Kigali Institute of Science and Technology

Institut des Sciences et de Technologie de Kigali

Avenue de l'Armée, B.P. 3900 Kigali, Rwanda

FACULTY OF ENGINEERING

Department of Electrical and Electronics Engineering

BSc Degree in Electrical Engineering

PROGRAMME SPECIFICATION

Prepared Nov 2008

PROGRAMME SPECIFICATION FORM

1. PROGRAMME DETAILS

1 **Programme Title**	BSc Degree in Electrical Engineering			
2 **Exit Awards**	**Level 5 – BSc Honours in Electrical Engineering** **Level 4 – BSc in Electrical Engineering**			
3 **Modes of Attendance**	Part-time		Full-time	√
	Distance		Work-based	
	Other		Short course	
4 **Resource group**:	1		5	√
	2		6	
	3		Other	
	4			
5 **First year of presentation**	2008		Current Session	

6 **Programme Organiser/Leader:**	Dr. Said KAFUMBE

7 **Programme Development Team**	
Name	**Faculty**
Mr. ZIMULINDA François (Chair)	FOE
Prof. Mohammed El Seyyad	FOE
Dr.Ignace GATARE	FOE
Mr. K.Gunalan	FOE
Mr. ASEMOTA	FOE
8 **Faculty/ School/Centre administratively responsible for the programme**	
FOE✓ FOS SOLAS CITC CITT CCE	

2. PROGRAMME FUNDING AND NEED FOR RESOURCES (changes since Programme Proposal Form)

Student numbers: Intake per year: __40__ into Level: __1

Eventual population, all years: _____160____

3. PROGRAMME AIMS AND RATIONALE

AIMS AND PHILOSOPHY OF THE BSc. in Electrical Engineering

In the new knowledge-based economy, engineering has become increasingly multi-disciplinary in nature. To better prepare students for this new environment, a new broad-based curriculum has been implemented in 2008. The aim is to produce engineers who are flexible across disciplines and able to apply their knowledge and skills to lead multi-disciplinary teams to solve increasingly complex problems. It also aims to produce thinking engineers who know how to apply existing technologies in novel ways and to create new technologies for the future.

As a developing country Rwanda has a huge need for engineers in different domains to improve the welfare of its population and to sustain the development of its industry. That is particularly true in the domain of electrical engineering. Rwanda projects that by 2020, at least 35 % of the population will be connected to electricity (up from the current 6%).

Also, part of the Rwandan Vision 2020 is to make Rwanda a knowledge-based economy. Information and communication technologies are expected to play an important role to achieve that vision. Therefore a constant injection of electrical engineers into the Rwandan economy is needed. The current programme is there to provide that function.

The KIST mandate is to produce the needed well trained manpower in science and technology. The Faculty of Science is there to fulfil this mandate in science while the Faculty of Engineering to which the current programme belongs, deals with technology. The current programme fulfils that mandate in the field of Electrical Engineering.

Educational Aims of the BSc in Electrical Engineering

The main aims of this programme are:

- To equip students with an understanding of the principles of electrical engineering, some aspects of which will be informed by current engineering practice necessary for them to secure employment as professional electrical engineers in a wide variety of industries.
- To introduce students to the principles of design in relation to simple electrical circuits.

- To encourage students with interests in electrical engineering to pursue those interests at university and at the same time to gain a firm grounding in the engineering of advanced technologies.
- To enable students to pursue careers across the breadth of the electrical industries.
- To develop students into graduates able and motivated to continue learning throughout their careers to meet the challenges of a changing world.
- To produce graduates who are able to take up higher studies and research in electrical engineering in internationally recognized institutions of higher learning.
- To produce graduates well trained in entrepreneurial skills which will make them be good nucleus for establishing more spin-off enterprises in the area of Electrical Engineering.

4. PROGRAMME LEARNING OUTCOMES

A. Knowledge and Understanding

At the end of the programme students should be able to demonstrate knowledge and understanding of:

A1. The essential facts, concepts, principles and theories of electrical science underpinning current technologies;

A2. Fundamental theories appropriate to the analysis of electrical system;

A3. Basic practical technologies currently used in electrical engineering;

A4. The limits of their knowledge, and how this may affect analyses of, and solutions to engineering problems;

A5. The commercial and financial constraints that engineers may have to work under

A6. Principles of design of electrical engineering systems,

A7. Management and business practices, including finance, law, marketing and quality control

B. Cognitive/Intellectual skills/Application of Knowledge

At the end of the programme students should be able to:

B1. Select and apply appropriate scientific principles, mathematical and computer based methods for analysing general electrical engineering systems

B2. Analyse and solve electrical engineering problems.

B3. Apply the evolving state of knowledge in a rapidly developing area.

B4. Deploy the appropriate methods, theory, practices and tools for tasks related to the engineering of electrical power systems;

B5. Analyse the professional and ethical considerations of exploiting electrical technology and be guided by the adoption of appropriate professional and ethical practices;

B6. Transfer appropriate knowledge and methods from one topic in electrical engineering to another.

B7. Applying engineering principles to create new products

C. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

At the end of the programme students should be able to:

C1. Apply the methods and techniques that they have learned to review and critically analyse information concerning engineering problems, and to propose and carry through appropriate solutions

C2. Operate electrical equipments effectively

C3. Plan, conduct and write a report on a project or assignment

C4. Use appropriate mathematical methods or use software packages for design, analysis and modelling

C5. Use relevant laboratory equipment and analyse the results critically.

C6. Design, build and test a system.

C7. Conduct Research into electrical engineering problems.

C8. Manage projects effectively.

C9. Communicate engineering information, ideas, problems and solutions to both specialist and non-specialist audiences, using appropriate technology.

D. General transferable skills

At the end of the programme students should be able to:

D1. Effectively retrieve information from a variety of sources;

D2. Ability to use IT to collect, analyse and present technical information;

D3. Manage resources and time; undertake lifelong learning.

D4. Use appropriate professional design tools;

D5. Work effectively as a member of a team, plan and execute a small project.

D6. Effectively present technical information in both written and oral forms;

D7. Undertake appropriate further training of a professional nature.

5. PROGRAMME STRUCTURE

Code	Module Title	Contact Hours	Credit	Level / Semester	Achievement of Level/Programme Outcomes*
YEAR 1 SEMESTER I					
ENG 3101	General English	72	0	**1 /1**	D6, D7
SST 3111	Study Skills for technology	36	10		C3, D3, D6, D9, D10
MAT 3111	Engineering Mathematics I	36	10		A1, B1, C2, D7
CIT 3111	ICDL	36	10		A3, B1, C2, D2, D7
MEE 3111	Drawing and CAD	36	10		A1, C2, C6, C8, D4
EEE 3111	Engineering Electromagnetics I	36	10		A2, B1, B7
TWP 3111	Electrical and Electronics Workshop technology - I	48	10		A5, B7, C1, C3, C5, C6, D1, D5
	Total L1 S1	**300**	**60**		
	Hours/week	**25**			
YEAR 1 SEMESTER II					
ENG 3101	General English	72	0	**1 / 2**	D6, D7
MAT 3121	Engineering Mathematics II	36	10		A1, B1, C2, D1
CIT 3121	Computer Programming	36	10		A3, B1, C2, C4, D1, D2, D4
EEE 3121	Engineering System Analysis	36	10		A2, A4, B1, B2, C3, D1, D8
EEE 3122	Analogue and Digital Electronics	36	10		A2, A6, B1, B2, C2, D2, D7, D9
EEE 3123	Network Analysis	36	10		A2, A6, B1, B2, C2, D4, D7, D9
TWP 3121	Electrical and Electronics Workshop Technology - II	48	10		A5, B7, C1, C3, C5, C8, D1, D5
	Total L1 S2	**300**	**60**		
	Hours/week	**25**			
	Total Level 1	**600**	**120**		

Code	Module Title	Contact Hours	Credit	Level / Semester	Achievement of Level/Programme Outcomes*
YEAR 2 SEMESTER I					
ENG 3201	English for Science and Technology	48	0	**2 / 1**	D6, D7
MEE 3211	Engineering mechanics (Dynamics)	36	10		A1, B1, B4, C1, C2
MAT 3211	Engineering Mathematics III	36	10		A1, B1, C2, D1
EEE 3211	Analogue Electronic Circuits	36	10		A2, A6, B1, B2, C2, D4, D7, D9
EEE 3212	Digital Electronic Circuits	36	10		A1, A2,A6, B1, B2, C2, D9
EEE 3213	Electrical Power Engineering	36	10		A1, B2, B7, C1, D4, D9
EEE 3214	Analogue & Digital Electronics Laboratory and Design	24	5		A5, A6, B2, B7, C3, C5, C6, C9, D1, D3, D5, D6, D7, D8, D9
EEE 3215	Electrical Engineering Laboratory and Design – I	24	5		A4, A6, B2, B5, C2, C5, C6, C8, D2, D4, D5, D6, D7, D9, D10
	Total L2 S1	**276**	**60**		
	Hours/week	**23**			
YEAR 2 SEMESTER II					
ENG 3201	English for Science and Technology	48	0	**2 / 2**	D6, D7
MAT 3221	Engineering Mathematics IV	36	10		A1, B1, C2, D1
EEE 3221	Electrical Machines I	36	10		A2, B2, B7, C1, D4, D9
EEE 3222	Network Analysis and Synthesis	36	10		A1, A2, A6, B1, B2, C2, D9
EEE 3223	Control Systems	48	10		A1, A2, A3, A6, B1, B2, B7, C2, C4, C5, C9, D1, D5, D6, D9

Code	Module Title	Contact Hours	Credit	Level / Semester	Achievement of Level/Programme Outcomes*
EEE 3224	Signals and Systems	36	10		A1, A2, A3, A6, B1, B2, B7, C2, C4, C5, C9, D1, D5, D6, D9
EEE 3325	Electrical Engineering Laboratory and Design – II	24	5		A5, A6, B2, B7, C3, C5, C6, C9, D1, D3, D5, D7, D9, D10
EEE 3226	Electrical Machines Laboratory - I	24	5		A5, A6, B2, B7, C3, C5, C6, C9, D1, D3, D5, D7, D9, D10
	Total L2 S2	**288**	**60**		
	Hours/week	**24**			
	Total Level 2	**564**	**120**		
YEAR 3 SEMESTER I					
ENG 3301	English for Academic Purpose	24	0	**3 / 1**	D6, D7
EEE 3311	Microprocessor and Its Applications	36	10		A2, A6, B1, B2, C2, D4, D7, D9
EEE 3321	Power Electronics	48	10		A2, B2, B7, C1, D4, D9
EEE 3312	Object Oriented Programming	36	10		A3, B1, C2, C4, D1, D2, D4
EEE 3314	Microprocessor Laboratory	24	5		A5, A6, B2, B7, C3, C5, C6, C7, C9, D1, D3, D5, D6, D7, D9, D10
ELE 3311	Electrical Machines II	36	10		A2, A6, B1, B2, C2, D4, D7, D9
ELE 3312	Communication Engineering	36	10		A2, B1, B6, B7
ELE 3313	Electrical Machines Laboratory – II	24	5		A5, A6, B2, B7, C3, C5, C6, C7, C9, D1, D3, D5, D6, D7, D9, D10
	Total L3 S1	**276**	**60**		
	Hours/week	**23**			
	Total Level 3	**276**	**60**		

Code	Module Title	Contact Hours	Credit	Level / Semester	Achievement of Level/Programme Outcomes*
YEAR 3 SEMESTER II					
ELE 3321	Modelling and analysis of power system	36	10	**4 / 2**	A2, A6, B1, B2, C2, D4, D7, D9
ELE 3322	Transmission & Distribution	36	10		A2, A6, B1, B2, C2, D4, D7, D9
ELE 3323	Electrical machines III	36	10		A2, A6, B1, B2, C2, D4, D7, D9
ELE 3324	Drives & Control	36	10		A2, B1, B2, B7, C2, C3, C7, D6, D9
EEE 3313	Measurements and Instrumentation	48	10		A2, B1, B2, B6, C5, C6, D1, D5, D9
ELE 3325	Electrical power systems laboratory	24	5		A2, B1, B2, B7, C2, C3, C7, D6, D9
ELE 3326	Drives & Control laboratory	24	5		B1, B2, B3, C5, D1, D5, D6, D7, D9
	Total L4 S2	**264**	**60**		
	Hours/week	**22**			
	Total Level 4	**264**	**60**		
ELE 3330	Industrial Attachment	**10 Weeks**	**20**	**4**	A6, B1, B3, B6, B7, B8, C2, C3, C5, C6, D1,D2, D3, D4, D5, D6
YEAR 4 SEMESTER I					
ELE 3411	Power System Analysis	48	10	**5 / 1**	A2, B1, B2, B7, C2, C3, C7, D6, D9
ELE 3412	High-Voltage Engineering	36	10		A1, A2, A6, B1, B2, B3, B7, C7, C8, C9, D4, D7, D9, D10
FIN 3420	Economics and Finance for Engineers	36	10		A7, B3, B7, B8, C8, C9, D5, D6, D9

Code	Module Title	Contact Hours	Credit	Level / Semester	Achievement of Level/Programme Outcomes*
CEE 3412	Engineering Ethics and Professional Conduct	24	5		A7, B5, B6, B7, C9, D5, D9
ESD 3411	Entrepreneurship Development	24	5		A7, B3, B7, B8, C8, C9, D1,D2,D9, D10
EEE 3410	Research Project - I	72	20		A6, B1, B3, B6, B7, B8, C2, C3, C5, C6, C7, C8, C9, D1,D2, D3, D4, D5, D6, D7, D10
	Total L5 S1	**264**	**60**		
	Hours/week	**22**			
YEAR 4 SEMESTER II					
EEE 3421	Micro controller & embedded systems	48	10	**5 / 2**	A1, A2, A6, B1, B2, B3, B7, C7, C8, C9, D4, D7, D9, D10
*ELE 3421	Power system operation and control	48	10		A2, A6, B1, B2, C2, D4, D7, D9
*ELE 3422	Renewable Energy Sources	36	10		A1, A2, A6, B1, B2, B3, B7, C7, C8, C9, D4, D7, D9, D10
ELE 3413	Power System Protection & Switchgear	36	10		A6, A7, B1, B2, C2, D4, D7, D9
EEE 3420	Research Project - II	72	20		A6, B1, B3,B5, B6, B7, C2, C3, C5, C6, C7, C8, C9, D1, D3, D4, D5, D7, D9,D10
	Total L5 S2	**240**	**60**		
	Hours/week	**20**			
	Total Level 5	**504**	**120**		
*** The only electives** **Electives are required**					

6. LEARNING AND TEACHING STRATEGY

The basic strategy is to encourage self learning by the student (Learning Objectives, LO D1). This will be achieved by a course in learning skills in the students' first semester, and by ensuring that the contact hours are on average throughout the programme no more than half the notional student learning effort hours of 40 per week (1200 hours over a 30 week year), that is an average of 20 hours per week. In the earlier years it will be a little higher than the average, reducing to the later years to below the average. Thus by the time the student leaves, he/she will be able to engage in life long learning (LO D10). In addition the student will be encouraged to make use of the e-learning environment as it becomes available (also LO D2).

