Modeling Language Reference Manual*, Addison-Wesley, 1999.
3. <http://java.sum.com>.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Interface and Embedded Systems (Elective)</b>	
<u>Subject Code</u>	:	EIE322	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory/Demonstration	9 hours
<u>Pre-requisites</u>	:	Logic Design	(EIE211)
<u>Credits</u>	:	3	

### Objectives :

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

### Keyword Syllabus :

Microcontroller architecture, interrupt timer, pulse measurement and generation, external driver interfaces, sensing and generation of analogue signals. Industrial I/O interfaces/buses: transaction protocols, timing specifications and arbitration. Application-specific memory devices and complex I/O devices. CPU bus interfacing techniques: timing analysis; buffer control; data alignment and routing. Embedded software architectures for real-time applications. Real-time OS; task scheduling, CPU utilization, RMS theorem, task latency analysis, semaphores and priority inversion. Development and debugging tools.

### Textbooks :

1. D.E. Simon, *An Embedded Software Primer*, Addison-Wesley, 1999.
2. W. Buchana, *PC Interfacing, Comm and Windows Programming*, Addison-Wesley, 1999.

### References :

1. M. J. Pont, *Embedded C*, Addison-Wesley, 2002.
2. H-S. Messmer, *The Indispensable PC Hardware Book*, Addison-Wesley, 1997.
3. S.R. Ball, *Debugging Embedded Microprocessor Systems*, Butterworth-Heinemann, 1998.
4. Steve Health, *Embedded Systems Design*, ISBN: 0-7506-3237-2, Butterworth-Heinemann, 1997.
5. J. Labrosse, *Micro C/OS-II*, R & D Books, Miller Freeman, 1999.
6. Betty Prince, *High Performance Memories*, John Wiley & Sons, 1996.
7. T. Shanley and D. Anderson, *PCI System Architecture*, 3<sup>rd</sup> ed., Addison-Wesley, 1995.
8. D.V. Hall, *Microprocessors and Interfacing : Programming and Hardware*, 2<sup>nd</sup> ed., McGraw-Hill, 1992.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Communication Fundamentals (Compulsory)</b>	
<u>Subject Code</u>	:	EIE331	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	28/5 hours
		Laboratory	18 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
		Mathematics II	(AMA202)
<u>Credits</u>	:	3	

### Objectives :

The subject aims to introduce

- (i) measure of information and channel capacity,
- (ii) theory and performance of analogue communication systems,
- (iii) pulse modulation techniques.

At the completion of the subject, the student is equipped with the basic principles of communication engineering. The fundamentals introduced in this subject are necessary for study of higher level subjects in the field of communication engineering.

### Keyword Syllabus :

Entropy, channel capacity. Double-sideband suppressed carrier, double-sideband large carrier (AM), single-sideband modulation, vestigial-sideband modulation, FDM. Narrowband FM, wideband FM, phase modulation, generation and demodulation of AM and FM signals. Noise in communication, S/N ratios for AM and FM reception. PAM, quantization and coding, PCM, delta modulation, TDM.

### Textbook :

1. A.B. Carlson, P.B. Crilly and J.C. Ruthledge, *Communication Systems*, 4<sup>th</sup> ed., McGraw-Hill, 2002.

### References :

1. F.G. Stremmer, *Introduction to Communication Systems*, Addison-Wesley, 1990.
2. S. Haykin, *Communication Systems*, 4<sup>th</sup> ed., John Wiley & Sons, 2001.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	<hr/>	
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Electromagnetics (Elective)</b>	
<u>Subject Code</u>	:	EIE332	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	28/6 hours
		Laboratory	15 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
		Mathematics II	(AMA202)
<u>Credits</u>	:	3	

### Objectives :

The subject aims to introduce

- (i) the static electric and magnetic field,
- (ii) the Maxwell's equations and wave propagation,
- (iii) the fundamentals of antennas,
- (iv) the basic concept of transmission line.

At the completion of the subject, the student is introduced to the basic electromagnetic theory and its applications which are necessary for the subject development in the next level option.

### Keyword Syllabus :

Static electric field, Poisson's and Laplace's equations, steady magnetic field. Maxwell's equations, wave equations, plane wave, reflection and refraction. Hertzian dipole, antenna patterns, thin linear antennas, receiving antennas, Friis transmission equation. Uniform and terminated transmission lines, Smith chart and impedance matching.

### Textbook :

1. W.H. Hayt and J.A. Buck, *Engineering Electromagnetics*, 6<sup>th</sup> ed., McGraw-Hill, 2001.

### References :

1. D.K. Cheng, *Fundamentals of Engineering Electromagnetics*, Addison-Wesley, 1993.
2. M.F. Iskander, *Electromagnetic Fields and Waves*, Prentice-Hall, 1992.
3. J.D. Kraus, *Electromagnetics*, McGraw-Hill, 1992.
4. S.V. Marshall and G.G. Skitek, *Electromagnetic Concepts and Applications*, 3<sup>rd</sup> ed., Prentice-Hall, 1990.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

**Subject Description**

<u>Subject Title</u>	:	<b>System and GUI Programming (Elective)</b>	
<u>Subject Code</u>	:	EIE335	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Computer Programming and Basic Software Engineering	(ENG221)
<u>Credits</u>	:	3	

Objectives :

This subject aims to provide students with a basic understanding of system programming for various operating systems (OS). Students are expected to have a closer look at various functions of a computer operating system from a programmer's perspective. Two major areas of study will be the OS system call and the GUI programming. This course will provide a practical application of material from operating systems, data structures and object-oriented design.

