

Tumba College of Technology

Department of Information Technology

Curriculum

Year 2009

Document History

Date	Version	Author	Remarks
2007/Apr/11	0.50	H.IDE(JICA)	First draft
2007/April/17	0.51	R.Joseph(MINEDUC)	Add some comments by Joseph, IDE
2007/Aug/07	0.52	R.Joseph, H.IDE	Reflect comments of 0.51
2007/Aug/13	0.60	H.IDE	Reflect comments from the curriculum workshop on 10 th Aug 2007 / Move the 'Digital Electronics' to 2 nd semester
2008/Aug/8	1.00	Muhamad & H.IDE	Erase Java II, Add LAMP II. Rearrange the contents of existing subjects and time period.
2008/Aug/12	1.01	IT Tutors & H.IDE	Add HTML basic to 'Intro to Pgm &DB'. Choose 'CCNA Discovery'
2008/Sept/16	1.02	Muhamad	Adding code to the subjects
2008/Dec/13	1.03	Muhamad	Renaming network software development with LAMP I and II, adding C programming and adding introduction to the CMS in web design course.
30/April/2009	1.0.4	IT staff & Sasahara and TAG	Renaming some courses and adding window server as new course

Table of Contents

1. General Information	3
a. Rationale.....	3
b. Intended outcomes.....	4
c. Pre-condition for designing this curriculum	4
2. Course structure	5
3. Subject detail.....	6
a. Hardware.....	6
Analogue electronics	6
Digital electronics	7
IT Essential 1	8
b. Network	9
Network Administration I	9
Network administration II	10
Linux Server	11
window server	12
c. Software.....	13
Computer User Application.....	13
Introduction to Programming and Database	14
Software Development Methodology	15
Software development fundamental.....	16
Web Based Application Advanced	17
Object Oriented Programming.....	18
Web Design Standard	19
IT Trend	20
d. Project.....	21
Project	21
Project	21
e. Common.....	22
Intensive English	22
Technical English.....	23
Communication skills	25
Technical report writing	26
Mathematics I	27
Mathematics II.....	28
Entrepreneurship.....	29

1. General Information

PROGRAMME TITLE: Diploma in Information Technology

FINAL AWARD: Ordinary Diploma (A1)

AWARDING BODY: Ministry of Education (National Examination Council)

COLLEGE: Tumba College of Technology

HOST DEPARTMENT: Dept. of Information Technology

COLLABORATION: Japan International Cooperation Agency (JICA)

a. Rationale

To improve the human resource in the technical side in Rwanda, and as a measure to decrease the problems of employment of graduates from technical secondary schools, the government has decided to start A1 programs to improve their employability and their advancement.

Information Technology is one of the areas considered to boost socio-economic development in the country

The course is intended to provide a balanced mix of Professional Technology knowledge in both theory and practical skills. In addition the student should be given ideas of self employment.

From the employer's point of view, there is a strong demand of Technicians in Rwandese industries/organizations such as RITA, RURA, RNC, GIS. The Technicians required should be knowledgeable and more practical. This makes the Graduates of the program to expect excellent career opportunities.

b. Intended outcomes

The graduates are expected to get the skills described as ‘key performance’ in the table below.

Specialty field	Key Performance Indicator (Graduates can :)	Employability
Hardware	<ul style="list-style-type: none"> assemble PCs (Board based) troubleshoot and repair for PCs and peripherals (e.g. Monitor, Printer). upgrade PCs 	<ul style="list-style-type: none"> IT user company¹ PC assembling company² Self employment Government sector³
Network	<ul style="list-style-type: none"> install LAN with Internet servers. administrate LAN 	<ul style="list-style-type: none"> IT user company Telecom companies Network service company⁴
Software	<ul style="list-style-type: none"> develop simple application software - Web application, Business application - by his/her own or by a small team 	<ul style="list-style-type: none"> IT user company. Government sector Software company
Common	<ul style="list-style-type: none"> make business plans have financial management skills have negotiation skills in business 	

c. Pre-condition for designing this curriculum

The listed items below were considered as a precondition in designing this curriculum.