The specific methods include:

- **Lectures**, supported by
  - Problem sheets for the student to solve in their own time.
  - Tutorial classes in levels 1 to 2, the number per lecture reducing through the levels.
  - Staff office hours in Levels 3 to 4, whereby the staff make themselves available at specific times in their office for students to come and ask questions. (LO's A1 to A7, B1 to B7, D1, D2, D4, D5, D8, D9)
- **Laboratory Classes,** Their role is to
  - Illustrate lecture material (LO's A1 to A4, B1, B2, B4)
  - Provide skill in using laboratory equipment and materials and recording data (LO's C1 to C7)
  - Analyse data, draw implications, and report the results (LO's A1 to A3, B1, B2, B4, C1, C2, C5, C6, D6, D8)
- **Project Work and Exercises**, These include
  - Essays (LO's A2, A5, A6, B1 to B4, C1, D1, D5, D6).
  - Small projects or exercises (LO's A2, A5, A6, B1, B2, B6, B7, C1 to C6, D1, D2, D5, D6).
  - Design projects in each laboratory course which is done in teams and provide an integrating thread for the mathematical and engineering knowledge. These are held in Levels 1, 2 and 4, with the Level 4 design project being of a realistic Electrical Engineering problem. (LO's A2, A5, A6, B1 to B4, B6, B7, C1 to C8, D1, D2, D5, D6).

- Individual Research Project at Level 4 (LO's A2, A5, A6, B1 to B4, B6, B7, C1 to C8, D1, D2, D5, and D6).

- **Industrial Visits and Placements** (LO's B2, B3, B6, B7, C1 to C3, C9, D1, D5, D6, D9)

7. ASSESSMENT STRATEGY

All assessment will be carried out with reference to marking criteria based on the KIST generic marking criteria. Specific marking criteria will be used for the different assessment types and these will use a matrix of elements and marking criteria where appropriate, such as project work. These marking criteria will be given to students so that they know what the examiners are expecting for a given piece of assessed work.

The maintenance of standards will be achieved by second marking and/or moderation of examinations, continuous assessed work and reports, depending on their nature. This will minimise mistakes or bias by any single examiner. Where possible, examinations and other assessments, level progressions and degree classification will be done anonymously to demonstrate impartiality to all students. In addition the overall assessment process will be subject to external examiner scrutiny that will provide benchmarking to international standards.

The different teaching methods are assessed as follows:

- **Lecture Modules** (those that are delivered mainly by lectures) will be examined primarily by end of semester unseen examinations, but will include an element (up to 40%) of continuous assessment. The latter may be taken from worked problem sheets, laboratory reports, essays or small project exercises. However most of the problem sheets supporting lectures will be formative as also may be some laboratory reports and essays (particularly at the lower levels) Some of the lecture courses may be examined primarily or completely by assignments, where the nature of the course is unsuitable for assessment by examination, e.g. study skills or computer programming. This strategy will contribute to ensuring the achievement of LO's A1 to A3, A5, A6, B1 to B4, C1, C5, C9, D1 to D5.
- **Design Projects**. These will examined by a group written report and group presentation. The report and presentation will be constructed so that individual contributions both to the technical work and team working will be

identifiable. The assessment will contribute to LO's A2, A5, A6, B1 to B4, B6, B7, C1 to C8, D1, D2, D5, D6.

- **Individual Research Project** ,This will be assessed by a written report, presentation and oral examination, thus contributing to the LO's A2, A5, A6, B1 to B4, B6, B7, C1 to C8, D1, D2, D5, D6.
- **Industrial Visits and Placement,** These will not normally be assessed summatively (they will be formative), but attendance and in some cases a satisfactory report may be required as a condition of progression, LO's B2, B3, B6, B7, C1 to C3, C9, D1, D5, D6, D9.

The individual module contributions to the Learning Objectives will be specified in each module specification, so that the higher level skills are demonstrated at the higher levels of the degree programme. A curriculum map for Modules and Learning Outcomes also shows the specification.

To guard against cheating, all end-of-semester examinations will be held under strict examination conditions in accordance with Institution requirements. It is impossible to completely prevent students collaborating on continuously assessed work, and indeed students helping each other is one of the most effective methods of student learning. However students will be made aware at the start of any module to what extent collaboration is desirable, and checks will be made by the relevant staff to ensure that direct copying is minimised. Similarly students will be made aware of what constitutes plagiarism, particularly in respect of essays and the Design Projects (Level 1, 2, 4) and Level 5 Research Project. Presentations and oral examination will help to make plagiarism apparent, but where appropriate, examiners will use other techniques such as internet searching and text comparators.

8. STUDENT PROFILE

The programme shall be open to local and international students interested in pursuing a career in Electrical Engineering. A minimum class size of 20 will be needed in order to run the programme economically. The programme will be open for full-time or part-time; however, the minimum enrolment shall be mandatory for either mode of delivery. There is no restriction based on age or gender for admission into the current programme. Therefore no special consideration of age or gender is taken into account in the design and delivery of the programme.

9. SPECIFIC ADMISSION CRITERIA

The following shall be the minimum criteria for admission:

- Candidates should have obtained at least a grade C in A' level Mathematics and Physics.
- Candidates from technical schools with a good pass in Electricity will be also considered.

10. STRATEGY FOR STUDENT SUPPORT

New entrants to the programme are given the opportunity to attend a 1-week orientation period. This familiarizes them with the structure and operation of their programme and the wider facilities of the Institute like:

- Registration
- Welcome meeting
- Security
- Safety
- Professional Institution membership
- Introduction to the Library
- Introduction to the Programmes of Study
- IT Support Service
- Students' Union
- Student support and welfare services
- Orientation guide for new international students
- Undergraduate handbook

An Industrial Training Co-ordinator helps students in identifying and acquiring a suitable industrial training placement. It also arranges for students to be visited by an industrial training tutor to support them during their time in industry.

To support work on individual projects during the final year of studies students are assigned a personal project supervisor who will meet with them regularly to provide guidance.

Each student will be assigned a Personal tutor who will provide advice on academic matters and follow up the student's progress. Personal tutors will refer students to the many other central support services of the Institute when necessary. This includes

counselling for students experiencing severe personal problems and supporting students on all administrative matters.

Student learning is supported by the collections of the KIST Library, the Institute's extensive Information Technology resources, the specialized technical laboratories and workshops. Support provided to students is consistent with the Institute policies on Equal Opportunities and Disabilities. A Directorate of Student Services provides assistance to students in matters related to their social welfare. KIST has a student affairs office that handles extra-academic students' issues.

11. PROGRAMME-SPECIFIC NEED FOR RESOURCES AND UNUSUAL DEMANDS ON UNIVERSITY RESOURCES

The following resources are required for the programme

Staff: (Based on the staff-student ratio of 1:15)

- Professor: 1
- Associate Professor: 2
- Senior Lecturer: 3
- Lecturer: 5
- Assistant lecturer: 7
- Laboratory technicians: 5
- Executive assistant to the HoD: 1

Laboratories and equipment: The following laboratories are required to run properly the programme

- Electrical Machines Laboratory
- Analog electronics laboratory
- Digital electronics and microprocessors laboratory
- Communication Engineering laboratory
- Measurements and control engineering laboratory
- Computer laboratory with a minimum of 30 PCs with simulation software for different subjects.

Other requirements:

- Computers for staff
- 4 LCD projectors

- Ideally a photocopier to aid the production of modern learning material

12. STRATEGIES FOR CONTINUOUS ENHANCEMENT AND FUTURE DEVELOPMENT

At the end of each semester there will be a Module Review meeting of all staff in the department to consider the progress of each module. The module leader will gather information from all staff involved in teaching the module and present these to the meeting. This will be considered along with student feedback on the module and the results of the module assessments. At the end of the year any views of external examiners will also be considered. Any module which is not going well will be subject to specific measures for improvement. This may involve changes to the content and timing of the module, the methods used for learning and teaching, the assessment methods and standards, and the physical resources required for the module. The effectiveness of these changes will be considered at the Module Review meeting after the next time the module is given.

At the end every four years a Programme Review meeting will consider the curriculum as a whole, regarding its quality and relevance to the needs of the profession and in the light of changes in technology. An Industrial Advisory panel, consisting of a range of professionals and employers in the Electrical Engineering profession, together with some of the senior staff in the department will consider the curriculum and offer suggestions and advice regarding the qualities and skills required of graduating students entering the profession. The Advisory panel will have an input into the Programme Review meeting and will also be asked to advise on any changes being considered to the curriculum.

13. STAFF DEVELOPMENT PRIORITIES

The most urgent priority is the equipping of staff to teach in a radically different manner than previously. The course material will be delivered with up to 35% less contact hours; they should teach so that students are encouraged to undertake self learning, and staff expectations of the students should be raised in terms of the initiative, ideas and confidence expected.

The staff members should be encouraged by giving training on latest development in Electrical Engineering field and supporting them to do their higher studies like Masters and PhD.

Another important priority will be the development of participation by every staff member in design projects, in collaborating with industries and in doing more consultancy projects.

14. ANY OTHER ESSENTIAL INFORMATION

PROVISIONAL APPROVAL

Members of Approval Panel

N^{O}	**Role/location**		**Date**
1	**Chair (VRAC)**	Signature	
		Print Name	
2		Signature	
		Print Name	
3		Signature	
		Print Name	
4		Signature	
		Print Name	
5		Signature	
		Print Name	
6		Signature	
		Print Name	
7		Signature	
		Print Name	
8		Signature	
		Print Name	

Seen and noted

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	
VRAF	Signature	
	Print Name	

MODULE DESCRIPTIONS

YEAR 1 SEMESTER I

MODULE DESCRIPTION FORM

1. **Module Code: ENG 3101**
2. **Module Title: General English**
3. **Level: I, SEM: 1 Credits: 0**
4. **First year of presentation: 1997 Administering Faculty: KIST Language Centre (KLC)**
5. **Pre-requisite or co-requisite modules, excluded combinations:**

   No pre-requisite required since this is a compulsory subject for all first year student
6. **Allocation of study and teaching hours (See Notes of Guidance)**

Total student hours: 144	**Student Hours**	**Staff Hours**
Lectures	72	144
Seminars/workshops	24	24
Practical classes/laboratory	24	24
Structured exercises	24	24
Set reading etc.		
Self-directed study	8	
Assignments – preparation and writing	20	
Examination – revision and attendance	20	
Other:		

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

This is a one- academic-year course to be offered in two SEMESTERs. These being the case, to know whether learning outcomes have been achieved or not will be possible at the end of the academic year and not at the end of a SEMESTER.

The course aims at laying down a solid foundation for language structure with a view to developing students' overall performance in English, this is to say, communication for general purposes; especially developing students' linguistic and communication skills, including listening, speaking, reading and writing, etc. Abilities in grammar, language functions, vocabulary building and cultural content activities are targeted for communicative purposes.

6.2. LEARNING OUTCOMES

A. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

A.1. Listening with comprehension to a recorded piece of information on a variety of topics in science and technology as well as texts of general interest;

A.2. Familiarizing students with phonetic symbols and their use, weak and strong forms

A.3. Speaking comprehensibly with relatively autonomy and independence;

A.4. Reading with comprehension a variety of shorter written authentic materials by using different reading techniques;

A.5. Writing simple and complex sentences using coordinating conjunctions, Writing short paragraphs, short essays and short descriptions.

B. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

B.1 Listen with comprehension to a recorded piece of information on a variety of topics as well as texts of general interest;

B.2 Speak comprehensibly to express their views, asking and giving information, talking about their experiences;

B.3 Read with comprehension a variety of short materials to find main ideas and to answer questions related to the text;

B.4. Write grammatical and meaningful sentences (simple and complex sentences), short paragraphs, short essays and short descriptions

C. Communication/ICT/Numeric/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C.1 Listen: Listening to peers and to recorded materials;

C.2 Speak: Exchanging personal information, asking for clarification and giving personal views;

C.3 Read: Reading short texts and writing short summaries

C.4 Write: writing simple and complex sentences, short paragraphs and essays,

D. General transferable skills

Having successfully completed the module, students should be able to:

D.1 Undertake self-learning: reading extensively and intensively a variety of materials

D.2. Participate in discussion, debates, outside the classroom on issues related to daily routines

D.3. Write simple descriptions, friendly letters, etc

7. INDICATIVE CONTENT

Listening: for specific information, listening for gist, listening for main idea; VOA, BBC, Special English Program and reporting

Phonology: familiarizing students with phonetic symbols and their use, weak and strong forms, understanding connected speech; signalling a question by intonation; problem with sound/spelling relationship, perception and pronunciation of unstressed syllables, stress and rhythm, word stress and intonation;

Speaking: Giving advice, expressing agreement and disagreement, persuading, and expressing feeling about people, predicting, talking about material and product, talking about manufacturing and other processes, etc. Oral presentations: Discussion in groups and pair works on contemporary issues and other topics (HIV/AIDS, Gender and development, sports, rural development) and reports;

Reading: *Reading different kinds of texts (from short (e.g. half a page) to relatively long texts (e.g. 2 pages) and for different purposes such as e*xpressive reading (reading with good pronunciation and correct stresses on strong syllables, and by respecting punctuation marks), predicting the meaning from the context of the texts, determining the meaning of words and phrases from the context, skimming, scanning, reading comprehension, reading for gist, for general and for specific information, increasing one's vocabulary through reading, using dictionary, etc.

Writing: writing simple and complex sentences using sentence connectors, adverbials and conjunctions, paraphrasing, summarising, writing paragraphs using paragraph development devices, letter writing, note-taking, simple report writing, writing descriptions etc.

Grammar quantifiers, the use of articles, the comparative for of adjectives, the different types of conjunctions (coordinating and subordinating conjunctions, the different types of clauses (dependent and independent clauses), , tag questions, using verb tenses and tenses sequencing: present simple, past simple, using infinitives, -ing form, using the gerund, prepositions and conjunctions, using adverbials, modals auxiliaries, reported speech, *present and past perfect, reported speech, conditional sentences, if vs when clauses, the passive voice*, sequencing markers, subordinating conjunctions and adverbials, etc.

8. LEARNING AND TEACHING STRATEGY

General principles (For SEMESTER 1 and SEMESTER 2)

The course is delivered using interactive/Communicative approach. i.e., everything done aims at equipping the student with skills he/she needs to interact with peers and the lecturer in class but also to enable him/her to study in English effectively. Students are given practice in the four basic skills: listening, speaking, reading, and writing along with grammatical notions. Group and pair-work are mostly emphasized in class. Students are always encouraged to take part in all class activities. Their errors are considered as part of the learning process as the lecturer might use them to address students' difficulties in the four skills, in language structure as well as in phonology. Students are also given some practice in listening to authentic recorded materials from the Cambridge English Course, VOA, and the BBC.

9. ASSESSMENT STRATEGY

For each SEMESTER, two types of assessments will be used:

● **On-going assessment/ Continuous Assessment Test (CAT):** 60% of the final grade. Calculated from different marked activities: listening, oral presentations (in groups, pairs and individual), short quizzes, essays, reports, written major Test out of 20 marks (It comprises: Reading Comprehension passages, Language in use or grammar, Phonology and Essay/Memo or Letter writing). Total mark: 100. This will serve to evaluate the student's ability to effectively use the learned listening, speaking, reading and writing skills.

Final Examination (2 hour examination): 40% of the final grade. By setting the final examination, lecturers aim at giving students the opportunity to demonstrate evidence of their understanding of the material and ability to skilfully use them rather than their ability to memorize masses of information.

Since this is a one academic year course, SEMESTER mark will constitute half (50%) of the final (end of year) mark and the final mark will be the sum of the two SEMESTERs. This being so, only the final mark (out of 100%) will be submitted to the Examination office for respective faculties and departments and this at the academic year (after SEMESTER 2 examinations).

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:	**40**	**A; B; C; D**
Written CAT	**20**	**B.4, C.4, D.3**
		B.1, B.2, B.3, C.1,C.2, C.3, 4.1

Final Exam	**40**	**A.1, A.2, A.3, A.4, B.4, C.4, D.3**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive/communicative approach, with a lot of opportunity of students' full involvement in group and pair work.
- Students will be given opportunities to participate in evaluating their own work in group works and pair works under the guidance of the teacher
- Tutorial group presentations on topics related to Science and Technology, as well as some current issues such as HIV/AIDS, environment, etc followed by peer comments and discussions
- Marked summative assessment (Written assignment, and test) handed back to students with comments.
- Students are given opportunities to consult their lecturers during working hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Michael Swan & Catherine Walter. *The New Cambridge English Course .CUP*

Siberstein, S. (1994). *Techniques and resources in teaching reading. Oxford and New York: Oxford University Press.*

Royster J., J., Lester M. (1891). Writer's Choice: Composition and Grammar. New York: MacMillan.