Keyword Syllabus :

GUI programming – user interface and window environment, Graphics Device Interface (GDI); GUI in Microsoft Foundation Classes (MFC), X window programming; Elements of a window, windows message system; asynchronous input; user events (keyboard and mouse); menus; controls. Win32 Application Programming Interface (API), UNIX system services; File system, management files and file system, device I/O, case study: Win32 file system and its system calls; Architecture of memory management: virtual memory and heap, case study: Win32 virtual memory management and heap routines; process and thread management, components of a process, thread: light weight process, thread synchronization, case study: creating threads and processes in Win32, creating POSIX threads in UNIX.

Textbooks :

1. Merusi, Donald, *Programming the Win32 API and UNIX System Services*, 1<sup>st</sup> ed., Prentice-Hall, 2001.
2. Johnson M. Hart, *Win32 System Programming: A Windows 2000 Application Developer's Guide*, 2<sup>nd</sup> ed., Addison-Wesley, 2001.

References :

1. Richter Jeffrey, *Advanced Windows*, 3<sup>rd</sup> ed., Redmond, Washington: Microsoft Press, 1997.
2. Richard J.Simon, *Microsoft Windows 2000 API Superbible*, 1<sup>st</sup> ed., SAMS, 2000.
3. Keith Haviland, Dina Gray and Ben Salama, *UNIX System Programming*, 2<sup>nd</sup> ed., Addison-Wesley, 1999.
4. Richard M. Jones, *Introduction to MFC Programming with Visual C++*, 1<sup>st</sup> ed., Prentice-Hall PTR, 2000.
5. Charles Petzold, *Programming Windows*, 5<sup>th</sup> ed., Redmond, Washington: Microsoft Press, 1997.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>Industrial Attachment (To be taken in lieu of IC367)</b>
<u>Subject Code</u>	:	EIE389
<u>Level of Study</u>	:	3
<u>Hours Assigned</u>	:	A minimum of 4 weeks
<u>Pre-requisites</u>	:	Nil
<u>Training Credits</u>	:	4

#### Objectives :

To give students an exposure to the industrial working environment through attachment in an industrial company for a minimum of 4 weeks in the summer between Year 2 and Year 3. The objective of this industrial attachment is to enhance students' problem solving and leadership abilities and to promote the sense of responsibility and positive working attitude. Students will acquire working experience in a real industrial environment and hands-on experience in the use of modern facilities, fabrication and documentation of their work in electronic and information industry.

<u>Method of Assessment :</u>	Continuous assessment	100%
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## Subject Description

<u>Subject Title</u>	:	<b>English in the Workplace (Compulsory)</b>
<u>Subject Code</u>	:	ELC305
<u>Level of Study</u>	:	3
<u>Hours Assigned</u>	:	Seminars 42 hours
<u>Pre-requisites</u>	:	English for Academic Purposes (ELC205)
<u>Credits</u>	:	3

### Objectives :

To develop those English language skills required by the students to communicate effectively in their future professional careers.

### Subject Description :

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

The study method is primarily based on seminars. These will include discussions, role-play, individual and group activities. Use will be made of video and tape recordings, library research, and our Centre for Independent Language Learning. Students in need of additional help will be required to attend a supplementary English programme organised by the English Language Centre.

### Learning and Teaching Materials :

“English in the Workplace” published by the English Language Centre, the Hong Kong Polytechnic University and the Macmillan Publishers (China) Ltd.

Specially prepared material from the English Language Centre will be used throughout the course. In addition, lecturers will recommend additional reference materials as required.

### 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 appropriacy : introducing notions of context-sensitive language use in both spoken and written English; for example, writing e-mails and using the telephone.
2. Seeking and supplying information : practice in the oral skills required in fact-finding and job-seeking interviews, problem-solving negotiations, and conducting questionnaire surveys.
3. Workplace writing : selecting and using relevant content; appropriate style; acceptable format; structure and layout, in letters, memoranda, reports, notices for public display, proposals, presentation notes, forms and questionnaires.
4. Language development : improving and extending relevant features of students' grammar, vocabulary and pronunciation.

<u>Method of Assessment</u> :	Coursework	100%
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### Subject Description

<u>Subject Title</u>	:	<b>Engineering Management (Elective)</b>	
<u>Subject Code</u>	:	ENG306	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture/Tutorial	42 hours
<u>Pre-requisites</u>	:	Nil	
<u>Exclusions</u>	:	Organisation and Management	(MM302)
<u>Credits</u>	:	3	

#### Objectives :

To improve the students' knowledge of the basic principles involved in the organization of engineering activities that provide goods and services. To provide an appreciation of legal aspects in relation to contracting and tendering, patents, and product reliability. To make students aware of the importance of quality management.

#### Keyword Syllabus :

Industrial Organization : functions and types; structure; corporate objectives, strategy and policy. Industrial Management : theories; role of managers - delegation, communication, coordination, planning, control, leadership; management information systems. Project Management : matrix organization; project specification. Management of Legal Aspects : professional codes of conduct; labour ordinances; contracting, tendering, licensing, patenting; product liability. Total Quality Management. Management of Environmental Issues : sources, effects and control of environmental pollutants. Reliability and Maintenance Management : preventive, productive and reliability centred maintenance. The management of research and development; management of change due to: technical innovation, organisational change, and business process re-engineering etc.

#### References :

1. F.F. Mazda, *Engineering Management*, Harlow, England: Addison-Wesley, 1998.
2. S.P. Robbins and M. Conlter, *Management*, 6<sup>th</sup> ed., Prentice-Hall International, 1999.
3. J.R. Schermerhorn, *Management*, 6<sup>th</sup> ed., John Wiley & Sons, 1998.
4. J.A.F. Stoner, R.E. Freeman and D.R. Gilbert, *Management*, 6<sup>th</sup> ed., Prentice-Hall, 1995.