- One semester has 15 weeks. (12 weeks for lecture, 3 weeks for examination.)
- One day can have up to 8 hours for lectures except Wednesday. Wednesday can have 5 hours.
- One hour means 45 minutes.

¹ This means the companies which intend to improve their business efficiency and effectiveness by using IT. For example, banking business, hotel business, retail business, distribute trade, hospitals.

² This means the companies which import computer parts and assemble PCs in Rwanda.

³ This means the IT department of the governmental bodies.

⁴ This means the companies which offer the services such as installing and administrating LAN, Internet connection for small offices and/or home offices.

2. Course structure

Sem	Code	Subject	Category	Hours	Total
1	EN111	Intensive English	Common	7	84
	MA111	Mathematic I	Common	5	60
	IT111	Computer User Application	Common	7	84
	ET111	Analog Electronics	General	6	72
	IT112	Introduction to Programming and Database	SD	5	60
	IT211	IT Essential 1	HW	6	72
	Total Hours				36
2	EN121	Technical English	Common	3	36
	EN122	Technical Report Writing	Common	1	12
	MAT121	Mathematic II	Common	6	72
	ET121	Digital Electronics	Common	6	72
	IT121	Software Development Methodology	SD	8	96
	IT122	Web Based Application Fundamental	SD	12	144
	Total Hours				36
3	IT226	Project	SD/NW	2	24
	EN211	Communication Skill	Common	3	36
	IT212	CCNA 1,2	NW	14	240
		Windows Server	NW	6	72
	IT213	Object Oriented Programming	SD	6	72
	IT222	Web Design Standard	SD	2	24
	Total Hours				33
4	FN221	Entrepreneurship	Common	2	24
	IT226	Project	SD/NW	4	48
	IT221	IT Trend	General	2	24
	IT223	CCNA 3,4	NW	14	156
	IT224	Linux Server	NW	6	72
	IT225	Web Based Application Advanced	SD	6	72
	Total Hours				31
5	IT311	Industrial attachment		40	480
	Total Hours				

3. Subject detail

a. Hardware

Title	Analogue electronics	
Subject Outline		
Students learn the functions and characteristics of electronic devices and circuit.		
Attainment Objectives		
Students can:		
<ul style="list-style-type: none"> - analyze BJT and FET-based amplifier circuits - analyze multistage amplifiers - choose appropriate power amplifiers for different applications - use properly opto-electronic devices and other special devices 		
Contents		
<ul style="list-style-type: none"> • Bipolar Junction Transistor Common emitter configuration, common collector configuration, common base configuration, dc load line analysis, BJT as a switch. Introduction to switched mode power supplies. • Field Effect Transistors FET amplifier configuration (CS, CG and CD), MOSFETs. • Multistage transistor amplifier Different coupling schemes and working principle, Working of RC coupled and Transformer multistage amplifier, approximate calculation of two stage voltage gain, Physical significance of bandwidth, upper and lower cross over frequencies, and direct coupled amplifier. • Power amplifier Amplifiers classes and efficiency (class A, B, C, AB), push-pull amplifier principle, push-pull drivers, harmonic distortion, Class AB operation. • Oscillators basic principles of sinusoidal oscillators, oscillators with RC feedback, oscillators with LC feedback, crystal oscillators, non-sinusoidal oscillators. • Special electronic devices and applications Opto-electronic device, photoconductive cells, photodiodes, phototransistors, liquid-crystal displays (LCDs), unijunction transistors (UJTs), voltage controlled capacitors (Varactors diodes). 		
Required preparatory study	None	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
<ul style="list-style-type: none"> • Reference Books are as follows: <ul style="list-style-type: none"> - Fundamentals of Electronic Devices and Circuits by David A. Bell - Electronic devices and circuits by Theodore F. Bogard - Principles of Electronics by A.P. Malvino • This subject is developed by the Dept of Communication Technology. 		