Grant T. (1997). English Conversation Practice: New York: McGraw-Hill Book Company

Journals

Background Texts (include number in library or URL) (inc ISBN)

English Grammar in Use

Audio Cassette & Cassette player

A kind of Marriage (from KIST Library)

Journals

None

Key websites and on-line resources

http://www.grammar.ccc.commnet.edu

http://www. Writeexpress.com

Teaching/Technical Assistance

Lecturers

Laboratory space and equipment

1 Language lab (American Corner) to be reallocated wider office space

To fix computers belonging to the American corner for CALL practices

Also, similar free space should be provided to students for listening practice, Video viewing and other related language practice.

Computer requirements

Set 10 more computers for language practice in the American Corner

Others

KIST Library to purchase 12 new cassette players/recorders and blank tapes for listening activities.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

2 more full time staff are urgently needed for a smooth running of the course.

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	**Dean/Head of Department**	**Date**
1 English	Signature	**10/12/2010**
	Print Name Joseph MAGAMBO	
2 KLC Directorate	Signature:	**10/12/2010**
	Print Name: John-Baptist RUSINE	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: SST 3111**
2. **Module Title: Study Skills for Technology**
3. **Level: 1 Semester: 1 Credits: 10**
4. **First year of presentation: 2008 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   No Prerequisites
   All first year, first semester modules
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	Student Hours	Staff hours
Lectures	12 + 12 tutorial	24 + 12 = 36
Seminars/workshops	12	24
Practical classes/laboratory		
Structured exercises		
Set reading etc.		----------
Self-directed study	28	----------
Assignments – preparation and writing	36	24
Examination – revision and attendance		
Other:		

NOTE: The above staff hours assumes a class of about 50 students

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The aim is to equip students for the very different teaching and learning style at University compared to school. Fundamentally it will cover the need to develop self-learning and to take responsibility for learning, managing time and teaching resources, and developing a creative and reflective approach to learning, as applied to the other modules of the semester.

6.2. LEARNING OUTCOMES

A. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

Prepare a short report and deliver a short presentation on a simple design project.

B. General transferable skills

Having successfully completed the module, students should be able to:

B.1 Undertake self-learning in relation to their other modules

B.2 Carry out self-learning throughout the rest of their programme and into their careers

B.3 Work as a member of a group and support each other

B.4 Manage their time at KIST and the teaching and learning resources

B.5 Communicate effectively to fellow students in group work, presentations and reports at a basic level.

7. INDICATIVE CONTENT

Time and stress management, how people learn, note making, preparation for exams

The Portfolio and Personal Development Plan (P.D.P.)

Group work and mutual support

Project Work (Main application to project design work at Levels 1 to 3)

Communications Skills – Report Writing, Oral & Visual Presentations

Use of Library and ICT resources

8. LEARNING AND TEACHING STRATEGY

The strategy is to use lectures, tutorial support and group work (with about 5 students in each group) to develop the study skills of the students.

The lecture and tutorial support form a two hour session each week, followed by a one hour group work session. Because many of the students will have English or French language problems in their first year, support will be provided in both languages to a limited extent.

Handouts in the lectures will also contain instructions for preparation for the group work. The group work is vital in encouraging student mutual support, and developing communication and team working skills. The students will produce a brief summary of the group's activity each week in a group log book. The group work will be supervised by tutors who will be allocated about 5 groups each, so that they can interact with the groups' activities and get to know each group member. The tutor will encourage autonomous working by the group members, so that they take the initiative in their own learning.

A key element will be the development of a reflective portfolio by each student, including the personal development plan. Each week the lecture handouts will also include instructions as to what to include in the portfolio from that week's work. The reflections will draw on the student's experience in learning from the other technical modules of that semester, and so it is important that the study skills course is integrated with the other modules.

9. ASSESSMENT STRATEGY

The assessment will be based on the portfolio and the group work.

The portfolio will contain a number of specified items and these will be assessed against a set of criteria based on the KIST generic marking criteria. These will be given to the students during the course so that they know at what the assessment is aiming.

The criteria will broadly cover:

a) The student's application of study skills to the other modules the student is studying.
b) The ability to reflect on his/her progress and show improvement in all courses.
c) The ability to initiate ideas for his/her future progress.
d) The use of teaching and learning resources
e) For the group work, the performance and contribution as part of a team.

The portfolio will be marked at the end of the semester, but with some components being marked earlier to provide feedback (see below). The group work will be assessed from the log book produced by the group, and on observations by the tutors

10. ASSESSMENT PATTERN

Component	**Weighting (%)**	**Learning objectives covered**
In-course assessment:		
Portfolio	**80%**	**2.1, 2.2, 2.4**
Group Work	**20%**	**1.1, 2.3, 2.5**

Final assessment:		

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

The Lecture/tutorial session are interactive with opportunity for students to ask questions and to receive support with difficulties, especially language. Also the most critical part of the handouts is translated into both languages.

Some of the portfolio items is marked and returned to students during the semester, typically at weeks 4 and 8.

Group work feedback is provided by the tutors during the group work periods, as well as promoting discussion on the returned portfolio items. Particular feedback is made on presentations, reports and project work.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Background Texts (include number in library or URL) (inc ISBN)

Bedford, Dorothy & Wilson, Elizabeth 'Study Skills for Foundation Degrees', David Fulton, 2006, ISBN 1-84312-464-5
Buzan, Tony. 'The Busan Study Skills Handbook', BBC Active, 2006, ISBN 1-4066-1207-3
Cottrell, Stella. 'The Study Skills Handbook' 2nd, Edition, Palgrave Macmillan, 2003, ISBN 978-1-4039-1135-3
Drew, Sue & Bingham, Rosie, 'The Student Skills Guide', Gower, 2001, ISBN 0-566-08430-9
Lee, James. 'GCSE Study Skills (GCSE Success Essentials)', Letts, 2005, ISBN 1-84315-473-0
Northedge, Andrew;Thomas, Jeff; Lane, Andrew; Peasgood, Alice. 'The Sciences Good Study Guide', the Open University, 1997, ISBN 0-7492-3411-3
Walmsley, Bernice. 'Teach Yourself Good Study Skills', Teach Yourself, 2006, ISBN 978-0-340-92814-1

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer, 2 tutors per 50 students for group work

Laboratory space and equipment

For group work sessions a room is required with a level floor with furniture that can be arranged for students to sit in groups. A black or white board is also required.

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

It is essential that the course is delivered in close collaboration with teachers of the other modules being taught and the department that the students belong to. Study skills have no relevance without relating them to the courses being studied.

This module is designed for all first year students in both Engineering and Science. The staffing resource has assumed about 50 students, but this will need adjustment depending on the total number. Ideally the course would best be taught to groups of students from the same departmental

14. TEACHING TEAM

To be determined

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _ _ MAT 3111 _____**
2. **Module Title: (ENGINEERING MATHEMATICS I)**
3. **Level: 1 Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Science**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Pre-requisite: S6 Mathematics
6. **Allocation of study and teaching hours**

Total student hours 100	**Student hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory		
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**18**	**16**
Examination – revision and attendance	**16**	**24**
Other:		

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The module describes the Students to understand Matrices, Differential Calculus, Functions of Several variables, Ordinary Differential equations and the Three Dimensional Analytical Geometry.

6.2. LEARNING OUTCOMES

A. Knowledge and Understanding

Upon Completion of this Module students,

A.1 should have a reasonable understanding of the definitions and terms related to the Module aims at as well as the Course Contents.

A.2 Should have a reasonable understanding of the statements, proofs and implications of the basic results.

A.3 should be able to present simple arguments and conclusions using Calculus and Complex Analysis arguments with clarity.

B. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

B.1 Developed their Problem solving Skills related to Calculus.

B.2 Have acquired reasonable facility for Symbolic and Numerical Calculation with Random Variables and Other Related Concepts.

C. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C.1 Apply Calculus concepts Principles and Methods to solve problems of any Branch of Mathematics.

C.2 Analyse and Evaluate Problems.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Assimilate Abstract Ideas.

4.2 Communicate information having Probability and Statistics content accurately.

7. INDICATIVE CONTENT

Unit I Matrices

Characteristic equation - Eigen values and Eigen vectors of a real matrix- property of Eigen values- Cayley-Hamilton theorem-Orthogonal reduction of a symmetric matrix to diagonal form- Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformation.

Unit II Geometrical Applications of Differential Calculus

Curvature- Cartesian and polar coordinates- Circle of curvature- Involutes and evolutes- envelopes- Properties of envelopes – Evolutes as envelope of normals.

Unit III Functions of Several variables

Function of two variables- Partial derivatives- Total differential – Differentiation of implicit functions- Taylor's expansion- Maxima and minima- Constrained maxima and minima by Lagrangean Multiplier method- Jacobians- Differentiation under integral sign.

Unit IV Ordinary Differential Equations

Simultaneous first order linear equations with constant coefficients - Linear equations of second order with constant and variable coefficients - Homogeneous equation of Euler type - Equations reducible to homogeneous form - Method of reduction of order- Method of variation of parameters

Unit V Three Dimensional Analytical geometry

Direction cosines and ratios- Angle between two lines- Equation of a plane- Equation of a straight line- Coplanar lines- Shortest distance between skew lines- Sphere- Tangent plane- Plane section of a sphere- Orthogonal spheres.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination. The students therefore will not just rely on memory but also show understandings of the principles in application to exam problems.
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- Computer Laboratory assessment criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	40	2.1, 2.2, 3.2, 4.1, 4.2
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Per marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Mann P.S. Introductory Statistics

Background Texts (include number in library or URL) (inc ISBN)

Advanced Engineering Mathematics by E. Kreysig.

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,

1 Tutorial assistant

Laboratory space and equipment

None

Computer requirements

Mat lab, Maple.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: CIT 3111**
2. **Module Title: INTERNATIONAL COMPUTER DRIVING LICENSE**
3. **Level: I Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: ENG**
5. **Pre-requisite or co-requisite modules, excluded combinations**
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff Hours**
Lectures	24	48
Seminars/workshops		
Practical classes/laboratory	12	24
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	16	6
Examination – revision and attendance	12	6
Other:		

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The ICDL is the internationally acclaimed qualification that enables people to demonstrate their competence in Information Technology skills. This course is becoming the most widely recognized qualification in the field of work-related computer use. ICDL is designed to cover the key concepts of computing, its practical applications and their use in the workplace and society.

Keywords:
Computer hardware, Software, Operating Systems, Word Processing, Office Automation, internet

6.2. LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

- Demonstrate practical application of Office Automation

4. General transferable skills

Having successfully completed the module, students should be able to:

– Develop learning new applications in day today computing

– Use competently the internet and common software applications

7. INDICATIVE CONTENT

Basic Concepts of Information Technology:

Definition of computers, Identify various kinds of computers, from mainframes to supercomputers, Advantages and Disadvantages of computers, Distinguish between Hardware and Software , Identify the main parts of a Personal computer, Central Processing Unit, Input Devices, Output Devices, Storage Devices, Software Types, Operating Systems & Utilities, Development Software/Programming languages,

Application Software types & use, General Precaution, user security, backup, operator error, hardware failure, software failure (Viruses), Routine Care and Maintenance

Using the Computer and Managing Files:

Start, shut down and restart the computer, Understanding the Desktop Environment, Starting and quitting a program, opening a document. Getting help, Organizing files and folders, Finding files and folders on your computer, Starting a program by using the run command, Working within documents (cut, copy, paste)

Word Processing:

Definition of Word Processing, Word Processing functions and features, Advantages of MS Word over a typewriter, Starting MS Word, Using the Menu System, Using the Mouse, Using the short cut buttons, Using the keyboard, Displaying Rulers and Toolbars, Opening a New Document, Using a File, New, Using the New button or Ctrl + N, Exiting Word, Opening and Closing and Exiting document, Saving a document, Selecting Text, Cursor movements, Importance of non-printing characters. , Formatting Fonts and Paragraphs, Paragraph Formatting, Producing newspaper columns, Formatting pages, editing a document. , Copying and Moving Text, Error Proofing tools (Check Spelling and Grammar), Adding and manipulating graphics and objects, Creating tables, Mail merging.

Printing, Print preview, printing a document

Spreadsheet:

Definition of Spreadsheet software, Enter data and formulas, Format a worksheet, Work with Functions, sum paste function and auto sum, average functions, IF function, other logical functions, Nested IF functions, Insert, select, copy, move and delete data, Create and copy formula, Search and replace data, Sort data, Create, adjust, move and delete charts, Import an object and text file into a spreadsheet, Preview and prepare a spreadsheet for printing.

Presentation (Microsoft Power-Point):

Presentation tools, Toolbars & there functions, Screen Layout & Views, creating a Presentation, from a template, from a blank presentation, opening an existing presentation, auto Layout & Help, Working with Slides, Inserting a new slide, Applying a design template, Changing slide layouts, Reordering slides, Hide slides, Create a custom slide show & Editing a custom slide show, Adding Content, Resizing a text box, Text box properties, Delete a text box, Bulleted lists, Numbered lists, Adding notes, Video and Audio, Working with Text, Adding text, editing options Formatting text, replacing fonts, Line spacing, Change case, spelling check, Color Schemes & Graphics, Color schemes, Backgrounds, Adding clip art, adding an image from a file, editing a graphic, AutoShapes & WordArt, Slide Effects, Action buttons, Slide animation, Animation preview, Slide transitions, Slide show options, Master Slides & Saving and Printing, Slide master, Header and footer, Slide numbers, Date and time, Page setup and print.

Information and Communication (Internet and E-mail)

Definition of Internet, World wide web, search engine tools, bookmark search results, electronic mail address, reading messages, attach documents or files to a message, organize and manage message folders or directories within electronic mail.

8. LEARNING AND TEACHING STRATEGY

The module will be delivered with the view of giving more emphasis on clear concepts and solid theoretical and practical knowledge of computer systems and applications in specific areas. This will be achieved by giving a number of real time

examples in lectures and giving enough lab exercises for the students to do and practice in the laboratory.

9. ASSESSMENT STRATEGY

The assessment strategy is aimed to test the

- Practical Skills in using the computational and utility tools like MS Office and the internet
- General skills like Self learning in familiar and unfamiliar situations
- Use competently all ICT tools like communication, office automation etc.

Assessment Criteria:

- In order to assess the above abilities and practical skills, the assessment will be based on a balance of assignment, quizzes, tutorials and lab work with a moderate weightage on Lab work.
- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Laboratory assessment will be made periodically based on performance in the regular lab work.
- For the assignment, criteria will be drawn up appropriate to the skills assessed , based on the KIST generic marking criteria

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Lab work	**35%**	**C8,D1,D8**
MINI TEST	**5%**	**C8, D1**
Final assessment:	**60%**	**C8,D1**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems in theory and laboratory classes
- Per marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.

Opportunities to consult lecturer and/or tutorial assistant in office hours and laboratories

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

ECDL/ICDL 3.0 Made Simple: Office 2000 Edition (Paperback) by Business Communications Development and Business Communications Development Ltd

Background Texts (include number in library or URL) (inc ISBN)

Journals
Key websites and on-line resources
Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment
ICDL common lab with open office and ms-office with internet according to ½ class strength
Computer requirements
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

The courses are structured so that one can start ICDL anytime and is available during the day or in the evenings. This course enables progression on to any of the Advanced ICDL Modules or the NQ Introduction to Computing and Information Technology course. The modules cover the main Microsoft Office suite of software packages and can be studied individually to sharpen up the skills in particular areas. More emphasis will be given on practice.