<u>Method of Assessment :</u>	Coursework	30%
	Examination	70%
	Total	100%

## Subject Description

<u>Subject Title</u>	:	<b>Industrial Centre Training II (Compulsory)</b>
<u>Subject Code</u>	:	IC367
<u>Level of Study</u>	:	3
<u>Hours Assigned</u>	:	30 hours/week for 4 weeks
<u>Pre-requisites</u>	:	Industrial Centre Training I (IC272)
<u>Training Credits</u>	:	4

### Objectives :

Industrial Centre Training II takes the form of technical projects with typically 4 to 6 students in a team working in the Industrial Centre for a minimum of 4 weeks. The objective of this training course is to develop or promote the personal ability of students; creativity, leadership, courage, responsibility, working attitude, problem solving power and presentation style when they are working in a project team.

On completion of this training course, students will be expected to gain confidence to overcome difficulties and to handle open-ended problems in their future careers. Students will acquire hands-on experience in prototyping a electronic product or an application software and present their work to prospective clients. In addition, due to the complexity of project in a simulated industrial training environment, students will be expected to gain hands on experience of using modern facilities in the design, fabrication and documentation of their work. Student will be expected to gain a good understanding of the importance of costs in related to any decisions making; their impacts on project, limitation, and factors when selecting different processes, approaches and materials in electronics and information technology industry.

### Keyword Syllabus :

Team work, personal ability, projects planning control, implementation, documentation and evaluation. Electronic product manufacturing process, design modifications. Application of materials. Cost control, market assessment. Electronic components selection, application and acquisition. Application software, embedded software creation, test and control. Use of manufacturing and test equipment, measurement techniques, cost control, quality control. Internet project presentation and collaboration.

### Method of Assessment :

Please refer to the section on "Assessment of Training".

## Subject Description

<u>Subject Title</u>	:	<b>Organisation and Management (Elective)</b>	
<u>Subject Code</u>	:	MM302	
<u>Level of Study</u>	:	3	
<u>Hours Assigned</u>	:	Lecture	28 hours
		Seminars	14 hours
<u>Pre-requisites</u>	:	Nil	
<u>Exclusions</u>	:	Introduction to Management	(MM201)
		Or	
		Organisational Behaviour	(MM211)
		Or	
		Organisation & Management	(MM202)
		Or	
		Engineering Management	(ENG306)
<u>Credits</u>	:	3	

### Role and Purpose :

This subject introduces the basic theories and concepts concerning firstly, the functions of managing a business and secondly, the study of human behaviour and its implications for the management of organisations.

### Objectives :

- (i) To identify the nature of managerial work in a variety of forms of organisation, taking into account the impact of the external environment.
- (ii) To examine the functions of management - planning, organising, controlling, decision making.
- (iii) To introduce the study of human behaviour and its implications for the management of organisations and businesses.

### Indicative Content :

- 1. Organising an Enterprise
  - 1.1 Review of a variety of organisations structures and the identification of the conditions under which they are appropriate.
- 2. Managers and Management
  - 2.1 Define the nature of managerial work taking into account the impacts of the external environment. Provide an overview of the evolution of Management.
- 3. Functions of Management
  - 3.1 The major elements of the following functions and their importance for the effective management of business organisations: planning, coordinating, controlling, decision making and problem solving, communication, strategic management, and quality management.
- 4. People in Organisations
  - 4.1 Factors such as biographical characteristics, ability, personality, perception, attitudes and values, and their effects on individual performance.
- 5. The Manager's Role as a Leader
  - 5.1 Motivation concepts, foundations of group behaviour, introduction to the theories of leadership, interpersonal communication.

6. Social Responsibility and Managerial Ethics

6.1 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.

Indicative Reading :

1. Certo, *Modern Management*, 9<sup>th</sup> ed., Prentice-Hall.
2. H. Davies, ed., *China Business: Contexts & Issues*, Longman Asia, 1995.
3. Andrew DuBrin, *Essentials of Management*, 5<sup>th</sup> ed., South Western, 2000.
4. Gomez-Mejia and Balkin, *Management*, McGraw-Hill, 2002.
5. Jones/George/Hills, *Contemporary Management*, 2<sup>nd</sup> ed., McGraw-Hill, 2000.
6. Kinicki & Williams, *Management : A Practical Introduction*, McGraw-Hill, 2003.
7. S.P. Robbins and M. Coulter, *Management*, 7<sup>th</sup> ed., Prentice-Hall, 2001.
8. Company Annual Reports (see library collection).

**Recommended periodicals, newspapers:**

The Asian Wall Street Journal  
The Economist  
South China Morning Post  
World Executive's Digest

<u>Method of Assessment :</u>	Coursework	50%
	Examination	50%
	Total	100%
<u>Minimum Component Pass Grade :</u>	Coursework	(D)
	Examination	(D)

### Subject Description

<u>Subject Title</u>	:	<b>VLSI and Computer-Aided Circuit Design (Elective)</b>	
<u>Subject Code</u>	:	EIE401	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	21 hours
		Laboratory	21 hours
<u>Pre-requisites</u>	:	Electronic Circuits	(EIE304)
		Basic Electronics	(ENG234)
<u>Credits</u>	:	3	

#### Objectives :

To provide students with

- (i) insights into the subject area of VLSI circuits and systems design based on silicon;
- (ii) a broad-spectrum awareness of the many facets of designs involved with CAD tools;
- (iii) in-depth hands-on experience on VLSI design.