Title	Digital electronics	
Subject Outline		
Students learn analysis and construction of digital systems.		
Attainment Objectives		
Students can:		
<ul style="list-style-type: none"> - explain the methods of analysis and synthesis of combinational and sequential circuits. - explain the adaptation of digital circuits to the environment. 		
Contents		
<ul style="list-style-type: none"> • Boolean Algebra and Logic Gates: Basic derived gates, circuits, truth tables, logic symbols, logic levels. Boolean expressions, axioms and postulates of Boolean algebra. Boolean laws and theorems. Minimization techniques of logic expressions using Boolean algebra and Karnaugh maps. • Combinational logic circuits Definition, SoP and PoS representation, canonical maxiterm/minterm expressions, algebraic simplifications of logic circuits, Karnaugh method, don't care, design of simple combinational logic circuit. Design of arithmetic circuits, half adder, full adder. BCD-to-7-segment decoder/drivers, encoders and decoders, multiplexer, de-multiplexers and applications. • Sequential logic circuits: Flip-flops, SR-FF, JK-FF, master/slave FF, D-FF, T-FF. • Design of sequential logic circuits State diagrams, transition tables, state tables, asynchronous & synchronous counters, & binary counters, other counter, shift registers, (PIPO, PISO, SISO, SIPO) • D/A & A/D Conversion D/A converters, accuracy, resolution, linearity error, full-scale range, full-scale error, setting time, A/D converters, resolution, quantization, quantization error. 		
Required preparatory study	Analogue electronics	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
<ul style="list-style-type: none"> • Reference books are as follows: <ul style="list-style-type: none"> - Digital Principles and Applications by Malvino Leach - Modern Digital Electronics by R.P. Jain - M. Morris Mano – Digital Logic and Computer Design PHI – 1994 - A.P. Malvino and D.P. Leach – Digital Principles and Applications – Fourth Edition – Tata McGraw Hill Edition – 1999. • This subject is developed by the Dept of Communication Technology. 		

Title	IT Essential 1	
Subject Outline		
Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. Through hands on activities and labs, students learn how to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems.		
Attainment Objectives		
Students can: - explain the functionality of PC components. - install and maintain PCs. - troubleshoot PC related problems.		
Contents		
<ul style="list-style-type: none"> IT Essential 1 Introduction technology basics, How computers work, Assembling a computer, Operating system fundamentals, Windows 9x operating systems, Windows NT/2000 operating systems, Multimedia capabilities, Advanced hardware fundamentals and servers, Networking fundamentals, Printers and printing, Preventive maintenance and upgrading, Trouble shooting PC hardware, Trouble shooting software 		
Required preparatory study	None	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
<ul style="list-style-type: none"> This subject is the same as ‘IT Essential 1’ designed by CISCO academy. This subject helps students prepare for CompTIA's A+ certification. 		

b. Network

Title	Network Administration I	
Subject Outline		
Students learn the basic functionality of network equipment and mechanism of network protocol (TCP/IP).		
Attainment Objectives		
Students can: - explain the mechanism of TCP/IP. - explain the basic functionality of OS such as Windows and Linux. - use basic tools for administrating a server and a router. - install a simple LAN.		
Contents		
<ul style="list-style-type: none"> • IT Essential 2 Operation system fundamentals, Introduction to networking, Physical components of a network, TCP/IP networking, Overview of network services, Introduction to network operating system, Installation and boot process overview, Windows 2000 professional, Linux installation procedure, Linux administration, Advanced NOS administration, Installing and maintaining hardware in Linux, Troubleshooting the operating system, Network security • CCNA Discovery 1 : Networking for Home and Small Businesses Plan and install a small network connecting to the Internet /Troubleshoot network and Internet connectivity /Share resources such as files and printers among multiple computers /Recognize and mitigate security threats to a home network /Configure an integrated wireless access point and wireless client • CCNA 2 Discovery 2: Working at a Small-to-Medium Business or ISP Understand the structure of the Internet and how communication occurs between hosts /Install, configure, and troubleshoot Cisco IOS devices /Plan a basic wired infrastructure to support network traffic /Configure a server to share resources and provide common Web services /Implement basic WAN connectivity using Telco services /Demonstrate proper disaster-recovery procedures and perform server backups 		
Required preparatory study	None	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject consists of 'IT Essential 2', 'CCNA Discovery1' and 'CCNA Discovery2 ' designed by CISCO academy. Tutors must go thorough all the 'Activities' and 'Labs' in the Cisco on-line textbooks before the semester starts.		