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: MEE 3111**
2. **Module Title: Engineering Drawing and CAD**
3. **Level: 1 Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations:**
   Pre-requisite: Mathematics at secondary six levels or equivalent
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff Hours**
Lectures	12	24
Practical classes/laboratory	24	48
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	24

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT

The aim of this course is to introduce students with key knowledge in the field of Engineering Drawing and CAD as applied to Engineering design practice in first angle and third angle projections. It covers Orthographic and Isometric projection of regular objects. It also introduces Solid works and CAD modelling to the engineering design.

6.2. LEARNING OUTCOMES

1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 Introduction to drawing: instruments, lines, Dimensioning, Convention representation of material and features.
1.2 Orthographic and Isometric projection of solids.
1.3 Sectional views.
1.4 Solid works and CAD
2. Cognitive/Intellectual skills/Application of Knowledge
Having successfully completed the module, students should be able to:
2.1 Apply principles of first angle and third angle projection method for engineering drawing practice.
2.2 Apply the mechanical software Auto CAD and Solid Works using computer to draw and design the objects of engineering application.
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1. Drawing simple objects using Auto CAD and Solid Works in computers.
3.2. Designing simple objects and analysing them using solid Works.
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Describe the basic terminology used in engineering drawing and interpret simple engineering drawing.
4.2 Interpret the design and simulation of models with mechanical software.

7. INDICATIVE CONTENT

Introduction to engineering drawing: Drawing sheet (Format); Types of lines, Lettering; Dimensioning; Scale, Conventional representation of various materials and common features.

Orthographic and isometric projections

Sectional views: Types of sectional views: Full sectional view, half sectional view. Some important sections: Revolved section, Removed section, Aligned section, Auxiliary section. Parts not sectioned.

Introduction to Assembly Drawing,

Drafting software: Introduction to Solid works,

CAD modelling and database,

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures and drawing/design classes. The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a drawing examination.
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 3.2, 4.1, 4.2
Assessment Test	20	3.1, 3.2, 4.1, 4.2
Final assessment:		
examination (2 hours)	60	1.1, 1.2, 1.3, 1.4, 2.1, 2.2,

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Per marking of tutorial questions for formative feedback.

- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)
Background Texts (include number in library or URL) (inc ISBN)

1. A text book of machine drawing in first angle projection; Author: R.K. Dhawan; 2003 Edition.
2. A text book of machine drawing; Author: R.K.Dhawan; 2nd Edition 1998.
3. Engineering drawing; Author: E.M. Oweeye and S.E. Smith; Edition 1994.
4. Engineering Drawing; Author:KR.Gopalakrishna;4th Edition 1991
5. Fundamentals of engineering drawing; Author: M. Bhattacharyya and S.Pal; Edition 1996.
6. Introduction to interactive computer graphics for design and production; Author: Warren J. Fuzadden and Fon M.Duff; Edition:2002
7. Manual of British standards in Engineering drawing and design; Author: Maurice Parker; Edition 1997

Key websites and on-line resources
None
Teaching/Technical Assistance
1 Lecturer,
1 Tutorial assistant
Computer requirements
Access to CAD and Solid Works

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3111**
2. **Module Title: ENGINEERING ELECTROMAGNETICS I**
3. **Level: 1 Semester: I Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	36	72
Seminars/workshops		
Practical classes/laboratory		
Structured exercises	24	24
Set reading etc.		----------
Self-directed study	12	----------
Assignments – preparation and writing	12	24
Examination – revision and attendance	16	36
Other:		

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The course aims to obtain an understanding of the behaviour and fundamental properties of electric and magnetic fields. It gives an introduction of the principal calculation techniques for the field phenomena in electrical and electronic engineering. It also covers the structure, interactions, and arrangements of atoms within solids.

6.2. LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 Fundamental properties of electric and magnetic fields.

1.2 Principal calculation techniques for field phenomena in electrical and electronic engineering

1.3 Structure of the atoms and their interactions between, and arrangements of atoms within solids

1.4 Insulators and magnetic materials

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Determine the electrical field concepts and quantities

2.2 Use calculation techniques for applications of electrical and electronic phenomena.

2.3 Analyze the structure of the atoms and interactions between them.

2.4 Apply the principles of the magnetic field phenomena.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Apply different laws of electrostatic phenomena.

3.2 Apply different laws of magnetostatic phenomena

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Undertake self learning in electro-magnetic phenomena

4.2 Make own calculation techniques for the applications of electrical and magnetic phenomena.

7. INDICATIVE CONTENT

Current Flow fields

Field concepts and quantities; potential; potential gradient; current density and equi-potential lines

Electrostatic Fields

Basic field concepts and field quantities; analogies between current, electric, and magnetic fields; Coulombs Law; superposition of fields due to several charges; dielectrics and relative permittivity; capacitance; Gauss Law

Magnetostatic Fields

Basic observed phenomena; Ampere force Law; field quantities; Amperes circuital Law and applications; Biot Savart Law and its applications

Induction and Inductance

Faraday's Law; Lenz's Law; self inductance; definition of solenoid; mutual inductance

Mechanical and thermal properties of materials

Thermal activation processes; mechanical behaviour of materials; Service life-Degradation and failure mechanisms.

Insulators

Material types; polarisation and breakdown phenomena; insulator configurations for typical applications

Magnetic Materials

Relative permeability; hysteresis; hard and soft materials; diamagnetic and paramagnetic behaviour; Curie point and Eddy currents; energy losses under ac conditions; material classes; typical applications

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures and by tutorial sessions.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding.

A certain number of Notes copies are given to Class Representatives before the lecture so that students can concentrate on the material of the lecture.

Questions sheets are given to students and after time, the questions are solved and discussed in class.

Different Assignments are given and so the students can undertake some investigation on their own and students can develop ideas and apply them

9. ASSESSMENT STRATEGY

- To assess knowledge and application through two continuous assessment tests.
- To assess self learning, understanding and applications through the assignment and a written examination.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered

In-course assessment:		
Continuous Assessment Tests (CAT)	**20**	1.1, 1.2, 2.1,2.2,
Assignment	**20**	2.4,4.2
Written Examination	**60**	1.1, 2.1, 3.1, 3.2, 4.2
Final assessment:		

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

Interactive lecturing style, with opportunities for questions

- Tutorial classes where students can ask questions and be led through solutions
- Opportunities to consult lecturer and tutorial assistants in their offices

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Background Texts (include number in library or URL) (inc ISBN)

Reference Books:

Engineering Electromagnetics by H. Hayt , Jr
Engineering Electromagnetics by Aziz S. Inan
Foundations of Electromagnetic Theory by Reitz, Milford and Christy

Journals

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement,

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	

4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _____TWP 3111_____**
2. **Module Title: : Electrical and electronics Workshop Technology I**
3. **Level: 1 SEMESTER: 1 Credits: 10**
4. **First year of presentation: 2011 (EEE,CEIT and CEET) Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

Pre-requisite: Registered to KIST for Year1

Co-requisite: None

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student hours**	**Staff hours**
Lectures	**12**	**12**
Seminars/workshops/tutorials	**……..**	**……..**
Demonstrations		**10**
Practical exercises	**36**	**72**
Structured exercises	**……..**	**……..**
Industrial visits		
Set reading etc.	**……..**	**……..**
Individual practical	**12**	
Self-directed study	**12**	**……**
Assignments – preparation and writing	**12**	**8**
Examination – revision and attendance	**16**	**32**
Other:	**.....**	**10hours**
Contact	**100hours**	**144hours**

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The course aims to provide the basics of electrical engineering through mainly practice as well as theory. The main topics will be:

For Electrical workshop I: introduction to electricity, cable joints and terminations, supply voltage, electrical tools, test of conductors, insulators and semi-conductors, Diagram(power circuit and control circuit)

For electronics workshop I: Basic electronic tools, introduction to electronic measurements, electronic components, electronic circuits and soldering and de-soldering.

6.2 LEARNING OUTCOMES

A. Knowledge and Understanding

Having successfully completed the module concerning electrical and electronics workshop I, students should be able to demonstrate knowledge and understanding of:

A1. Accident prevention in electrical workshop

A2. The fundamental concepts, principles and theories of electrical engineering

A3. The commercial and financial constraints that engineers may have to work under

B .Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed this module, students should be able to:

B1. Demonstrate electrical workshop tools and equipment.

B2. Perform different electrical installations
B3.Applying engineering principles to create new products
B4. Demonstrate of electronics tools and equipment.
B5.Perform different electronics tests and installations

C. Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C1. Applying the methods and techniques that they have learned to review and critically analyse information concerning engineering problems, and to propose and carry through appropriate solutions;

C2. Planning, conducting and writing a report on a project or assignment

C3. Using relevant workshop equipment and analysing the results critically.

C4. Designing, building and testing a system.

C.5 Managing practical works effectively.

C6. Applying the methods and techniques that they have learned to review and critically analyse information concerning engineering problems, and to propose and carry through appropriate solutions.

C7. Be creative in the solution of problems in design and development

D. General transferable skills

Having successfully completed the module, students should be able to:

D1. Effectively retrieve information from a variety of sources;

D2. Work effectively as a member of a team;

D3. Learn independently in familiar and unfamiliar situations with open mindedness and in a spirit of critical enquiry.

D4. Have the capacity for self-learning in familiar and unfamiliar situations.

7. INDICATIVE CONTENT

A.ELECTRICAL WORKSHOP I

1. ACCIDENT PREVENTION
   - Causes and prevention of accidents
   - Danger to electrical current and Danger to Man by electrical current
   - Safety regulation for working with electrical power and electrical equipment
   - Error to voltage
   - Warning signs

2. INTRODUCTION TO ELECTRICITY.
   - Structure of matters and atomic structure
   - Generation of electricity
   - Supply AC&DC voltage
   - DC&AC Generators
   - Electrical measurement and Units

3. CONDUCTORS, INSULATORS AND SEMI-CONDUCTORS
   - Size of conductors
   - Classification of conductors, insulators and semi-conductors
   - Cable conductors and cable ratings
   - Dielectric strength
   - Rubber tap
   - Friction tape

4. DISTRIBUTION SYSTEM
   - Different way switch circuits
   - Schematic
   - Wiring

- Circuit
- Ring and Spur fused pluge
- Fuse rating and Number of socket outlet.
- Test carried
- Symbols

5. POWER CIRCUITS
   - Three phase induction motor direct on line circuits
   - List of components
   - Work execution with diagrams and procedures
   - Reports

B.ELECTRONICS WORKSHOP I

- Definition of electronics.
- Basic electronic tools: safety precautions, introduction to basic electronic tools and different tools used in electronics
- Introduction to electronic Measurements: introduction, measuring resistance, measuring voltage, measuring current and measuring with oscilloscope
- Passive components: Resistors, Ohm's Law, Kirchhoff's current and voltage Laws, color coding, capacitors, inductors and transformers. Faults circuit.
- Active components: diodes, half wave and full wave rectifications, transistors, transistor as switch, transistor as amplifier.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through practical exercises. Audio-visual tapes, power point presentations are used so that students can concentrate on the practical demonstration/Exercises to be done. Practical hand-outs showing working procedures are given before the start of the each practical exercise. Hand-outs are given after each session. The Individual practical, Practical exercises, assignment and self-directed study will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge though a written CAT. To assess practical skills through the practical exercises and final practical examination
- To assess self-learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to do fault-finding and formulate the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the practical exercises, the Training Workshop assessment criteria will be used
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and CAT	10	A1, A2, A3, A4, A5
Practical exercises and report	30	B1, B2, B3, C1, C2 C3, C4,C.5,C6,

Final assessment:		
Practical examination (4hours)	60	B1, B2, B3, C1, C2 C3, C4,C.5,C6,
	----------	

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple practical exercises.
- Marked summative assessments (practical report and assignment) handed back to students, with comments.
- Opportunities to consult Instructor during working hours.

12. Indicative Resources

Core Text (include number in library or URL) (inc ISBN)

General instruction on Electrical network execution (BY UTE: Electrical Technic Union) Professional electricity Electrical Technology (By G.Mannevy-Tassy), Electrical Schematics and Industrial automation (by John Barry and John-Yves Kersulec), Electrical machine (By Long man, Therager)

Key websites and on-line resources

www.Google.com

Teaching/Technical Assistance

3 Instructors,
1 Artisan

Workshop space and equipment

Workshop equipment and space for Electrical workshop – existing in Electrical workshop.

Computer requirements

Laptop (required)

Others

Projector (urgently required)

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
1. Dean	Signature	
	Print Name: Dr. MBEREYAHO Leopold	
2. HoD	Signature	
	Print Name: Mr. NTIHINYUZWA Isaac	
3. Module Leader	Signature	
	Print Name: Mr. NTIHINYUZWA Isaac	
4.	Signature	
	Print Name: Mrs. NIYIBIZI Marianne, RUHUMULIZA Aline, HATEGEKIMANA Pascal, KARASIRA Juvenal, MUSHINZIMANA JMV	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

YEAR 1 SEMESTER II

MODULE DESCRIPTION FORM

1. **Module Code: ENG 3101**
2. **Module Title: General English**
3. **Level: I, SEM: 2 Credits: 0**
4. **First year of presentation: 1997 Administering Faculty: KIST Language Centre (KLC)**
5. **Pre-requisite or co-requisite modules, excluded combinations:**

   No pre-requisite required since this is a compulsory subject for all first year student
6. **Allocation of study and teaching hours (See Notes of Guidance)**

Total student hours: 144	**Student Hours**	**Staff Hours**
Lectures	72	144
Seminars/workshops	24	24
Practical classes/laboratory	24	24
Structured exercises	24	24
Set reading etc.		
Self-directed study	8	
Assignments – preparation and writing	20	
Examination – revision and attendance	20	
Other:		

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

This is a one- academic-year course to be offered in two SEMESTERs. These being the case, to know whether learning outcomes have been achieved or not will be possible at the end of the academic year and not at the end of a SEMESTER.

The course aims at laying down a solid foundation for language structure with a view to developing students' overall performance in English, this is to say, communication for general purposes; especially developing students' linguistic and communication skills, including listening, speaking, reading and writing, etc. Abilities in grammar, language functions, vocabulary building and cultural content activities are targeted for communicative purposes.

6.2. LEARNING OUTCOMES

D. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

A.1. Listening with comprehension to a recorded piece of information on a variety of topics in science and technology as well as texts of general interest;

A.2. Familiarizing students with phonetic symbols and their use, weak and strong forms

A.3. Speaking comprehensibly with relatively autonomy and independence;

A.4. Reading with comprehension a variety of shorter written authentic materials by using different reading techniques;

A.5. Writing simple and complex sentences using coordinating conjunctions, Writing short paragraphs, short essays and short descriptions.

E. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

B.1 Listen with comprehension to a recorded piece of information on a variety of topics as well as texts of general interest;

B.2 Speak comprehensibly to express their views, asking and giving information, talking about their experiences;

B.3 Read with comprehension a variety of short materials to find main ideas and to answer questions related to the text;

B.4. Write grammatical and meaningful sentences (simple and complex sentences), short paragraphs, short essays and short descriptions

F. Communication/ICT/Numeric/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C.1 Listen: Listening to peers and to recorded materials;

C.2 Speak: Exchanging personal information, asking for clarification and giving personal views;

C.3 Read: Reading short texts and writing short summaries

C.4 Write: writing simple and complex sentences, short paragraphs and essays,

G. General transferable skills

Having successfully completed the module, students should be able to:

D.1 Undertake self-learning: reading extensively and intensively a variety of materials

D.2. Participate in discussion, debates, outside the classroom on issues related to daily routines

D.3. Write simple descriptions, friendly letters, etc

7. INDICATIVE CONTENT

Listening: for specific information, listening for gist, listening for main idea; VOA, BBC, Special English Program and reporting

Phonology: familiarizing students with phonetic symbols and their use, weak and strong forms, understanding connected speech; signalling a question by intonation; problem with sound/spelling relationship, perception and pronunciation of unstressed syllables, stress and rhythm, word stress and intonation;

Speaking: Giving advice, expressing agreement and disagreement, persuading, and expressing feeling about people, predicting, talking about material and product, talking about manufacturing and other processes, etc. Oral presentations: Discussion in groups and pair works on contemporary issues and other topics (HIV/AIDS, Gender and development, sports, rural development) and reports;

Reading: *Reading different kinds of texts (from short (e.g. half a page) to relatively long texts (e.g. 2 pages) and for different purposes such as e*xpressive reading (reading with good pronunciation and correct stresses on strong syllables, and by respecting punctuation marks), predicting the meaning from the context of the texts, determining the meaning of words and phrases from the context, skimming, scanning, reading comprehension, reading for gist, for general and for specific information, increasing one's vocabulary through reading, using dictionary, etc.