#### Keyword Syllabus :

Overview of VLSI design process; various design methodologies; stick diagram; design rules and layout, sheet resistance and area capacitance calculations; low power and low voltage VLSI design; design for testability techniques.

Performance issues and concerns in circuit layout; delay models and timing driven placement/routing; power minimization.

Project works in hand-on chip design of MOS VLSI circuits for multi-media, communications, and computer applications.

#### References :

1. Allen Geiger and Strader, *VLSI Design Techniques for Analog and Digital Circuits*, McGraw-Hill, 1990.
2. A.P. Ambler, M. Abadir and S. Sastry, *Economics of Design and Test for Electronic Circuits and Systems*, Ellis Horwood, 1992.
3. R.K. Poon, *Computer Circuits Electrical Design*, Prentice-Hall, 1995.
4. M.H. Rashid, *SPICE for Circuits and Electronics Using Pspice*, Englewood cliffs, Prentice-Hall, 1995.
5. J.A. Connelly and P. Choi, *Macro Modelling with SPICE*, Prentice-Hall, 1992.
6. D.A. Pucknell and K. Eshraghian, *Basic VLSI Design*, 3<sup>rd</sup> ed., Prentice-Hall, 1994.

<u>Method of Assessment</u> :	Coursework	60%
	<u>Examination</u>	40%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Power Electronics (Elective)</b>	
<u>Subject Code</u>	:	EIE402	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Electronic Circuits	(EIE304)
		Basic Electronics	(ENG234)
<u>Credits</u>	:	3	

### Objectives :

To familiarize students with

- (i) the principles and applications of power electronics;
- (ii) converter topologies, operations and control strategies;
- (iii) CAD (computer-aided design) techniques as applied to power electronics;
- (iv) the latest development in power electronics.

### Keyword Syllabus :

An overview on power electronics; power converter topologies; modelling, analysis and control of converter circuits; cycle-by-cycle and low-frequency behaviour simulations; computer-aided design of power electronic circuits; design to meet regulatory requirements; design of magnetic components; latest development in power electronics and future trends; practical design techniques.

### Textbook :

1. Y.S. Lee, *Computer-Aided Analysis and Design of Switch-Mode Power Supplies*, Marcel Dekker, New York, 1993.

### References :

1. J.P. Agrawal, *Power Electronic Systems: Theory and Design*, Prentice-Hall, 2001.
2. S. Cuk and R.D. Middlebrook, *Advances in Switched-Mode Power Conversion*, Vol. 1, 2 and 3, Teslaco, 1983.
3. J.G. Kassakian, M.F. Schlecht and G.C. Verghese, *Principles of Power Electronics*, Addison-Wesley, 1991.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>High Frequency Circuit Design (Elective)</b>
<u>Subject Code</u>	:	EIE403
<u>Level of Study</u>	:	4
<u>Hours Assigned</u>	:	Lecture/Tutorial                      33 hours Laboratory                                9 hours
<u>Pre-requisites</u>	:	Electronic Circuits                      (EIE304) Basic Electronics                        (ENG234)
<u>Credits</u>	:	3

#### Objectives :

In the pre-requisite subjects, students are acquainted with basic analogue circuit techniques and some commonly used analogue configurations. This subject extends these concepts in a design-oriented approach in important high frequency applications. A portion of this subject is devoted to non-linear analogue circuit design which serves to complement other existing subjects in communications circuits.

#### Keyword Syllabus :

Analogue circuit fundamentals, high-frequency analysis and design, design-oriented analysis techniques, noise analysis; MOS amplifier and switch-capacitor filters, distortion analysis; RF circuit elements and design, nonlinear analogue circuits, low-power design.

#### Textbooks :

1. P.R. Gray and R.G. Meyer, *Analysis and Design of Analog Integrated Circuits*, 3<sup>rd</sup> ed., New York: Wiley, 1993.
2. K.R. Laker and W.M.C. Sansen, *Design of Analog Integrated Circuits and Systems*, 1<sup>st</sup> ed., New York: McGraw-Hill, 1994.

#### References :

1. F. Nibler et al., *High Frequency Circuit Engineering*, London: IEE, 1996.
2. B. Razavi, ed., *Monolithic Phase-Locked Loops and Clock Recovery Circuits*, New York: IEEE Press, 1996.
3. P. Horowitz and W. Hill, *The Art of Electronics*, 2<sup>nd</sup> ed., New York: Cambridge University Press, 1989.

<u>Method of Assessment :</u>	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>Circuits for Consumer Electronics (Elective)</b>	
<u>Subject Code</u>	:	EIE405	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Logic Design	(EIE211)
		Electronic Circuits	(EIE304)
		Basic Electronics	(ENG234)
<u>Credits</u>	:	3	

#### Objectives :

This subject aims

- (i) to introduce the operation and basic building blocks for some common consumer electronics products; and
- (ii) to familiarize students with the top-down design principles of selected consumer electronics products and some design standards in the development of consumer electronics products.

#### Keyword Syllabus :

Operating principles of selected consumer electronics products such as audio-visual products (e.g., hi-fi systems, DVD, VCD, CD, MP3 players, digital video recorders), telecom products (e.g., mobile phones, WLAN), portable computing devices (e.g., PDA, notebooks), smart cards, infrared/RF controllers, etc.

Common analog and digital building blocks such as DSP chips, sensors, filters, amplifiers, display driver circuits, embedded systems, RF circuits, etc.