Title	Network administration II	
Subject Outline		
Students learn the advanced functionality of network equipment and basic configuration of WAN.		
Attainment Objectives		
Students can: - design and install a LAN - design and install a simple WAN - administrate a small scale network with an Internet connection.		
Contents		
<ul style="list-style-type: none"> • CCNA 3 : Introducing Routing and Switching in the Enterprise Implement a LAN for an approved network design /Configure a switch with VLANs and inter-switch communication /Implement access lists to permit or deny specific traffic /Implement WAN links /Configure routing protocols on Cisco devices /Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI model • CCNA 4: Designing and Supporting Computer Networks Gather customer requirements /Design a simple Internetwork using Cisco technology /Design an IP addressing scheme to meet LAN requirements /Create an equipment list to meet LAN design requirements /Install and configure a prototype Internetwork /Obtain and upgrade Cisco IOS software in Cisco devices 		
Required preparatory study	Network administration (I)	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject consists of ‘CCNA Discovery3’, ‘CCNA Discovery4’ designed by CISCO academy. Tutors must go thorough all the ‘Activities’ and ‘Labs’ in the Cisco on-line textbooks before the semester starts.		

Title	Linux Server	
Subject Outline		
Students learn how to install, configure and maintain window servers and based internet server.		
Attainment Objectives		
Students can:		
<ul style="list-style-type: none"> • - install a DHCP server. - install a DNS server. - install an E-mail server. - install a Web server. - install a FTP server. - install a Samba server. - install a IP PBX (Asterisk) - install a monitoring tool 		
Contents		
<ul style="list-style-type: none"> • UNIX Installation: Computer Networking, Architecture of OS UNIX, Basic of using Linux, Bash, NFS, Basic of DNS (BIND), Advanced DNS (BIND), Install and Configuration RPM Apache, Install and Configuration Apache from source code, Servlet Container-Tomcat, Basic of FTP Sever (vsftpd), Basic of Samba, Basic of Mail Server (Postfix) 		
Required preparatory study	Network administration(I)	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject is designed based on the JICA Kyrgyz IT center's training course. (UNIX Installation)		

Title	window server	
Subject Outline		
Students learn how to install, configure and maintain window based internet server.		
Attainment Objectives		
Students can:		
<ol style="list-style-type: none"> 1. Install and configure active directory 2. Create group policy 3. Install and configure a DHCP server. 4. Install and configure a DNS server. 5. Install and configure an e-mail server. 6. Install and configure a Web server. 7. Install and configure a FTP server. 		
Contents		
Required preparatory study	Network administration(I)	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
Teacher will design this subject		

c. Software

Title	Computer User Application	
Subject Outline		
Students learn the basic functions of a PC and operations of office application software from a view point of 'IT user'. The 'OpenOffice' will be used as office application software.		
Attainment Objectives		
Students can:		
<ul style="list-style-type: none"> - identify PC components such as screen, keyboard mouse and their roles. - explain the historical, current and future trends in computing. - explain proper attitudes towards joining the 'Internet society'. - explain the importance of 'copyright'. - do touch typing. - retrieve the necessary information from Internet by using a search engine. - create a report by using a word processor, spreadsheet and drawing software. - make a presentation by using a presentation software 		
Contents		
<ul style="list-style-type: none"> • OpenICDL(International Computer Driving License) based training <ul style="list-style-type: none"> ➤ Concept of Information Technology ➤ Using computer and managing files with desktop environment ➤ Word processing using OpenOffice.org Writer ➤ Spreadsheets using OpenOffice.org Calc ➤ Presentation using OpenOffice.org Impress ➤ Database using OpenOffice.org Base ➤ Information and Communication using Mozilla and Thunderbird • Information ethics 		
Required preparatory study	None	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
Simple E-learning material developed by JICA is available for the 'Information ethics'.		