Writing: writing simple and complex sentences using sentence connectors, adverbials and conjunctions, paraphrasing, summarising, writing paragraphs using paragraph development devices, letter writing, note-taking, simple report writing, writing descriptions etc.

Grammar quantifiers, the use of articles, the comparative for of adjectives, the different types of conjunctions (coordinating and subordinating conjunctions, the different types of clauses (dependent and independent clauses), , tag questions, using verb tenses and tenses sequencing: present simple, past simple, using infinitives, -ing form, using the gerund, prepositions and conjunctions, using adverbials, modals auxiliaries, reported speech, *present and past perfect, reported speech, conditional sentences, if vs when clauses, the passive voice*, sequencing markers, subordinating conjunctions and adverbials, etc.

8. LEARNING AND TEACHING STRATEGY

General principles (For SEMESTER 1 and SEMESTER 2)

The course is delivered using interactive/Communicative approach. i.e., everything done aims at equipping the student with skills he/she needs to interact with peers and the lecturer in class but also to enable him/her to study in English effectively. Students are given practice in the four basic skills: listening, speaking, reading, and writing along with grammatical notions. Group and pair-work are mostly emphasized in class. Students are always encouraged to take part in all class activities. Their errors are considered as part of the learning process as the lecturer might use them to address students' difficulties in the four skills, in language structure as well as in phonology. Students are also given some practice in listening to authentic recorded materials from the Cambridge English Course, VOA, and the BBC.

9. ASSESSMENT STRATEGY

For each SEMESTER, two types of assessments will be used:

● **On-going assessment/ Continuous Assessment Test (CAT):** 60% of the final grade. Calculated from different marked activities: listening, oral presentations (in groups, pairs and individual), short quizzes, essays, reports, written major Test out of 20 marks (It comprises: Reading Comprehension passages, Language in use or grammar, Phonology and Essay/Memo or Letter writing). Total mark: 100. This will serve to evaluate the student's ability to effectively use the learned listening, speaking, reading and writing skills.

Final Examination (2 hour examination): 40% of the final grade. By setting the final examination, lecturers aim at giving students the opportunity to demonstrate evidence of their understanding of the material and ability to skilfully use them rather than their ability to memorize masses of information.

Since this is a one academic year course, SEMESTER mark will constitute half (50%) of the final (end of year) mark and the final mark will be the sum of the two SEMESTERs. This being so, only the final mark (out of 100%) will be submitted to the Examination office for respective faculties and departments and this at the academic year (after SEMESTER 2 examinations).

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:	**40**	**A; B; C; D**
Written CAT	**20**	**B.4, C.4, D.3**
		B.1, B.2, B.3, C.1,C.2, C.3, 4.1

Final Exam	**40**	**A.1, A.2, A.3, A.4, B.4, C.4, D.3**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive/communicative approach, with a lot of opportunity of students' full involvement in group and pair work.
- Students will be given opportunities to participate in evaluating their own work in group works and pair works under the guidance of the teacher
- Tutorial group presentations on topics related to Science and Technology, as well as some current issues such as HIV/AIDS, environment, etc followed by peer comments and discussions
- Marked summative assessment (Written assignment, and test) handed back to students with comments.
- Students are given opportunities to consult their lecturers during working hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Michael Swan & Catherine Walter. *The New Cambridge English Course .CUP*

Siberstein, S. (1994). *Techniques and resources in teaching reading. Oxford and New York: Oxford University Press.*

Royster J., J., Lester M. (1891). Writer's Choice: Composition and Grammar. New York: MacMillan.

Grant T. (1997). English Conversation Practice: New York: McGraw-Hill Book Company

Journals

Background Texts (include number in library or URL) (inc ISBN)

English Grammar in Use

Audio Cassette & Cassette player

A kind of Marriage (from KIST Library)

Journals

None

Key websites and on-line resources

http://www.grammar.ccc.commnet.edu

http://www. Writeexpress.com

Teaching/Technical Assistance

Lecturers

Laboratory space and equipment

1 Language lab (American Corner) to be reallocated wider office space

To fix computers belonging to the American corner for CALL practices

Also, similar free space should be provided to students for listening practice, Video viewing and other related language practice.

Computer requirements

Set 10 more computers for language practice in the American Corner

Others

KIST Library to purchase 12 new cassette players/recorders and blank tapes for listening activities.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

2 more full time staff are urgently needed for a smooth running of the course.

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	**Dean/Head of Department**	**Date**
1 English	Signature	**10/12/2010**
	Print Name Joseph MAGAMBO	
2 KLC Directorate	Signature:	**10/12/2010**
	Print Name: John-Baptist RUSINE	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _ _ MAT 3121 _____**
2. **Module Title: (ENGINEERING MATHEMATICS II)**
3. **Level: 1 Semester: 2 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Science**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Pre-requisite: ENGINEERING MATHEMATICS I
6. **Allocation of study and teaching hours**

Total student hours 100	**Student Hours**	**Staff Hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory		
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**18**	**16**
Examination – revision and attendance	**16**	**24**
Other:		

6.1. Brief description of aims and content (NOT MORE THAN FIVE LINES)

The Module aims to introduce students to the various properties of
Unit I Multiple Integrals
Unit II Laplace Transforms
Unit III Vector Calculus
Unit IV Complex Analysis

6.2. LEARNING OUTCOMES

1. Knowledge and Understanding

Upon Completion of this Module students,

1.1 should have a reasonable understanding of the definitions and terms related to the Module aims at as well as the Course Contents.

1.2 Should have a reasonable understanding of the statements, proofs and implications of the basic results.

1.3 should be able to present simple arguments and conclusions using Calculus and Complex Analysis arguments with clarity.

1. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

1.1 Developed their Problem solving Skills related to Calculus.

1.2 Have acquired reasonable facility for Symbolic and Numerical Calculation with Random Variables and Other Related Concepts.

2. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Apply Calculus concepts Principles and Methods to solve problems of any Branch of Mathematics.

3.2 Analyse and Evaluate Problems.

3. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Assimilate Abstract Ideas.

4.1 Communicate information having Probability and Statistics content accurately.

7. INDICATIVE CONTENT

Unit I Multiple Integrals

Double integration in Cartesian and polar coordinates—Change of order of integration—Area as a double integral—Triple integration in Cartesian coordinates—Change of variables—Gamma and Beta functions: Definition and simple problems only.

Unit II Laplace Transforms

Transforms of simple functions—Basic operational properties—Transforms of derivatives and integrals—Initial and final value theorems—Inverse transforms—Convolution theorem—Periodic functions—Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

Unit III Vector Calculus

Gradient, Divergence, Curl—Solenoidal and irrotational fields—Vector identities (without proof)—Directional derivatives—Line, surface and volume integrals—Statements of Green's, Gauss divergence and Stoke's theorems only—Verification and applications to cubes and parallelopipeds only.

Unit IV Complex Analysis

Definition of analytic function—Cauchy-Riemann equations—Properties of analytic functions—Determination of harmonic conjugate—Milne-Thomson's method—Conformal mappings: Mappings w=z+a, az, 1/z, sinz and bilinear transformation.

Line integral—Cauchy's integral theorem (without proof)—Cauchy's integral formulae (with proof)—Application of Cauchy's integral formulae—Taylor's and Laurent's expansions (statements only)—Singularities—Poles and Residues—Cauchy's residue theorem (with proof)—Contour integration—integration around a unit circle.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination. The students therefore will not just rely on memory but also show understandings of the principles in application to exam problems.
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- Computer Laboratory assessment criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	40	2.1, 2.2, 3.2, 4.1, 4.2
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Mann P.S. Introductory Statistics

Background Texts (include number in library or URL) (inc ISBN)

Advanced Engineering Mathematics by E. Kreysig

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

None

Computer requirements

Matlab, Maple.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement,

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	

3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: CIT 3121**
2. **Module Title: COMPUTER PROGRAMMING**
3. **Level: I Semester: 2 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: ENG**
5. **Pre-requisite or co-requisite modules, excluded combinations**
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	12	24
Seminars/workshops		
Practical classes/laboratory	24	48
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	16	8
Examination – revision and attendance	12	20
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

In this course students will build upon the fundamental skills acquired in c programming. The goal of this course is to provide students with a basic understanding of the computing tool that fuels the information age. The course currently focuses on computer document creation and computer programming concepts. Students will learn more formally about software development, using the programming language called C.

Keywords:

Variables, Data Types, Constants, If statement, Switch Statement, GoTo Statement, Arrays, Functions, Pointers, Structures and Files.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 – Application of mathematics in programming.

1.2 - Application of science in programming.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

– Select the relevant mathematical methods or models for analyzing computational problems.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

– Demonstrate Practical application of computer programming

4. General transferable skills

Having successfully completed the module, students should be able to:

– Competently use available computing techniques

7. INDICATIVE CONTENT

Unit1: Program Concept: Characteristics, stages in Program Development, Programming aids, Algorithms, Flow Charts - Symbols, Rules, **Programming Logic**- Simple, Branching, Looping, Program Testing, Debugging & their tools.

Unit2: Introduction to C: Features & Structure of C program, Variables, Expressions, Identifiers, Keywords, Data Types, Constants. **Operator and expressions:** Arithmetic, Logical, Relational, Conditional, Bit wise Operators, Precedence and Associativity of Operators, pre processor statements, Type conversion in expression.

Unit3: Formatted INPUT/OUTPUT: Basic input/output library functions Single character & Formatted I/O Library functions - concepts, Mathematical & Character functions. Selection Statements and Loops: If statement, If Else statement, Nesting of If Else Statement, else if ladder, The ?: operator, go to statement, Switch statement, Compound statement, Loop controls, for, while, do-while loops, break, continue, and go to statement.

Unit4: Arrays and Functions: Single and Multi Dimensional arrays, Array declaration and initialization. **Strings:** declaration, initialization. The need and form of C functions, User defined and library function, Function arguments, Return values and nesting of function, Recursion, Calling of functions, Array as function argument. Scope and life of variables - local and global variable, parameter passing, Storage classes- auto, extern, static, register.

Unit5: Structures and Files: Defining structure, accessing structure members, Nested structures. **Pointers:** Pointers in C, Arrays and Pointers. **Files:** Handling Files in C, C File Handling - File Pointers, Input and Output using file pointers.

8. LEARNING AND TEACHING STRATEGY

A course handbook will be provided in advance and this will contain in depth information relating to the course content and give an opportunity to the students to prepare the course. The lecture materials will be posted on the web page that will also contain comprehensive web links for further relevant information. The module will be delivered through lectures, tutorial/practice sessions and group discussions. In addition to the taught element, students will be expected to undertake a range of self-directed learning activities, which will comprise case studies and mini research projects. All supporting documents for the course will be made available on web, as printed copies and also as soft copies. Laboratory exercise in would be provided with intricate problems related to level 1.

9. ASSESSMENT STRATEGY

- The assessment strategy is aimed to test the Knowledge gained in Application of mathematics and science in programming.
- practical Skills in using the computational and utility tools like MS Office and the internet
- select and apply appropriate computational tools for problem solving
- Use competently all ICT tools like communication, office automation etc.

Assessment Criteria:

- In order to assess the above abilities and practical skills, the assessment will be based on a balance of assignment, quizzes, tutorials and lab work with an appreciable weightage on Lab work.
- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Laboratory assessment will be made periodically based on performance in the regular lab work.

- For the assignment, which forms a very small component of the assessment criteria will be drawn up appropriate to the skills assessed, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, Quiz Tutorial, Practical	**35%**	**A1,B1,C8,D8**
MINI TEST	**5%**	**A1,B1**
Final assessment:	**60%**	**A1,B1,C8**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours and laboratories.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. *New C Primer Plus*, Mitchell Waite and Stephen Prata, 2nd edition
2. *C How to Program*, Harvey M. Deitel, Paul J. Deitel, Prentice Hall, ISBN: 0-13-089572-5, 2001
3. The C Programming Language, 2nd Ed., Kernighan & Ritchie, Prentice Hall

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Computer laboratory required for all students to practice and develop

Others

C compiler on windows / unix or any operating system required

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement,

Department	Dean/Head of Department	Date

1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3121**
2. **Module Title: Engineering System Analysis**
3. **Level: I Semester: II Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

NONE

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours ___100___	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory	**6**	**12**
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

This course introduces the idea of electronic engineering systems and analysis which provide a foundation for numerous other courses that deal with the concept of electronic engineering system via: communication, control and instrumentation.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

A1 – Mathematics relevant to signals and channels

A2 – Basic concepts of signals and channels

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

B1 – Select and apply relevant mathematical methods and tools for modelling and analysis of circuits

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C1 – Observe and store system input and output accurately in lab and in real world

C2 – Analyze, evaluate and interpret input and output signals and apply them to solution of problems and system.

4. General transferable skills

Having successfully completed the module, students should be able to:

D1– Demonstrate computational skills in solving problems associated with circuits

D2 – Use competently commercial software for analysis circuits

7. INDICATIVE CONTENT

Introduction to Signals in Engineering Systems

Signals as seen in everyday life, and in various branches of engineering and science Electrical, mechanical, hydraulic, thermal, biomedical signals and systems as examples. Extracting the common essence and requirements of signal and system analysis from these examples

Introduction to Electronic Communication Systems

Basic elements of electronics communication systems-transmitter, channel and receiver. Radio broadcasting, transmission and reception. Modulation, need for modulation in communication and types of modulation techniques. Bandwidth requirements-sine wave and Fourier series review, frequency spectra of non-sinusoidal waves. Communication channels and their characteristics-wireless channels, fiber optic channels, wireless electromagnetic channels, underwater acoustic channels, storage channels.

CAD of Circuits

Application of circuit CAD packages to D.C circuits with passive components, D.C circuit transients, frequency analysis of A.C circuits with passive components, and to simple digital circuits. (**MultiSim/Circuit Maker/PSpice** shall be used).

8. LEARNING AND TEACHING STRATEGY

The module will be delivered as a series of lectures supported by tutorial, laboratory sessions and directed study in which the students will undertake set exercises. The emphasis of the module is to introduce students the classification, properties and representation of discrete time and continuous time signals and systems, the analysis, sampling theory, structures and interconnection of systems and the exercises will be designed to reflect this. An assignment will cover key topics such as convolution, interconnection of systems, and realization structures of discrete time systems. Students will be assessed on the appropriateness of their solution and on their ability to apply specified tools to the design.

9. ASSESSMENT STRATEGY

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

The Institute policy requires the internal moderation of assessments. Each Module shall have a Module Leader, and a Co-Leader, Module Co-Leader shall serve as the internal moderator of the module.