Top-down design principles of selected systems (e.g., stereo systems and colour displays); industrial standards of selected audio-visual systems (e.g., NTSC, MP3, etc.); safety and EMC requirements (e.g., IEC-1000).

#### Textbook :

1. Philip H. Hoff, *Consumer Electronics for Engineers*, New York: Cambridge University Press, 1998.

#### References :

1. Ronald K. Jurgen, *Digital Consumer Electronics Handbook*, New York: McGraw-Hill, 1997.
2. Williams Tim, *EMC for Product Designers*, Oxford: Newnes, 1996.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Honours Project (Compulsory)</b>
<u>Subject Code</u>	:	EIE410
<u>Level of Study</u>	:	4
<u>Equivalent Hours of Study</u>	:	Project Work 360 hours (inclusive of contact hours, private study, etc.)
<u>Pre-requisites</u>	:	Nil
<u>Credits</u>	:	9

### Objectives :

The main objective is learning by doing.

The project is intended to be a challenge to the students' intellectual and innovative abilities and to give them the opportunities to integrate and apply the knowledge and analytical skills gained in the different disciplines. It should also provide students with some appreciation of the entire process of problem solving. The progress from concept to final implementation and testing, through problem definition and selection of alternative solutions, will be emphasized.

### Method of Assessment :

At the completion of the project, the student will be required to do an oral presentation/demonstration of his/her project to an audience of fellow students, staff and industrialists. Two hardcopies and one softcopy of the final report, and the daily log-book are to be submitted at the end of the second semester. The reports go to a panel consisting of the project supervisor and one other member of staff of the department. A viva will be conducted by the panel.

### Assessment of the project will be split into 3 areas :

- (i) oral presentation, viva and assessment by a panel;
- (ii) work done over the project period including daily log-book; and
- (iii) final report.

A maximum of 10% of the total mark will be given to the language component of the final report.

In order to ensure that comparable standards are being used to assess the projects, a project assessment form is used to guide the panel members in the assessment exercise. The Project Management Team will also oversee the overall standard of the projects to ensure a reasonable degree of uniformity in the assessment.

## Subject Description

<u>Subject Title</u>	:	<b>Artificial Intelligence (Elective)</b>	
<u>Subject Code</u>	:	EIE411	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory/Demonstration	9 hours
<u>Pre-requisites</u>	:	Computer Programming and Basic Software Engineering	(ENG221)
<u>Credits</u>	:	3	

### Objectives :

- (i) to introduce the student the major ideas and techniques of Artificial Intelligence (AI);
- (ii) to develop an appreciation for various issues in the design of intelligent internet and multimedia systems;
- (iii) to provide the student with programming experience from implementing AI techniques and simple AI systems.

### Keyword Syllabus :

Intelligent Agents, Blind and Informed Search Methods, Game Playing, Logical Agents, Inference in First-Order Logic, Knowledge Representation, Planning and Acting in the Real World, Uncertainty, Probabilistic Reasoning Systems, Machine Learning, Decision Trees, Knowledge in Learning, Agents that Communicate, Text Processing, Robotics, Applications of AI techniques to Internet and Multimedia Systems.

### Textbook :

1. S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 2<sup>nd</sup> ed., Prentice-Hall, 2003.

### References :

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

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>Digital Signal Processing (Elective)</b>	
<u>Subject Code</u>	:	EIE413	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
		Mathematics II	(AMA202)
		Linear Systems	(EIE312)
<u>Credits</u>	:	3	

#### Objectives :

To provide students with

- (i) concepts and design techniques of basic digital signal processing systems and
- (ii) features and basic theories of various applications of digital signal processing.

#### Keyword Syllabus :

Revision on the discrete-time systems and general realization techniques, design of infinite impulse-response (IIR) and finite impulse-response (FIR) digital filters, convolution and implementation, discrete Fourier transform, fast Fourier transform and implementation, short-time Fourier transform, wavelets, multiresolution analysis, introduction to random processes and systems, autocorrelation, non-parametric and parametric models, sample DSP applications: such as adaptive digital filtering and spectrum estimation and analysis.

#### Textbooks :

1. E.C. Ifeachor and B.W. Jervis, *Digital Signal Processing - A Practical Approach*, Prentice-Hall (Pearson Education), 2002.
2. J.G. Proakis and D.G. Manolakis, *Digital Signal Processing, 3/e.*, Prentice-Hall, 1996.

#### References :

1. W.D. Stanley, G.R. Dougherty and R. Dougherty, *Digital Signal Processing*, Reston Pub. Co. Ltd, Prentice-Hall International, Inc., 1984.
2. S.K. Mitra, *Digital Signal Processing – A Computer-based Approach*, McGraw-Hill International Ed., 1998.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Computer Architecture and Systems (Elective)</b>	
<u>Subject Code</u>	:	EIE414	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	36 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Computer System Fundamentals	(EIE311)
		Computer Programming and Basic Software Engineering	(ENG221)
<u>Credits</u>	:	3	

### Objectives :

To provide students with

- (i) concepts and design techniques of high performance computer architectures and
- (ii) features and design philosophies of modern computer systems.

### Keyword Syllabus :

Taxonomy of computer architectures; pipelined architectures: memory system, cache, virtual memory, memory management; pipelined ILP and dependencies; superscalar processors, speculative execution and branch processing; multiprocessor architectures, cache coherence and memory consistency; system bus architecture.