Title	Introduction to Programming and Database	
Subject Outline		
Students learn all the necessary technical elements for developing a simple program and a database. The 'technical elements' include C programming, Linux and MySQL. In this subject, each student will go through entire process of create a small database and manage it by his/herself student will go will learn simple programming in C language.		
Attainment Objectives		
Students can: - use basic commands of Linux (e.g. Login, cd, rm, cp, mv) - draw a simple flowchart and code it by PHP - issue basic sql statements and understand the concept of the relational database.		
Contents		
<ul style="list-style-type: none"> • Introduction to Linux Introduction of Linux, Basic operation, file system, file copy, move, file permission control • Introduction of programming with PHP and MySQL Basic algorism (e.g. sort), Development environment setup, Basic HTML, PHP grammar, Programming Introduction to SQL database, Introduction to MySQL, MySQL system administration, Designing SQL database, Manipulating SQL database, MySQL database maintenance • Introduction of programming with C Basic algorism 		
Required preparatory study		
Grading criteria	Examination (CAT1)	15%
	Examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject is designed based on the JICA Kyrgyz IT center's training course except 'Introduction of programming with PHP and basic algorism'.		

Title	Software Development Methodology	
Subject Outline		
Students learn a process for developing software which has the quality as an industrial product.		
Attainment Objectives		
Students can: - manage their daily activities as defined in Personal Software Process. - explain all the necessary tasks for developing software. - make a development plan for small scale software with an appropriate software development methodology. - develop design documents by UML.		
Contents		
<ul style="list-style-type: none"> • Personal software process The process for ensuring quality software product by an engineer though : Managing the quality of their projects, Make commitments they can meet, Improving estimating and planning, Reduce defects in their products, etc. • Software development methodology Software development processes, Problems on development of large-scale software , Software development models, Data, Process and Object Oriented Approaches, Introduction to system modeling methods, CASE Tool • System design fundamental System design process and work flow, System requirements analysis & definition, Architecture design, Logical design for data oriented systems, Physical design (Detailed design), Software testing design • UML ver2.0 Modeling Concepts of UML, Class Diagrams, Activity Diagrams, Interaction Diagram, Use Case • Review and Test The concept and importance of software review and testing, Productivity improvement in the development process and products, The overview of system testing and profiling 		
Required preparatory study	Students must have an experience on developing small scale software. This subject should be conducted in line with 'Software development with LAMP I'	
Grading criteria	Theory examination (CAT1)	30%
	Practical examination (CAT2)	0%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject is designed based on the JICA Kyrgyz IT center's training course (Software development methodology, System design fundamental, UML, Review and Test) and based on the JICA Myanmar IT training course (Personal Software Process).		

Title	Software development fundamental	
Subject Outline		
Students learn all the necessary technical elements for developing a small scale Web application. The ‘ technical elements’ include Linux, Apache, MySQL and PHP (= LAMP) and specification documentation. In this subject, each student will go through entire process of software development and create the application by his/herself.		
Attainment Objectives		
Students can: - setup a development environment for LAMP. - develop (= design, code, test) a small scale Web application by LAMP.		
Contents		
<ul style="list-style-type: none"> • Introduction to LAMP Overview of the technologies for dynamic Web Application, What is LAMP?, Consideration of version combination in LAMP, Linux administration basics, Setting up LAMP environment, • Apache administration for LAMP Introduction to Apache Web server, Basic administration of Apache, Practical techniques of Apache • PHP programming basics for LAMP Introduction to PHP, Basic programming in PHP, Accessing MySQL from PHP, Practical techniques of PHP for Web application, Popular extension to PHP • LAMP workshop Developing a small scale Web application 		
Required preparatory study	Students must have knowledge about the software development process. This subject should be conducted in line with ‘Software development technique’	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject is designed based on the JICA Kyrgyz IT center’s training course (Introduction to LAMP, Apache administration for LAMP, MySQL administration for LAMP, PHP programming for LAMP, LAMP workshop).		

Title	Web Based Application Advanced	
Subject Outline		
Students learn the object oriented approach with PHP.		
Attainment Objectives		
Students can: - develop a small system with PHP by using object oriented approach.		
Contents		
<ul style="list-style-type: none"> Object oriented approach with PHP Introduction of PHP, Sample programming with PHP5, MySQL and Apache. PHP workshop Developing a small scale Web application by PHP5. 		
Required preparatory study	Web Based Application Fundamental	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
TCT needs to develop the teaching materials from scratch.		