Below are listed some sections of the examination regulations that are applicable:

- Unless otherwise stated, the modules will be subject to Continuous Assessment and final end of module examination.
- Continuous Assessment (CAT) will consist usually of written tests, assignments, and/or short quizzes, laboratory exercises, all of which will contribute no more than 40% of the total mark.
- The final examination shall be held during the examination period at the end of the semester, and will contribute 60% of the total mark.
- A minimum score of 40% of the CAT is needed for a candidate to qualify for the final examination.
- Candidates who fail to obtain a pass (50%), but who attain at least 40% from both CAT and exam will be allowed to write a supplementary examination, offered at the end of the academic year. Otherwise, the candidates will have to repeat the module at the earliest time when it is offered.
- Candidates who fail the supplementary examination shall repeat the module.
- The maximum mark for a supplementary examination will be 50%.

- A candidate who fails a course that was repeated shall be discontinued from studies.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the EEE Laboratory assessment criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Practical	**15%**	**A1,A2,B1,C1,C5,D1,D3**
MINI TEST	**25%**	**A1,A2,B1,D1**
Final assessment:	**60%**	**A1,A2,B1,C1,C5,D1**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked assessments are handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours and during tutorial sessions.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Background Texts (include number in library or URL) (inc ISBN)

1. Kennedy & Davis, "Electronic Communication Systems," Tata McGraw-Hill Publications, 1999.

2. John G.Proakis and Dimitris K. Manolakis, "Digital Signal Processing: Principles, Algorithms and Applications," Prentice Hall, 4th Edition, 2006.

3. John G.Proakis and Masoud Salehi, "Communication Systems Engineering," Prentice Hall, 2nd Edition, 2001.

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer, 1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement,

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: __EEE 3122_____**
2. **Module Title: Analogue and Digital Electronics _____**
3. **Level: 1 Semester: II Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours _____100_____	**Student Hours**	**Staff Hours**
Lectures	36	72
Seminars/workshops		
Practical classes/laboratory		
Structured exercises	18	36
Set reading etc.	12	----------
Self-directed study	12	----------
Assignments – preparation and writing	10	24
Examination – revision and attendance	12	36
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

The course aims to provide the fundamental concepts of electronic materials and analogue and digital electronic engineering.
The main subject areas for this module are the basic conduction mechanisms in metals and semiconductors, diodes, Bipolar Junction Transistors and their applications.
It also covers Boolean algebra, combinational logic circuits and sequential circuit analysis and design.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 Electron energy bands
1.2 Electronic components and Sub-systems
1.3 Active semiconductor devices
1.4 Concepts of digital electronic Engineering

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:
2.1 Distinguish the mechanisms of conduction in metals and semiconductors.
2.2 Explain the working of the ideal diode and real diodes.
2.3 Explain D.C models, a.c. small signal models.
2.4 Design some applications of diodes.
2.5 Explain the working of Bipolar Junction Transistors and Field Effect Transistors and their applications.
2.6 Handle the number systems, in particular Binary Number system and Boolean algebra.
2.7 Analyze and design combinational logic circuits and sequential circuits.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Do some calculations for applications of diodes and transistors.
3.2 Functions minimisation using Boolean Algebra and combinational circuits.
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Undertake self learning in Analogue Electronic and Digital Electronic Engineering.
4.2 Analyze and design fundamental applications of analogue and digital circuits.

7. INDICATIVE CONTENT

Electronic Material
Electron energy bands
Conduction in metals and semiconductors
Analogue Electronic
PN junctions
Ideal diode and real diode
Characteristics of diodes and transistors
Circuit models of bipolar junction transistors
Bias circuits for bipolar junction transistors
Bias circuits for Field Effect Transistors
Amplifier design (Class A)
Transistor circuit techniques
Feedback amplifiers and oscillators
Digital Electronic Engineering
Numbers systems, Binary numbers
Boolean algebra, Boolean minimisation
Combinational circuits
Logic families, flip flops Counters
Multivariable Boolean reduction
Synchronous and asynchronous sequential circuits
Programmable logic design techniques

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures and by tutorial sessions.
The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding.
A certain number of Notes copies are given to Class Representatives before the lecture so that students can concentrate on the material of the lecture.
Questions sheets are given to students and after time, the questions are solved and discussed in class.
Different Assignments are given and so the students can undertake some investigation on their own and students can develop ideas and apply them.

9. ASSESSMENT STRATEGY

- To assess knowledge and application through two continuous assement tests.
- To assess self learning, understanding and applications through the assignment and a written examination.

ASSESSMENT CRITERIA:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the continuous assessment tests and for the assignment, criteria based on the KIST generic marking criteria will be used.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
CAT (Continuous Assessment Tests)	**20**	**1.1, 1.2, 1.3, 1.4,2, 4,2.7,4.1**
Assignment	**20**	**2.3, 2.4, 2.6,**
Written examination	**60**	**1.1, 2.7, 1.4,3.1, 3.2**
Final assessment:		

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions.
- Tutorial classes where students can ask questions and be lead through solutions.
- Opportunities to consult lecturer and tutorial assistants in their offices.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Background Texts (include number in library or URL) (inc ISBN)

Reference books:

Analogue Electronic

Fundamentals of Electronic Devices and circuits by Theodore F. Bogard
Electronic Devices and Circuits by David A. Bell
Principles of Electronics by A.P. Malvino

Digital Electronic Engineering

Modern Digital Electronics by R. P. Jain
Digital Principles and Applications by Malvino Leach
Digital Fundamentals by Thomas L. Floyd

Journals

None

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement,

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: EEE 3123

2. Module Title: Network Analysis

3. Level: 1 Semester: 2 Credits: 10

4. First year of presentation: 2009 Administering Faculty: Engineering

5. Pre-requisite or co-requisite modules, excluded combinations :

Secondary Level Mathematics, Engineering Mathematics I

6. Allocation of study and teaching hours See Notes of Guidance

Total student hours : 100	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops/Tutorials	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT

This module is designed to enable students to achieve a basic knowledge of electrical circuit analysis techniques. To introduce techniques for analyzing the transient of RL,RC and RLC circuits. This module is an essential precursor to several more advanced courses. This subject provides the basis for single AC circuits, poly-phase system and their representation.

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 The behaviour and influence of resistors, inductors and capacitors in electrical Circuits

1.2 The circuit design by using different theorems

1.3 Can analyse the circuit during the transient conditions

1.4 Single phase and poly phase network analysis

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Solve simple problems in basic electrical circuit theory.

2.2 Analyse and predict the behaviour of simple logic circuits and electronic devices

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Demonstrate in-depth understanding of the circuit theory techniques those are available for analysing RL, RC and RLC circuits.

3.2 Demonstrate the transient response of RL, RC and RLC circuits and the sinusoidal response of simple RLC circuits.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Manage your own learning

4.2 Apply mathematical methods to solve problems

4.3 Apply problem solving techniques to familiar and unfamiliar problems

7. INDICATIVE CONTENT

- Network analysis – Mesh and Loop methods
- Network theorems- Superposition theorem, linearity principles, Reciprocity theorem, Milliman's theorem, Thevenin's theorem Norton's theorem their equivalents, Maximum power transfer theorem.
- Transient response - Natural and forced response of RC, RL, and RLC circuits in both DC and AC circuits.
- AC circuit theory and phasors & Resonance - Concepts of Alternating current, Generation of AC voltage, Equations of sinusoidal waveform ,Instantaneous ,Average and RMS value, Response of R,L and C elements, Active ,Reactive power and Power Factor. RL circuits, RC circuits, RLC circuits, Series & Parallel Resonance.
- Coupled coils and three-phase circuits

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3, 4.1, 4.2, 4.3
Experiment and report	20	3.1, 3.2, 4.1, 4.2, 4.3

Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

1. Engineering Circuits Analysis; Author: Hyatt, W.H. Jr and Kemmerly, J.E., McGraw- Hill International Editions, 1993.
2. Theory and Problems of Electric Circuits; Author: Edminister, J.A., Schaum's outline series McGraw Hill Book Company, 2nd Edition, 1983.
3. Circuits and Network Analysis and Synthesis; Author: Sudhakar, A. and Shyam Mohan S.P., Tata McGraw-Hill Publishing C.Ltd., New Delhi, 1994.
4. Circuit Theory (Analysis and Synthesis); Author: A.Chakrabarthi, Dhanpat Rai & Co,Delhi, Edition,2001
5. Electric Circuits;Author: Nilsson J W, Riedel S A, Prentice-Hall, 2000
6. Electrical Sciences; Author: M.V.Rao, Subhas Publications, 2000
7. Electrical Technology; Author: B.L.Thereja ,
8. Fundamentals of Electrical Engineering ; Author: Gupta, S.K.KATARIA & SONS, 2001

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1Tutorial assistance,

Laboratory space and equipment

Laboratory equipment and space for circuit analysis experiments

Computer requirements

Access to Circuit maker, Pspice, MATLAB

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	

	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _____TWP 3121_____**
2. **Module Title: Electrical and electronics Workshop Technology II**
3. **Level: 1 SEMESTER: 2 Credits: 10**
4. **First year of presentation: 2011 (EEE) Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

Pre-requisite: Registered to KIST for Year1

Co-requisite: None

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student hours**	**Staff hours**
Lectures	**12**	**12**
Seminars/workshops/tutorials	**……..**	**……..**
Demonstrations		**10**
Practical exercises	**36**	**72**
Structured exercises	**……..**	**……..**
Industrial visits		
Set reading etc.	**……..**	**……..**
Individual practical	**12**	
Self-directed study	**12**	**…….**
Assignments – preparation and writing	**14**	**8**
Examination – revision and attendance	**16**	**32**
Other:	**.....**	**10hours**
Contact	**100hours**	**144hours**

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The course aims to provide the basics of electrical engineering through mainly practice as well as theory. The main topics will be:

For electrical workshop II: This course is to give the introduction to a Three phase induction motor, three phase induction motor forward and reverse operation, three phase induction motor Star/Delta operation, Combination of three phase induction motor forward/reverse operation and three phase induction motor Star/Delta operation and introduction to the domestic lighting system.

For electronics workshop II:

The course aims to provide the basics of practical skills of electronic circuits. It covers: Practical electronics part 1

6.2 LEARNING OUTCOMES

A. Knowledge and Understanding

At the end of the programme students should be able to demonstrate knowledge and understanding of:

A2 The fundamental concepts, principles and theories of electrical engineering

A3. The commercial and financial constraints that engineers may have to work under.

A4. Accident prevention in electronics workshop.

A5. The fundamental concepts, principles and theories of electronics and telecommunication engineering

B .Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module concerning Electrical workshop II, students should be able to:

B1. Demonstration of electrical workshop tools and equipment.

B2. Different electrical installations

B3.Applying engineering principles to create new products

B4. Demonstration of electronics tools and equipment.

B5.different electronics tests and installations

C. Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C1. Applying the methods and techniques that they have learned to review and critically analyse information concerning engineering problems, and to propose and carry through appropriate solutions;

C2. Planning, conducting and writing a report on a project or assignment

C3. Using relevant workshop equipment and analysing the results critically.

C4. Designing, building and testing a system.

C.5 Managing practical works effectively.

C6. Applying the methods and techniques that they have learned to review and critically analyse information concerning engineering problems, and to propose and carry through appropriate solutions.

C7. Be creative in the solution of problems in design and development

D. General transferable skills

Having successfully completed the module, students should be able to:

D1. Effectively retrieve information from a variety of sources;

D2. Work effectively as a member of a team;

D3. Learn independently in familiar and unfamiliar situations with open mindedness and in a spirit of critical enquiry.

D4. Have the capacity for self-learning in familiar and unfamiliar situations.

7. INDICATIVE CONTENT

A.ELECTRICAL WORKSHOP II

1. INTRODUCTION TO A THEE PHASE INDUCTION MOTOR
   - Introduction
   - Construction
   - Three phase induction motor technical information
   - Common troubles and trouble shouting
   - Motor protection
2. MOTOR REWINDING
   - Preparation
   - Data taking
   - Development of winding diagram and
   - Winding connection
3. THREE PHASE INDUCTION MOTOR CONTROL CIRCUIT
   - Three phase induction motor forward and reverse operation,
   - Three phase induction motor Star/Delta operation,
   - Combination of three phase induction motor forward/reverse operation and three phase induction motor Star/Delta operation and introduction to the domestic lighting system
4. DOMESTIC LIGHTING SYSTEM
   - Introduction
   - Cosine low

- Factors affection lighting system
- Intensity of light and number of the lamps required in the room
- Row and column distance between lamps and their mounting heights in different rooms.

B. ELECTRONICS WORKSHOP II

- Definition of electronic circuit.

- Practical electronics part 1 deals with soldering instructions and colour code, measurements with the oscilloscope, diodes, half- wave rectifier circuit, two- pulse bridge circuit, smoothing circuit, filter circuit, zener diode, transistor as variable resistor, stabilized power supply, regulated power supply, transistor as switching element, bistable flip-flop, monostable flip-flop, astable flip-flop, Schmitt trigger, temperature-dependent switch and light-sensitive switch.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through practical exercises. Audio-visual tapes, power point presentations are used so that students can concentrate on the practical demonstration/Exercises to be done. Practical hand-outs showing working procedures are given before the start of the each practical exercise. Hand-outs are given after each session. The Individual practical, Practical exercises, assignment and self-directed study will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge though a written CAT. To assess practical skills through the practical exercises and final practical examination
- To assess self-learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to do fault-finding and formulate the solution

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the practical exercises, the Training Workshop assessment criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and CAT	10	A1, A2, A3,A4,A5
Practical exercises and report	30	B1, B2, B3, B4, B5, C1, C2C3, C4, C.5, C6,
Final assessment:		
Practical examination (4hours)	60	B1, B2, B3, B4, B5, C1, C2 C3, C4,C.5,C6,
	----------	

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple practical exercises.
- Marked summative assessments (practical report and assignment) handed back to students, with comments.
- Opportunities to consult Instructor during working hours.

12. Indicative Resources

Core Text (include number in library or URL) (inc ISBN)

General instruction on Electrical network execution (BY UTE: Electrical Technic Union) Professional electricity Electrical Technology (By G.Mannevy-Tassy), Electrical Schematics and Industrial automation (by John Barry and John-Yves Kersulec), Electrical machine (By Long man, Therager)

Key websites and on-line resources

www.Google.com

Teaching/Technical Assistance

2 Instructors,
1 Artisan

Workshop space and equipment

Workshop equipment and space for Electrical workshop – existing in Electrical workshop.
But not adequate according to the students number received.

Computer requirements

Laptop (required)

Others

Projector
Printer

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
1. Dean	Signature	
	Print Name: Dr. MBEREYAHO Leopold	
2. HoD	Signature	
	Print Name: Mr. NTIHINYUZWA Isaac	
3. Module Leader	Signature	
	Print Name: Mr. NTIHINYUZWA Isaac	
4.	Signature	
	Print Name: Mrs. NIYIBIZI Marianne, RUHUMULIZA Aline, HATEGEKIMANA Pascal, KARASIRA Juvenal, MUSHINZIMANA JMV	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	

Quality Office	Signature	
	Print Name	

YEAR 2 SEMESTER I

MODULE DESCRIPTION FORM

1. **Module Code: ENG 3201**
2. **Module Title: English for Science and Technology**
3. **Level: 2, SEM 1 Credits: _0**
4. **First year of presentation: 1997 _____ Administering Faculty: KIST Language Center (KLC)**
5. **Pre-requisite or co-requisite modules, excluded combinations ENG 3101 General English**
6. **Allocation of study and teaching hours (See Notes of Guidance)**

Total student hours : 96	**Student Hours**	**Staff Hours**
Lectures	48	48
Seminars/workshops	24	24
Practical classes/laboratory	24	24
Structured exercises	24	
Set reading etc.		
Self-directed study	32	
Assignments – preparation and writing	24	
Examination – revision and attendance	24	
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT

This is a one-academic-year course (24 weeks) to be taught in two (2) SEMESTERs of 12 weeks each. It aims at improving students' proficiency in a view to enable them to perform various tasks in English. In the first part (SEMESTER1), students will be given opportunity to reinforce language structures learned in ENG 3101 (General English), but the emphasis will be more on listening, speaking, reading and writing good paragraphs and relatively longer essays by using activities based on current issues of everyday life, their culture, but most of which based on science and technology.