### Textbook :

1. D. Sima, T. Fountain and P. Kasuk, *Advanced Computer Architectures*, Addison-Wesley, 1997.

### References :

1. D. Anderson, *PCI System Architecture*, 4<sup>th</sup> ed., Addison-Wesley, 1999.
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*, 5<sup>th</sup> ed., Addison-Wesley, 1999.
4. Kai Hwang, *Advanced Computer Architecture, Parallelism, Scalability, Programmability*, McGraw-Hill, 1993.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>Multimedia Technology (Elective)</b>	
<u>Subject Code</u>	:	EIE415	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Nil	
<u>Credits</u>	:	3	

#### Objectives :

To provide students with widespread understanding of multimedia technologies. After the completion of the module, the student should be able to appreciate a wide range of techniques and standards adopted in the multimedia industry.

#### Keyword Syllabus :

Digital audio and video processing, multimedia standards; image and video storage system, storage media: CS-Audio, CD-ROMI and DVD; content based image and video indexing and retrieval system; multimedia integration tools: SMIL; game development; multimedia communications: quality of service (QoS) requirements for multimedia communications, loss concealment, transport protocol support for multimedia communications, multimedia on Internet; case studies on multimedia conferencing, video-on-demand (VOD), set-top box and interactive TV.

#### Textbooks :

1. M. Mandal, *Multimedia Signals and Systems*, Kluwer Academic Publishers, 2003.
2. F. Halsall, *Multimedia Communications: Applications, Networks, Protocols and Standards*, Addison-Wesley, 2001.

#### References :

1. C.H. Wu and J.D. Irwin, *Emerging Multimedia Computer Communication Technologies*, Prentice-Hall, 1998.
2. F.F. Kuo, W. Effelsberg and J.J. Garcia-Luna-Aceves, *Multimedia Communications: Protocols and Applications*, Prentice-Hall, 1998.
3. G.J. Lu, *Communication and Computing for Distributed Multimedia Systems*, Artech House, 1996.
4. B. Furht, S.W. Smoliar and H.J. Zhang, *Video and Image Processing in Multimedia Systems*, Kluwer Academic Publishers, 1995.
5. Selected papers from *IEEE Multimedia*.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

**Subject Description**

<u>Subject Title</u>	:	<b>e-Commerce Infrastructure and Processes (Elective)</b>	
<u>Subject Code</u>	:	EIE417	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture	22 hours
		Tutorial	12 hours
		Mini-project	8 hours
<u>Pre-requisites</u>	:	Logic Design	(EIE211)
		Computer Programming and Basic Software Engineering	(ENG221)
<u>Credits</u>	:	3	

Objectives :

This subject aims

- (i) to introduce the infrastructure of E-commerce and the processes involved in realizing business transactions by networked digital technologies;
- (ii) to introduce relevant E-commerce business models as well as some popular E-commerce applications.

Keyword Syllabus :

Review of the Internet operation and network structure; connectivity and navigation; E-commerce software design (e.g., database, intelligent agents, search engines, etc.); web metrics (e.g., collection of users' data); business models (e.g., brokerage, advertising, infomediary, utilities, etc.); markets and distributions; customer relationship management; encryption methods; public key cryptography; secure protocols for business transactions (e.g., SSL, SET); digital signatures; firewalls, proxy services and application gateways; case studies (e.g., ebay.com, amazon.com); some related issues (e.g., trust, network privacy, intellectual property).

Indicative Reading List :

1. Mark Norris, Steve West, and Kevin Gaughan, *E-Business Essentials: Technology and Network for the Electronic Marketplace*, John Wiley & Sons, 2000.
2. Sanjib Purba, (Editor), *Architectures for e-Business Systems: Building the Foundation for Tomorrow's Success*, Auerbach, 2002.
3. G. P. Schneider and J. T. Perry, *Electronic Commerce*, Course Technology, 2001.
4. R. Kalakota, *Electronic Commerce: A Manager's Guide*, Addison-Wesley, 1997.
5. J. Dyché, *The CRM Handbook: A Business Guide to Customer Relationship Management*, Addison-Wesley, 2002.
6. William Stallings, *Cryptography and Network Security: Principles and Practice*, Prentice-Hall, 1999.
7. Simson Garfinkel and Gene Spafford, *Web Security and Commerce*, O'Reilly & Associates, 1997.
8. Donal O'Mahony, Michael Peirce, and Hitesh Tewari, *Electronic Payment Systems for E-Commerce*, Artech House, 2001.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>Speech and Image Processing (Elective)</b>
<u>Subject Code</u>	:	EIE421
<u>Level of Study</u>	:	4
<u>Hours Assigned</u>	:	Lecture/Tutorial                      33 hours Laboratory                                9 hours
<u>Pre-requisites</u>	:	Digital Signal Processing                (EIE413)
<u>Credits</u>	:	3

Objectives :

- (i) To provide students with basic concepts of speech and image processing.
- (ii) To provide students with the principles of speech and image coding.
- (iii) To explain the technologies behind speech and image recognition systems.

Keyword Syllabus :

Fundamentals of speech science, speech production models, short-term processing of speech, linear prediction analysis, speech coding and its applications; Speech recognition, Image processing, digital image representation and visual perception, image transforms, image enhancement, image filtering and restoration, image coding and compression techniques.

Textbooks :

- 1. J.R. Deller, J.G. Proakis, and J.H.L. Hansen, *Discrete-Time Processing of Speech Signal*, Macmillan Pub. Company, 2000.
- 2. R.C. Gonzalez and R.E. Woods, *Digital Image Processing*, 2<sup>nd</sup> ed., Addison-Wesley Publishing Company, 2002.