Title	Object Oriented Programming	
Subject Outline		
Students learn the concept of ‘Object Oriented Approach(OOA)’, UML and grammar of Java programming language.		
Attainment Objectives		
Students can: - explain the concept of OOA - choose an appropriate UML chart and draw it when they develop some software. - code a Java program.		
Contents		
<ul style="list-style-type: none"> • Object oriented analysis and design with UML Structured programming, Concept and definition of Object Oriented Analysis and Design, Development method of object oriented design with UML, Quality and productivity of program • Java programming (Fundamental) Concept of Java Language, Java Programming Grammar basics (I), Java Programming Grammar basics (II), Class and Object, File system, Network 		
Required preparatory study	Software Development Methodology	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject is designed based on the JICA Kyrgyz IT center’s training course (Object oriented analysis and design with UML, Java programming fundamental).		

Title	Web Design Standard	
Subject Outline		
Students learn the basics of developing the friendly user interface.		
Attainment Objectives		
Students can: - design and develop a simple and friendly user interface.		
Contents		
<ul style="list-style-type: none"> • Overview of Web design Web characteristics, Problems, The importance of MVC architecture • Web user interface design Important aspects of user interface, Color scheme, Type and font handling, Intuitive page layout, User responsiveness, Effective Web site structure, Handling stateless navigation • Media technologies for the Web When and where to use medias on Web page, 2D Graphics, Animation, Sound & Video, 3D Graphics • Analysis and Marketing Access analysis, Search engine handling and SEO, Web marketing • The latest trend in Web design Web 2.0, Web services API & Mash-up, Feed, Rich client and Ajax, XML-based Web design. • Introduction to CMS (Contents Management System) What is CMS, characteristics of WebCMS, benefit of CMS, different CMS Installation of CMS, and module configuration. 		
Required preparatory study	(Web Based Application Fundamental and Web Based Application Advanced) or Object Oriented Programming	
Grading criteria	Theory examination (CAT1)	15%
	Practical examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
This subject is under development in JICA Kyrgyz IT center project. Contents are subject to change.		

Title	IT Trend	
Subject Outline		
Students learn the trend of the information technologies that are not covered by other subjects.		
Attainment Objectives		
Students can:		
- explain the characteristics of other major programming language (e.g. C#, VB)		
- explain the cutting edge IT topics (e.g. pervasive computing, embedded software, grid computing, Web service)		
- explain the wide used IT terms and their concept (e.g. e-government, out sourcing business, Enterprise Resource Planning, Business Process Re-engineering)		
- search the necessary information on IT trend from the Internet.		
Contents		
<ul style="list-style-type: none"> • Introduction of major programming languages • Cutting edge topics in IT 		
Required preparatory study	None	
Grading criteria	Examination (CAT1)	15%
	Examination (CAT2)	15%
	Final examination (practice and theory)	60%
	Continuous assessment (attendance rate, quiz etc.)	10%
Note		
TCT IT staff needs to develop teaching materials		

d. Project

Title	Project	
Subject Outline		
Students learn the basic concepts, needed material and procedures to carry out Project work with group supervisor.		
Attainment Objectives		
Students can:		
<ul style="list-style-type: none"> - explain the characteristics of a project work. - explain clearly the material to be used for a project work. - give the types of project work and explain. - search the necessary information on Project work. 		
Contents		
Depends on the project team.		
Required preparatory study	None	
Grading criteria	NA	
Note		

Title	Project	
Subject Outline		
Students learn to identify a project work with respect to the working environment and they will have to carry out practical work and submit project work report and present.		
Attainment Objectives		
Students can:		
<ul style="list-style-type: none"> - explain the characteristics of a project work. - explain clearly the material to be used for a project work. - give the types of project work and explain. - search the necessary information on Project work. 		
Contents		
<ul style="list-style-type: none"> -Student can start developing application software -Student can start doing hardware project work. -Student can start carry out network project work. 		
Required preparatory study	Project I	
Grading criteria	Practical examination	50%
	Viva Voce	40%
	Project Record	10%
Note		