In the second part (SEMESTER 2), students will be given opportunities to develop their analytical skills, critical thinking, understanding and decoding science or technology related materials through the practice of the four skills: listening, speaking, reading and writing, write assignments, memos, business letters, application letters, resumes/CVs,

6.2 LEARNING OUTCOMES

A. Knowledge and understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

A.1 the writing process: prewriting (Finding and exploring a topic, Determining purpose and audience, Brainstorming, ordering ideas, planning, drafting;

A.2 the listening process of dialogues, news, short stories, radios, etc. in order to respond appropriately and critically in a wide range of situations;

A.3 the structure of spoken information from peers or other sources in order to participate actively in various group discussions and to do oral presentation on topics related to current issues;

A.4 the strategies used for reading various written materials strategies (e.g. Skimming, scanning);

A.5 the importance of grammar accuracy in order to understand and interpret written and oral information

B. Cognitive/Intellectual skills/Application of knowledge

Having successfully completed the module, students should be able to:

B.1 Structure and organize different types of essays in a coherent way;

B.2 Produce different types of informal and formal letters in English;

B.3 Produce a short and coherent essay-type summary of a long text;

B.4. Listening for specific and general information, listening to casual and prepared speeches, listening to radio and/or broadcasts or recorded documentaries, listening to English speakers in various conditions;

B. 5. Reading for critical appreciation and thinking

C. Communication/ICT/Numeric/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C.1 Listen ***to speakers of English*** for specific information in and outside classroom;

C.2 ***Speak to users of English to exchange*** information for different purposes,

C.3 ***Read different types of texts:*** skimming/scanning,

C.4 ***Write*** short and coherent essay-type summary of a relatively long text, letters and note taking;

D. General transferable skills

Having successfully completed the module, students should be able to:

D.1 Undertake self-learning: reading extensively and intensively a variety of materials;

D.2. Participate in discussion, debates, on science and technology related topics;

D.3 Write comprehensibly for different purposes.

7. INDICATIVE CONTENT

Integrated Skills: Listening, speaking, reading and writing skills development;

Review of grammatical structures: tenses, passive voice, reported speech, complex sentences, noun clauses, etc

7.1 ***Listening:*** Listening for specific and general information, listening to casual and prepared speeches, listening to radio and/or broadcasts or recorded documentaries, listening to English speakers in various conditions and listening to **TOEFL based materials**;

7.2 ***Speaking:*** Presentations about and discussions on contemporary issues and other topics (e.g. HIV/AIDS, Gender ; development, environment, science and technology), etc;

7.3 **Reading**: Apply different reading strategies to different text types and reading TOEFL based materials; applying the three phases/tasks in the reading process (pre-reading task, while reading task, post reading task) and applying the reading techniques (reading for specific information, reading for critical thinking, skimming, scanning**);**

7.4 **Writing**: the use of subordinating conjunctions, the quality of a good paragraph, topic cohesions and coherence, Introduction to letter writing, the use of different punctuation marks, connectors, **note-taking, memo writing, official/ business letter writing, writing CVs/resume,** and writing TOEFL

essay types, Applying the writing process (Selecting the topic, Brainstorming, Planning, Wring the first draft, Editing, Writing the final draft, etc

7.5 ***Language*** **structure:** Revision of verb tenses (simple and compound tenses), the if-clauses, modal auxiliaries, the use of articles, the gerund, the passive, subordinating conjunctions and the adverbials.

8. LEARNING AND TEACHING STRATEGY

1. General principles

The course is delivered using learner-centred and communicative approaches. The teacher will bear in mind that learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production. This can be achieved by getting learners work in groups, pairs, individually or as a whole class. As much as possible, activities (speaking, reading and writing and listening) should be authentic-sounding and relevant to the learner's needs.

Although the four skills (listening and speaking, reading and writing) are presented as separate outcomes, they should be integrated when taught and assessed. Therefore, as much as possible all activities will try to offer opportunities to practice the four language skills with emphasis put on the skill targeted by the lesson, since all the four skills are interrelated.

Special effort should be made to select the language teaching/learning material relating to science and technology.

The grammar issues are addressed as **revision and reinforcement** of what students learned in year1, SEMESTER 1 & 2.

The grammar issues addressed are the recurring mistakes/difficulties from learners' speaking and writing and not a systematic teaching of grammar or phonology. Some remedial teaching should be provided so as to address those issues when necessary.

At the beginning of a lesson, the teacher may get learners talk about experiences/events/latest news etc. as a warm activity in an improvised way. This should be short (about 5 minutes) but on a regular basis

Suggested procedures for conducting learning activities

A. **Reading/Listening**

A reading/listening activity could include the following 3 phases:

1. ***A pre-reading/pre-listening task*** whose aim is to give students a reason to read by giving them something to look as they read/listen the text. The task should focus on the main points/ideas of the text so that after the first reading, they have a good idea of what the text is about.

2. ***A while-reading/listening task***

This type of task aims at checking the full understanding of the text. This can be achieved through:

Multiple – choice questions (MCQ)

True (False questions (T/F).
Open – ending questions (WH-questions)
Completing a table
Listening and note-taking
Listening and gap-filling

3. ***A post-reading/listening task***

This type of task aims at bringing students to react in a personal way relating to their opinions, feelings and experiences. Activities can comprise the following:

- *Creating new texts : e.g. change a narrative into a drama role play an interview with a character in the text, create a similar text modelled on the one just read,*
- *Recreating the text : e.g. reconstruct it from keys words, write a summary*
- *Expressing views on the subject of the text and relating it to their own experience.*
- *Exploiting the text for grammar and vocabulary learning: e.g.: rewrite it in a different tense, find verbs to correspond to the selected adjectives or nouns; find synonyms, antonyms.*

Note: It is to be understood that the teacher will select tasks which are appropriate for a given text.

9. ASSESSMENT STRATEGY

Continuous Assessment Test (CAT): 60% of the final grade. Calculated from take home teacher marked assignments and in class marked activities:

- Writing short type essays, writing formal and informal letters, memos, writing Summaries,
- Reading comprehension activities,
- Listening to pieces of authentic recordings for general and specific information,
- Individual and group oral presentations,

Final Examination (2 hour examination): 40% of the final grade. By setting the final examination, lecturers aim at giving students the opportunity to demonstrate evidence of their understanding of the material and ability to skilfully use them rather than their ability to memorize masses of information.

Total mark for the module: 100. This is to evaluate the student's ability to effectively use the learned listening, speaking, reading and writing skills.

Because this is a one academic year course, SEMESTER mark will constitute half (50%) of the final (end of year) mark and the final mark will be the sum of the two SEMESTERs. This being so, only the final mark (out of 100%) will be submitted to the Examination office for respective faculties and departments.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:	**40**	**2.4, 3.4, 4.3**
Mid-SEMESTER CAT	**20**	**2.1, 2.2, 2.3, 3.1,3.2, 3.3, 4.1**
Final Exam:	**40**	**1.1, 1.2, 1.3, 1.4, 2.4, 3.4, 4.3 2.1, 2.2, 2.3, 3.1,3.2, 3.3, 4.1**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

●Interactive/communicative approach with a lot of opportunity of students' full involvement in group and pair work.

●Tutorial group presentations on topics related to Science and Technology, as well as some current issues such as HIV/AIDS, environment, etc followed by peer comments and discussions

●Marked summative assessment (Written assignment, and test) handed back to students with comments.

●Students are given opportunities to consult their lecturers during working hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Michael Swan & Catherine Walter. The New Cambridge English Course .CUP

Background Texts (include number in library or URL) (inc ISBN)

English Grammar in Use

Audio Cassette & Cassette player

A kind of Marriage (from KIST Library)
Journals
None

Key websites and on-line resources

http://www.grammar.ccc.commnet.edu
http://www. Writeexpress.com

Teaching/Technical Assistance

8 Lecturers

Laboratory space and equipment

1 Language lab (American Corner) to be reallocated wider office space
To fix computers belonging to the American corner for CALL practices

Also, similar free space should be provided to students for listening practice, Video viewing and other related language practice.

Computer requirements

Set 10 more computers for language practice in the American Corner

Others

KIST Library to purchase 12 new cassette players/recorders and blank tapes for listening activities.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

The lecturer and tutor are encouraged to use any written or recorded document relevant to the target group's core subjects of science or engineering.

14. TEACHING TEAM

Three (3) more staff will be needed for a smooth running of the course in 2011.

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
1. Department of English	Signature	**10/12/2010**
	Print Name: Joseph MAGAMBO	
2 KLC Directorate	Signature	**10/12/2010**
	Print Name: John-Baptist RUSINE	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _ _ __ _ _ MAT 3211 _____**
2. **Module Title: (ENGINEERING MATHEMATICS III)**
3. **Level: 2 Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Science**
5. **Pre-requisite or co-requisite modules, excluded combinations**

Pre-requisite: Analysis I, Linear Algebra I.

6. **Allocation of study and teaching hours**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory		
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**18**	**16**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

The Module aims to introduce students to the various properties of
Unit I Fourier series Unit II Partial Differential Equations unit iii boundary value problems unit IV Fourier transforms unit v statistics

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Upon Completion of this Module students,

1.1 Should have a reasonable understanding of the definitions and terms related to the Module aims at as well as the Course Contents.

1.2 Should have a reasonable understanding of the statements, proofs and implications of the basic results.

1.3 Should be able to present simple arguments and conclusions using Numerical Analysis arguments with clarity.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Developed their Problem solving Skills related to Calculus.

2.2 Have acquired reasonable facility for Symbolic and Numerical Calculation with Random Variables and Other Related Concepts.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Apply Numerical Analysis Methods to solve problems of any Branch of Mathematics.

3.2 Analyse and Evaluate Problems.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Assimilate Abstract Ideas.

4.1 Communicate information having Numerical Analysis content accurately.

7. INDICATIVE CONTENT

Unit I Fourier series

Dirichlet's conditions—General Fourier series—Half range Sine and Cosine series—Parseval's identity—Harmonic analysis.

Unit II Partial Differential Equations

Formation—Solution of standard types of first order equations—Lagrange's equation—Linear Homogeneous partial differential equations of second and higher order with constant coefficients.

UNIT III BOUNDARY VALUE PROBLEMS

Classification of Second Order Linear Partial differential equations- Solutions of one –dimensional wave equation, one-dimensional heat equation- Steady state solution of Two dim heat equation Fourier series solutions in Cartesian co-ordinates.

UNIT IV FOURIER TRANSFORMS

Statement of Fourier integral theorem- Fourier transform pairs- Fourier Sine and Cosine transforms- Properties of Transforms of simple functions- Convolution theorem- Parseval's identity.

UNIT V STATISTICS

Review of Measures of Central tendency, measures of dispersion(No questions should be asked) Moments Skewness and kurtosis based on moments- linear correlation and regression Tests based on Normal and t distribution for means and difference of means- c2 test for Goodness of fit.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination. The students therefore will not just rely on memory but also show understandings of the principles in application to exam problems.
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- Computer Laboratory assessment criteria will be used .
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	40	2.1, 2.2, 3.2, 4.1, 4.2
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)
Mann P.S. Introductory Statistics
Background Texts (include number in library or URL) (inc ISBN)
Advanced Engineering Mathematics by E. Kreysig.
Journals
None
Key websites and on-line resources
None
Teaching/Technical Assistance
1 Lecturer,
1 Tutorial assistant
Laboratory space and equipment
None
Computer requirements
Matlab, Maple.
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

<u>Library</u>	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code : MEE 3211**
2. **Module Title :** Engineering Mechanics (Dynamics)
3. **Level:** 2 **Semester:** 1 **Credits:** 10
4. **First year of presentation:** 2009 **Administering Faculty:** Engineering
5. **Pre-requisite or co-requisite modules, excluded combinations:**
   Pre-requisite : Physics, Mathematic and Engineering Mechanics (Statics).
   Co-requisite : None
6. **Allocation of study and teaching hours**

Total student hours **100**	**Student hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops	**6**	**12**
Practical classes/laboratory	**6**	**12**
Structured exercises	**-**	**-**
Set reading etc.	**-**	**-**
Self-directed study	**36**	**-**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT

The course aims to provide the basics of Engineering Mechanics in dynamic condition as applied to Engineering design purpose. It covers the mathematical relationships between physical quantities like displacement, time, velocity, acceleration, force and mass in the condition of Rectilinear and curvilinear motion of the Particle. It also introduces Work and Energy. Impulse and momentum. Torque and rotational inertia. Velocity and acceleration diagrams.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

   Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

   1.1 Rectilinear and Curvilinear Motion of the particles

   1.2 Equation of Angular and Impulse momentums.

   1.3 Work, Energy, Torque and

   1.4 Solid body rotation

2. Cognitive/Intellectual skills/Application of Knowledge

   Having successfully completed the module, students should be able to:

   2.1 Apply Equation of Motion find the acceleration, velocity and displacement of rectilinear and curvilinear motion of particles.

   2.2 Apply the equation of motion find the velocity of projectiles

   2.3 Apply the impulse momentum principle to find out the solution in mechanical engineering problems.

   2.4 Find out the moment of inertial of rotation bodies.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

   Having successfully completed the module, students should be able to:

   3.1 Conduct the simple experiment to find out the moment of inertia of the rotational body

   3.2 Analyse the data of displacement, velocity and acceleration moving particles or objects.

3.3 Conduct the simple experiment to find out the work energy.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Undertake self learning in engineering mechanics in dynamic condition

4.2 Produce simple reports

7. INDICATIVE CONTENT

Rectilinear and curvilinear motion of Particle

Kinetics: Equation of motion, angular momentum.

Work and Energy

Impulse and momentum

Torque and rotational inertia

Velocity and acceleration diagrams

Solid body rotation

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding.

Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Mechanical Engineering Laboratory assessment criteria will be used
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
CAT	20	1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2,4.
Experiment and report	10	3.1, 3.2, 3.3, 4.1, 4.2
Assignment and report	10	2.1, 2.2, 2.3, 2.4, 4.1, 4.2
Final assessment:		
Final examination (3 hours)	60	1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2,4.

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE:

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.

Opportunities to consult lecturer and/or tutorial assistant in office hours

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

R.S Khurmi .*A Text book of Engineering Mechanics*. Chand & Company Limited .New Delhi.1999

Background Texts (include number in library or URL) (inc ISBN)

1. Dr. M. Fogiel. *Problem Solvers .Statics & Dynamic*s. Research and Educational Association .New Jersey.
2. H.R. Harrison and T. Nettleton. *Principle of Engineering Mechanics*. Edward Arnold.London.1994
3. Irving. H. Shames. *Engineering Mechanics. Statics and Dynamics* 5th ed.
4. J.L. Meriam, L.G Kraige. *Engineering Mechanics .Dynamics*. John Wesley &Sons INC.USA. 5th ed.