References :

- 1. L.R. Rabiner and B.H. Juang, *Fundamentals of Speech Recognition*, Prentice-Hall, 1993.
- 2. W. K. Pratt, *Digital Image Processing*, John Wiley and Sons, 1992.
- 3. Bovik, *Handbook of Image and Video Processing*, Academic Press, 2000.
- 4. T.P. Barnwell III, K. Nayebi, and C.H. Richardson, *Speech Coding: A Laboratory Textbook*, John Wiley & Sons, Inc. 1996.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Internet and Its Management (Elective)</b>	
<u>Subject Code</u>	:	EIE423	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	28 hours
		Laboratory	18 hours
<u>Pre-requisites</u>	:	Computer System Fundamentals	(EIE311)
<u>Credits</u>	:	3	

### Objectives :

To introduce the technical aspects and management of the Internet.

### Keyword Syllabus :

Reference model and protocols: TCP/IP, UDP, Domain Name System (DNS); Routing; Other protocols: Hyper-Text Transfer Protocol, Simple Mail Transfer Protocol, and Post Office Protocol; Internet Applications: TELNET, FTP, Email, WWW; Internet system configuration and management: setting up IP, DNS, internet electronic mail, Web sites; Network security.

### Textbook :

1. D.E. Comer, *Computer Networks and Internets, with Internet Applications*, 3/e., Prentice-Hall, 2001.

### References :

1. D. Lynch and M. Rose, *The Internet System Handbook*, Addison-Wesley, 1994.
2. J.S. Quarterman and C.S. Mitchell, *The Internet Connection: System Connectivity and Configuration*, Addison-Wesley, 1994.
3. D.E. Comer, *Internetworking with TCP/IP, Vol. I: Principles, Protocols, and Architecture*, 3<sup>rd</sup> ed., Prentice-Hall, 1995.
4. F.J. Cooper et al., *Implementing Internet Security*, New Riders, 1995.
5. A.E. Walsh, *Foundations of Java Programming for the World Wide Web*, IDG Books Worldwide, 1996.

<u>Method of Assessment</u> :	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Distributed Systems and Network Programming (Elective)</b>	
<u>Subject Code</u>	:	EIE424	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	33 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Computer Programming and Basic Software Engineering	(ENG221)
<u>Credits</u>	:	3	

### Objectives :

This subject will provide students with the principles of distributed systems and cluster computing. By the end of the course, students are expected to understand the enabling technologies for building distributed systems and also appreciate the hardware and software tradeoffs for application performance, development, and management on a cluster of computers. The subject also enables students to master the development skill for providing distributed services on the Web. Through mini-projects, students will work as a team to develop interoperable and distributed Web applications.

### Keyword Syllabus :

Introduction to Distributed Systems. Enabling Tools and Technologies for Building Distributed Systems: Networked computing; Component-based software development; Extensible Markup Language (XML). Distributed Services on the Web: Simple Object Access Protocol (SOAP); Web Services Description Language (WSDL); Universal Description, Discovery and Integration (UDDI); Web Services Security. Cluster computing; Software and Hardware for cluster computing; Clustering technologies.

### Textbooks :

1. H.M. Deitel et al., *Java Web Services for Experienced Programmers*, Prentice-Hall, 2003.
2. G.F. Pfister, *In Search of Clusters*, 2<sup>nd</sup> ed., Prentice-Hall PTR, 1998.

### References :

1. R. Nagappan, *Developing Java Web services : Architecting and Developing Secure Web services using Java*, Wiley Pub., 2003.
2. C. Ethans, *Web Services Essential*, O. Reilly, 2002.
3. P. Pacheco, *Parallel Programming with MPI*, Morgan Kaufmann, 1998.
4. <http://java.sum.com>

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Data and Computer Communications (Elective)</b>
<u>Subject Code</u>	:	EIE442
<u>Level of Study</u>	:	4
<u>Hours Assigned</u>	:	Lecture/Tutorial                      36/6 hours Laboratory                                      12 hours
<u>Pre-requisites</u>	:	Communication Fundamentals              (EIE331)
<u>Credits</u>	:	3

### Objectives :

This subject aims at introducing to the students the basic knowledge about data communication and computer networking. It will stress both fundamental concepts (e.g. OSI model, protocol operations) and practical system characteristics (e.g. interface, LAN, internetworking). By going through this subject, the students will have learned the necessary foundation knowledge to design and manage data communication systems and computer networks.

### Keyword Syllabus :

Overview of OSI 7-layer model and computer network architecture. Physical layer characteristics. Data link layer protocol design and performance issues. Local Area Network standards and their characteristics. Network layer protocols. Transport layer protocols. Examples of higher layer protocols and operations.

### Textbook :

1. B.A. Forouzan, *Data Communications and Networking*, 2<sup>nd</sup> ed., McGraw-Hill, 2000.

### References :

1. W. Stallings, *Data and Computer Communications*, 6<sup>th</sup> ed., Prentice-Hall, 2000.
2. A.S. Tanenbaum, *Computer Networks*, 4<sup>th</sup> ed., Prentice-Hall, 2003.
3. J.F. Kurose, K.W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, Addison-Wesley, 2003.
4. G.S. Hura, *Data and Computer Communications: Networking and Internetworking*, Boca Raton, 2001.

<u>Method of Assessment :</u>	Coursework	40%
	<u>Examination</u>	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

## Subject Description

<u>Subject Title</u>	:	<b>Telecommunication Networks (Elective)</b>
<u>Subject Code</u>	:	EIE443
<u>Level of Study</u>	:	4
<u>Hours Assigned</u>	:	Lecture/Tutorial 36/6 hours Laboratory 12 hours
<u>Pre-requisites</u>	:	Communication Fundamentals (EIE331)
<u>Credits</u>	:	3

### Objectives :

This subject aims at introducing to the students the basic knowledge about the telecommunication industry: its services and market, the theoretical basis about performance (queuing theory) and operation (multiplexing, switching, routing, and signaling). By going through this subject, the students will have gathered the necessary foundation information, and then be well prepared to engage into the telecommunication industry to take up assignment of job duties in various areas.