e. Common

Title	Intensive English	
Subject Outline		
Students learn speaking / listening / writing skills enough to join the TCT's lectures organized in English.		
Attainment Objectives		
Students can:		
- express themselves fluently in writing, speaking and listening in English.		
- join the lectures organized in English.		
Contents		
<ul style="list-style-type: none"> • English speaking Word building and spelling, formation of nouns, formation of adjectives, formation of verbs, spelling, antonyms ,synonyms, learning new words like cries of animals, sounds of objects, young ones of animals, diminutives, collections, comparisons, one word for many ,idioms and phrases, miscellaneous idioms, distinction between similar words often confusing. • English writing <ul style="list-style-type: none"> a) Grammar: parts of speech, words and words-groups, the sentence, the noun, the pronoun, the case, the article, the adjective, the verb, the mood, the participle and the gerund, agreement of the verb with its subject, auxiliary and defective verbs, The tense, change of voice, the adverb, the preposition, the conjunction, the interjection, the same word used as different parts of speech. b)Composition: paragraph writing, Essay writing, descriptive essays, narrative essays, imaginative and reflexive essays, letter writing, personal or private letter, official letters and applications, business letters, invitations, story writing, précis-writing. • English listening English Music, Speech and other English program. 		
Required preparatory study	None	
Grading criteria	Practical examination	0%
	Assignment (attendance rate, quiz etc.)	10%
	Final examination	60%
	Continuous assessment	30%
Note		
None		

Title	Technical English
Subject Outline	
Students learn the technical terms enabling them to write and present technical report, placing order, inviting dignitaries and so on.	
Attainment Objectives	
Students can: - write a technical Lab/Project report, commercial letter. - write a letter applying for a job.	
Contents	
<ul style="list-style-type: none"> • Grammar <ul style="list-style-type: none"> Word Formation with prefixes and Suffixes-Deriving other forms of words from the given form-active and passive voice-simple present, present continuous, present perfect and past continuous tenses-gerunds-conditional sentences-standard abbreviations compound nouns-nominal compounds-adjectives-meaning of words definitions correcting the sentences-filling the blanks with words given in the brackets-punctuation, statements of comparison, Instruction(Use of should and the imperative). Synonyms and antonyms-Preposition-relative-adverbs-connectives-expressions of cause and effect-purpose and means. • Comprehension and Transcending <ul style="list-style-type: none"> Test a reading comprehension: An unseen passage followed by(i) true or false (ii) Multiple choice (iii)sentence completion (iv) short answer and Questions etc. Transcending: <ul style="list-style-type: none"> a. A simple diagram b. A simple flow chart c. A simple classification d. A simple tree diagram • Report writing and letter writing <ul style="list-style-type: none"> Writing of Laboratory report-Writing of Technical reports. Letter inviting dignitaries to preside over a function-letter accepting an invitation-letter declining an invitation-letter to the editor-requisition letter for practical training-application for a job with bio-data. • Commercial letters <ul style="list-style-type: none"> a. Specification of common Engineering Equipments and tools-Calling for the quotations for the supply of equipments like Hardware and Computer Network, System software, Application software, Web design equipments, generator for power supply, Electronic devices and other Computer and electronic laboratory Components. b. Placing orders. c. Asking for clarification. d. Letter of complaint regarding some manufacturing defects. • Essays <ul style="list-style-type: none"> Writing essays on topics of Scientific and Technological important especially in the field of electronics/Computer Technology and not exceeding 500 words. Note: During the class period/hour, group discussions, debates, speeches, seminar and conversation etc. should be arranged to improve the communication skill. 	

Required preparatory study	Intensive English	
Grading criteria	Practical examination	0%
	Assignment	10%
	Final examination	60%
	Continuous assessment (attendance rate, quiz etc.)	30%
Note		
None		