### Keyword Syllabus :

Overview of Telecommunication Networks and Industry. Queuing theory and traffic engineering. PCM and digital multiplexing hierarchy: T1, E1, T2, T3, SONET, SDH. Telecommunication switching, routing, and signaling: Time switch, space switching, routing algorithm, SS7 signaling.

### Textbook :

1. R.L. Freeman, *Fundamentals of Telecommunications*, John Wiley, 1999.

### References :

1. W. Goralski, *SONET/SDH*, McGraw-Hill, 2002
2. M. Cole, *Introduction to Telecommunications: Voice, Data and the Internet*, Prentice-Hall, 2002.
3. J. Salrand, *High-performance Communication Networks*, Morgan Kaufmann, 2000.
4. S.K. Bose, *An Introduction to Queuing Systems*, Kluwer Academic/Plenum Publishers, 2002.
5. W.C. Chan, *Performance Analysis of Telecommunications and Local Area Networks*, Kluwer Academic Publishers, 2000.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

**Subject Description**

<u>Subject Title</u>	:	<b>Digital Communications (Elective)</b>	
<u>Subject Code</u>	:	EIE446	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	28/6 hours
		Laboratory	15 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
		Mathematics II	(AMA202)
		Advanced Engineering Mathematics	(EIE300)
		Communication Fundamentals	(EIE331)
<u>Exclusions</u>	:	Advanced Digital Communications	(EIE441)
<u>Credits</u>	:	3	

Objectives :

The aim is to produce graduates with a clear theoretical background in the manipulation of digital signals for high-speed data transmission and to equip them with sound understanding in design of some typical high-speed digital communication systems.

Keyword Syllabus :

Baseband data transmission, intersymbol interference, eye-diagram, equalization. Matched-filter detection, probability of error. Passband modulation systems: ASK, FSK, PSK, DPSK, QPSK, OQPSK, DQPSK,  $\pi/4$ -DQPSK, QAM, MSK, GMSK. Modem. Source coding: Huffman coding, Shannon-Fano coding, Lempel-Ziv coding. Shannon's theorem. Channel coding: linear block codes, cyclic codes and convolutional codes.

Textbook :

1. S. Haykin, *Communication Systems*, 4<sup>th</sup> ed., John Wiley & Sons, 2001.

References :

1. A.B. Carlson, P.B. Crilly and J.C. Ruthledge, *Communication Systems*, 4<sup>th</sup> ed., McGraw-Hill, 2002.
2. J.G. Proakis and M. Salehi, *Communication Systems Engineering*, Prentice-Hall, 1994.
3. B. Sklar, *Digital Communications: Fundamentals and Applications*, Prentice-Hall, 1988.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.

### Subject Description

<u>Subject Title</u>	:	<b>Mobile Communications (Elective)</b>	
<u>Subject Code</u>	:	EIE447	
<u>Level of Study</u>	:	4	
<u>Hours Assigned</u>	:	Lecture/Tutorial	36/6 hours
		Laboratory	9 hours
<u>Pre-requisites</u>	:	Mathematics I	(AMA201)
		Mathematics II	(AMA202)
		Communication Fundamentals	(EIE331)
<u>Credits</u>	:	3	
<u>Exclusions</u>	:	Wireless Communications	(EIE444)
		Cellular Communications Systems	(EIE445)

#### Objectives :

This subject aims to introduce

- (i) the fundamental design principles in mobile communications,
- (ii) the operating principles and features of mobile communication systems: GSM, TETRA, CDMA (IS-95).

#### Keyword Syllabus :

Cellular concept, frequency reuse, frequency planning, co-channel interference, adjacent channel interference. Multiple access methods: FDMA, TDMA, and CDMA. Free space radio wave propagation, reflection, diffraction and scattering. Okumura & Hata models, Rayleigh, Ricean and lognormal distributions. Doppler frequency, delay spread, coherence bandwidth, and level crossing rate. Digital modulation techniques for mobile radio: quaternary phase shift keying (QPSK),  $\pi/4$ QPSK, minimum phase shift keying (MSK) and GMSK. Examples of commercial mobile systems: GSM, TETRA and CDMA (IS-95).

#### Textbook :

1. Rappaport T. S., *Wireless Communications: Principles and Practice*, Prentice-Hall PTR, 1996.

#### References :

1. Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D), Designers' guide; Part 1: Overview, technical description and radio aspects, ETSI ETR 300-1.
2. Radio Equipment and Systems (RES); Trans European Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design, ETSI ETS 300 392-1.
3. V.K. Garg and J. Wilkes, *Principles and applications of GSM*, Prentice Hall PTR, 1999.
4. V.K. Garg, *IS-95 CDMA and cdma2000 : cellular/PCS systems implementation*, Prentice-Hall, 2000.
5. Y.R. Man, *CDMA Cellular Mobile Communications and Network Security*, Prentice-Hall, 1998.
6. W.C.Y. Lee, *Mobile Communication Design Fundamentals*, 2<sup>nd</sup> ed., Wiley, 1993.
7. M.D. Yacoub, *Foundation of Mobile Radio Engineering*, CRC Press, 1993.

<u>Method of Assessment</u> :	Coursework	40%
	Examination	60%
	Total	100%

Note : To pass this subject, students must obtain grade D or above in BOTH the coursework and the examination.