Title	Communication skills	
Subject Outline		
Students learn advanced English skills.		
Attainment Objectives		
Contents		
<p>This subject is designed to enable student to improve the four main skills - speaking, listening, reading and writing. The subject aims to improve student confidence in the English language as quickly as possible. As well as these four main skills we will also work on other key areas to help develop student fluency and accuracy - pronunciation, grammar, vocabulary, idioms.</p> <p>The final lesson of the course is devoted to 'Speaking & Listening' which is an extra opportunity for fluency practice.</p> <p>The teacher has to use an innovative approach to teaching. Lessons must be activity and task-based with a high level of student involvement.</p> <p>The course must be Organized in this way gives students three free periods when they are free to use the Library Magazines, take part in the social program or simply hold conversation(in English)to one another etc.</p> <p>Student will be individually assessed both on arrival and regularly throughout the course. The instructor will give student a written and oral test on his first day and monitor his progress regularly throughout his course.</p> <p>(Joseph-san. the style of the explanation of this subject is different from others. In addition, I do not understand the difference between this subject and 'Intensive English/ Tech English'. Since English subjects are the common for all departments, please have discussion with your colleagues and clarify the exact contents of this subject.)</p> <p>Mr.IDE, I hold discussion with other coordinators about intensive and technical English and we concluded saying that we have to consider intensive English and transfer some elements from technical English and be added to Intensive English.</p>		
Required preparatory study		
Grading criteria	Practical examination	0%
	Assignment (attendance rate, quiz etc.)	10%
	Final examination	60%
	Continuous assessment	30%
Note		

Title	Technical report writing	
Subject Outline		
Students learn how to write a good technical report in English.		
Attainment Objectives		
Students can:		
- prepare the content of a technical report		
- understand the methodology and sequence of writing technical report		
Contents		
<ul style="list-style-type: none"> • Meaning and purpose of technical reports • Technical report components • Bibliography in standard format • Terms of reference 		
Required preparatory study		
Grading criteria	Practical examination	0%
	Assignment	10%
	Final examination (attendance rate, quiz etc.)	60%
	Continuous assessment	30%
Note		
None		

Title	Mathematics I	
Subject Outline	Students learn the mathematical concepts and techniques necessary for solving engineering problems.	
Attainment Objectives	<p>Students can:</p> <ul style="list-style-type: none"> - execute operations involving complex numbers - execute operations with vectors in two and three dimensions - understand matrix algebra and its applications - describe and Characterize lines, planes, conic sections and quadric surfaces - find minima and maxima of a function - sketch a function's curve - calculate arc lengths and areas 	
Contents	<ul style="list-style-type: none"> • Vectors Vector spaces, vectors in two and three dimensions, vector algebra, inner product (dot product), cross product and applications. • Matrices Matrix algebra, solution of systems of linear equations, determinants, inverses and characteristic values. • Analytical Geometry Plane analytical geometry; conic sections, translation and rotation of axes. Analytical geometry in three dimensions (lines, planes, spheres, quadric surfaces). • Calculus The concept of functions: Elementary and Transcendental Functions of a real Variable. Exponential, Hyperbolic and Logarithmic Functions of a real variable. • The derivative and applications curve sketching, maxima and minima, velocity and acceleration; trigonometric, exponential and logarithmic functions. • Definite and indefinite integrals area, work, arc length, the fundamental theorem, techniques of differentiation and integration. 	
Required preparatory study	None	
Grading criteria	Practical examination	0%
	Assignment (attendance rate, quiz etc.)	20%
	Final examination	60%
	Continuous assessment	20%
Note	None	

Title	Mathematics II	
Subject Outline		
Students learn mathematical concepts that are the foundation of computer science and engineering.		
Attainment Objectives		
Students can:		
- apply mathematical concepts and methods in modeling and solving engineering optimization problems.		
Contents		
<ul style="list-style-type: none"> • Sequences and series Taylor's theorem, power series. • Ordinary Differential Equations ODE of the first order, Linear equations of higher order with constant coefficients, Power series solutions, Laplace transformation, Fourier series. • Probability and statistics Sample spaces, random variables, probability, distribution and density functions, expectation, variance, moments and generating functions, central limit theorem. • Numerical Analysis Numerical Solutions of polynomial Algebraic Equations, Interpolation Formulae, Numerical Differentiation and Integration, Trapezoidal and Simpson's Rules of Integration Numerical Solutions of Ordinary Differential Equations. • Mathematical programming and modeling Simplex method, Transport methods, PERT methods etc... 		
Required preparatory study	Mathematics I	
Grading criteria	Practical examination	0%
	Assignment (attendance rate, quiz etc.)	20%
	Final examination	60%
	Continuous assessment	20%
Note		
None		