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,

1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment is in Mech. Eng. lab, but needs attention.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	

ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

Appendix: Assessment Criteria: Laboratory Experiment

Two elements, Group Report – max 12; Individual Report – max 8

	Excellent	Good	Fair	Weak	Poor	Very Poor
	12,11	10,9	8,7	6	5	4 - 0
Report - Group mark	Results correct, Graphs good	Minor errors, graphs satisfactory	Some errors, graphs not clear	Errors or omissions, but some results acceptable	Errors mean results just fail to be acceptable	Significant errors, unacceptable results
	8,7	6	5	4	3	2 - 0
Individual Report	Good comments on all points	Good comments on several points	Some relevant comments	Comments acceptable, but lack depth	Comments just not acceptable, lacking thought	Poor comments lacking significance

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3211
2. **Module Title:** ANALOGUE ELECTRONIC CIRCUITS
3. **Level: 2 Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Pre-requisite: EEE 3122 Analogue and Digital Electronics
   Co-requisite: EEE 3215 Analogue & Digital Electronics Laboratory and Design
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	**36**	**72**
Seminars/workshops		
Practical classes/laboratory		
Structured exercises	**12**	**24**
Set reading etc.		**----------**
Self-directed study	**30**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**10**	**24**
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

This module builds on the knowledge acquired in the course of EEE 3124 Analogue and Digital Electronics to provide the students with further understanding of the working principles of electronic devices and circuits. It covers Rectifiers and Power Supplies, Single stage and multistage amplifiers, Differential and Tuned Amplifiers, Feedback amplifiers and oscillators and Pulse Circuits.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding
   Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
   1.1. Single and polyphase rectifiers
   1.2. Filter and voltage regulator circuits
   1.3. Bipolar and FET small signal amplifiers
   1.4. Class A, B and C power amplifiers
   1.5. Differential and tuned amplifiers
   1.6. Various types of oscillators
   1.7. Wave shaping circuits
2. Cognitive/Intellectual skills/Application of Knowledge
   Having successfully completed the module, students should be able to:
   2.1. Analyse rectifier and filter circuits
   2.2. Design zener and transistor series voltage regulators
   2.3. Design transistor biasing circuits
   2.4. Analyse CE, CB and CB and FET amplifiers
   2.5. Analyse Class A, B and C power amplifiers
   2.6. Apply feedback/circuit analysis to oscillators and power amplifiers.

2.7. Analyse and design simple pulse circuits

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1. Demonstrate in-depth understanding of the Amplifier design.

3.2. Analyze Rectifier, Filters, Amplifiers and Oscillator circuits.

3.3. Apply methods of solution to problems in rectifiers, amplifiers, and pulse circuits.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1. Undertake self-learning in Analogue Electronics

4.2. Communicate technical ideas in writing

7. INDICATIVE CONTENT

Rectifiers And Power Suppliers

Single and polyphase rectifiers and analysis of filters circuits – design of zener and transistor series voltage regulators- switched mode power suppliers.

Amplifiers

Biasing circuits for transistors – FET and their analysis – CE, CC and CB amplifiers – FET amplifiers – frequency response – cascade and Darlington connections – analysis of Class A and B power amplifiers – complementary symmetry amplifiers – Class C power amplifiers.

Differential and Tuned Amplifiers

Differential amplifiers – common mode and difference mode analysis – Drift compensation – FET input stages – Chopper stabilizer amplifiers – introduction to tuned amplifiers.

Feedback Amplifiers And Oscillators

Advantages of negative feedback – voltage /current, series /shunt feedback – positive feedback – condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and crystal oscillators.

Pulse Circuits

RC wave shaping circuits – multivibrators – Schmitt triggers- UJT and transistor sawtooth oscillators. Linearization using constant current circuit, Bootstrap and Miller saw tooth generators, current timebase generators.

8. LEARNING AND TEACHING STRATEGY

Students will learn factual material through lectures and guided reading. Tutorials will be used to apply the basic principles. Laboratory work that will be done in a co-requisite separate course will be used to demonstrate concepts and show differences between theory and reality.

Lecture notes will be given to students prior to all lectures. That would help the learners to clarify their doubts during lecture time and make it more interactive.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

9. ASSESSMENT STRATEGY

9.1 To assess understanding by a written examination

9.2 To assess self-learning by an open-ended assignment

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assessment Test	30%	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 3.1, 3.3
Assignment	10%	2.1, 2.2, 2.3, 3.2,4.1, 4.2

Final assessment:		
Final examination	60%	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1, 3.3.

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked assessments handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. Millman and Halkias, 'Electronic Devices and Circuits', Tata McGraw-Hill, 1991.
2. Albert Paul Malvino, 'Electronic Principles', Tata McGraw-Hill, 6th Edition, 1995, David A

Background Texts (include number in library or URL) (inc ISBN)

1. Bell, 'Electronic Devices and Circuits' 3rd Edition, Prentice Hall of India, 1999.
2. Millman and Taub, Pulse, ' Digital and Switching Wave forms', McGraw-Hill, 1991.
3. Sze, S.M.'Physics of Semiconductor Devices', Wiley Eastern, 1981
4. Boylestad and Nashelsky, 'Electronic Devices and Circuit theory', Prentice Hall of India, 6th Edition, 1999.
5. Mothersheed, 'Electronic Devices and Circuits', Prentice Hall of India, 1999.
6. Streetman, B, 'Solid State Electronic Devices', Prentice Hall of India, 4th Edition, 1995.
7. John D.Ryder, 'Electronic Fundamentals and Applications: Integrated and Discrete Systems', 5th Edition, Prentice Hall of India, 1999.
8. David Neamen, 'Semiconductor Physics and Devices – Basic Principles', Tata McGraw-Hill, 1999.
9. Electronics - Circuits and Systems, 3rd Edition, By Owen Bishop – Dec 2007.

Journals

None

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,

1 Tutorial assistant

Laboratory space and equipment

Computer lab.

Computer requirements

Circuit Maker simulation software

Others

None

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3212
2. **Module Title:** Digital Electronic Circuits
3. **Level:** 2 **Semester:** 1 **Credits: 10**
4. **First year of presentation:** 2009 **Administering Faculty:** Engineering
5. **Pre-requisite or co-requisite modules, excluded combinations**

   Pre-requisite: EEE 3122 Analogue and Digital Electronics

   Co-requisite: EEE 3215 Analogue & Digital Electronics Laboratory and Design
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours ___100_____	**Student Hours**	**Staff Hours**
Lectures	**36**	**72**
Seminars/workshops		
Practical classes/laboratory		
Structured exercises	**12**	**24**
Set reading etc.		**----------**
Self-directed study	**30**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**10**	**24**
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

This module builds on the knowledge acquired in the course of EEE 3124 Analogue and Digital Electronics to provide the students with further understanding of the working principles of electronic devices and circuits. It covers Logic Gates, Combinational Circuits, Flip-flops, Registers and Counters, Semiconductor memories and Fundamentals of sequential circuit modes.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

   Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

   1.1 Different technologies of implementing logic gates

   1.2 Various common combinational circuits

   1.3 Flip-flops, registers and counters

   1.4 Semiconductors memories

   1.5 Principles of sequential circuits design
2. Cognitive/Intellectual skills/Application of Knowledge

   Having successfully completed the module, students should be able to:

   2.1 Implement logic gates using various technologies

   2.2 Design various combinational circuits such as adders, subtractors, encoders, decoders, multiplexers and demultiplexers, comparators, and code converters.

   2.3 Implement combinational circuits using EPROM, EEPROM, PAL and PLA

   2.4 Design counters and other sequential circuits.
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

   Having successfully completed the module, students should be able to:

3.1 Demonstrate in-depth understanding of design of Combinational circuit.
3.2 Analyze Combinational and sequential circuits.
3.3 Apply methods of solution to Combinational and sequential circuits

4. General transferable skills

Having successfully completed the module, students should be able to:
4.1 Undertake self-learning in Digital Electronics
4.2 Communicate technical ideas in writing

7. INDICATIVE CONTENT

Logic Gates

RTL, DTL, TTL, ECL, ICL, HTL, NMOS & CMOS logic gates, Circuit diagram and analysis characteristics and specifications, tri-state gates.

Combinational Circuits

Problem formulation and design of combinational circuits, Adder / Subtractor, Encoder / decoder, Mux / Demux, Code-converters, Comparators, Implementation of combinational logic using standard ICs, ROM, EPROM, EEPROM, PAL, PLA and their use in combinational circuit design.

Sequential Circuits

Flipflops - SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits - their design, State minimization, state assignment, Circuit implementation, Registers-Shift registers, Ripple counters, Synchronous counters, Timing signal, RAM, Memory decoding, Semiconductor memories.

Fundamental Mode Sequential Circuits

Stable, Unstable states, Output specifications, Cycles and Races, Racefree Assignments, Hazards, Essential hazards, Pulse mode sequential circuits.

8. LEARNING AND TEACHING STRATEGY

Students will learn factual material through lectures and guided reading. Tutorials will be used to apply the basic principles. Laboratory work that will be done in a co-requisite separate course will be used to demonstrate concepts and show differences between theory and reality.

Lecture notes will be given to students prior to all lectures. That would help the learners to clarify their doubts during lecture time and make it more interactive.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

9. ASSESSMENT STRATEGY

9.1 To assess understanding by a written examination
9.2 To assess self-learning by an open-ended assignment

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assessment Test	30%	1.1, 1.2, 1.3, 2.1, 2.2, 2.3,3.1
Assignment	10%	2.1, 2.2, 2.3, 2.4, 3.2,4.1, 4.2
Final assessment:		
Final examination	60%	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.

- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked assessments handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

1. Digital Principles and Applications by Malvino Leach
2. Modern Digital Electronics by R.P. Jain
3. Digital fundamentals by Thomas L. Floyd

Background Texts (include number in library or URL) (Inc ISBN)

1. Digital Computer Electronics by Malvino Brown
2. Fundamental of Electrical Engineering by Bobrow
3. Kohavi, Z., Switching & Finite automata Theory, Tata McGraw-Hill, New Delhi, 1981
4. Hachtel, G.D. & Somenzi, F., Logic Synthesis and Verification algorithms, Kluwer academic press 1996.
5. Hill. J. Peterson, G.L., Switching Theory and Logical design, John Wiley III Edition, 1981.
6. Lee, S., Digital Circuits & Logic Design, Prentice Hall India, 1980.
7. DIGITAL ELECTRONICS: Circuits and Systems , By Puri, V. TMH , 2005

Journals

None

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer lab

Computer requirements

Circuit Maker simulation software

Others

None

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3213
2. **Module Title: ELECTRICAL POWER ENGINEERING**
3. **Level: 2 Semester: I Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Electromagnetics I, Engineering mathematics I
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours _____100_____	**Student Hours**	**Staff Hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The aim of this module is to give a detailed view of the field of electrical power engineering fundamentals. This module deals with basic concepts of generation from conventional, nuclear and renewable sources.Transmission and distribution of power, understanding calculations and measurement of loads under balanced and unbalanced conditions. Students are also to be acquainted with power systems economics

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:

1.1 Electric Power Supply Systems
1.2 Active and reactive power concepts
1.3 Thermal and hydropower stations
1.4 Power Factor Improvement and Benefits
1.5 Transformers
1.6 Transmission and distribution systems
1.7 Power system economics

2. Cognitive/Intellectual skills/Application of Knowledge

Upon successful completion of module, students should be able to:

2.1 Describe and explain the operations of different sources of electric powerm generation
2.2 Analyse mathematically the active and reactive power
2.3 Select suitable thermal and hydropower stations with other peaking and intermittent generating units for the supply situation
2.4 Device transmission and distribution combinations for the needed supply economy

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Upon successful completion of module, students should be able to:

3.1 Evaluate electrical power demand and supply situations coupled with their sources

3.2 Calculate from measurement the required loads and transmission/distribution requirement

3.3 Use different methods for power delivery efficiency

4. General transferable skills

Upon successful completion of module, students should be able to:

4.1 Solve subject specific numerical and conceptual problems

4.2 Undertake self-learning of electrical power engineering and their applications

4.3 Produce simple reports

7. INDICATIVE CONTENT

1- Introduction to Electric Power Supply Systems
- Power Generation Plant
- Single and three phase systems
- Transmission and Distribution Lines
- Industrial End User

2- Active and reactive power concepts
- Balanced and unbalanced loads
- Power measurements

3- Thermal and hydropower stations
- Construction and efficiency
- Synchronization process of multi-generators

4- Power Factor Improvement and Benefits
- Power factor basics
- The advantages of PF improvement by capacitor addition
- Cost benefits of PF improvement

5- Transformers
- Types, rating and location of transformers
- Tapchangers (On load and off load)
- Parallel operation of transformers
- Instrument transformers (current and potential)

6- Transmission and distribution systems
- Overhead and underground cables
- Representation of transmission lines (short, medium and long)
- Calculation of transmission line constants

7- Power system economics

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.

The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.

Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistance

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments
Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz

- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3214
2. **Module Title:** Analogue and Digital Electronics Laboratory
3. **Level:** 2 **Semester:**1 **Credits:** 5
4. **First year of presentation**: 2009 **Administering Faculty:** Engineering
5. **Pre-requisite or co-requisite modules, excluded combinations**

Pre-requisite: EEE 3122 Analogue and Digital Electronics
Co-requisite: EEE 3211 Analogue Electronic Circuits
EEE 3212 Digital Electronic Circuits

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours ___50_____	**Student Hours**	**Staff hours**
Lectures		
Seminars/workshops		
Practical classes/laboratory	**36**	**72**
Structured exercises		
Set reading etc.		
Self-directed study		
Assignments – preparation and writing		
Examination – revision and attendance		
Other: Report writing/marking	**14**	**60**

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

To provide the learner with hand on skills in analogue electronic devices and circuits and various digital and linear integrated circuits. The course will consist of a number of experiment on passive components, diodes, bipolar transistors, junction field-effect transistors, transistor amplifiers, logic gates, combinational circuits, flip flops, synchronous sequential circuits and memory devices.

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 The working principles and the characteristics of diodes , transistors, and discrete components
1.2 The various Logic families.
1.3 The working principles of various sequential circuits.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Select devices for transistor application circuits.
2.2 Select logic gates for combinational circuit designs.
2.3 Select Flip flops for Sequential circuit designs.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1. Identifies resistors and capacitors of standard values.
3.2. Verify experimentally the diode V-I characteristic
3.3. Implement a simple power supply with a rectifier, filter and voltage regulator.

3.4. Verify experimentally the bipolar characteristic curves
3.5. Implement a simple bipolar transistor-based amplifier
3.6. Verify the JFET V-I characteristics
3.7. Bias FET transistors
3.8. Implement experimentally RTL and TTL logic gates
3.9. Design and implement counter circuits
3.10. Design and implement sequential circuits

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1. Undertake self-learning using laboratory experiments
4.2. Communicate technical ideas in writing

7. INDICATIVE CONTENT

ANALOG ELECTRONICS

I. Components

1. Resistors and capacitors standard values
2. Component symbols
3. Frequency response, bode plots, basics review

II. Diodes

Diodes, diode equation
Diode models
Zener diodes
Diode applications
Peak sample, power rectifier, clamps, regulator

III. Bipolar transistors

V-I characteristics, breakdown
Common-emitter large signal model, graphical analysis
Common-collector
Common-emitter
Applications: current source, DC power supply regulator
Transistor biasing
Common-emitter amplifier
AC load line
Common-collector (emitter-follower) amplifier

IV. Junction field-effect transistors

1. Operation
2. Background and V-I characteristics: JFET
3. FET switch, chopper, MUX
4. Low frequency incremental model
5. Biasing
6. JFET current source

V. Two-transistor amplifiers

1. Differential emitter-coupled pair
2. Current mirror
3. Complementary emitter-follower (Class B, AB)
4. Amplifier classes
5. Power amplifiers

DIGITAL ELECTRONICS

Logic gates – RTL, TTL.
Flip – Flops – SR , JK, D, T
Counters – Binary, BCD, Hexa Decimal, UP/Down, Modulo Counters.

Adder/Subtractor – Half, Full.
Multiplexer / Demultiplexer – 3to 8 / 4 to 16.
Encoders / Decoders –
Code Converters – BCD / Binary / HexaDecimal / ASCII.
Memory – Registers, SRAM.

8. LEARNING AND TEACHING STRATEGY

The students will consolidate their knowledge in analogue and digital electronics by performing laboratory experiments. Each laboratory session could include the following steps depending on the relevancy as judged by the staff member:

1. Briefing on safety guidelines by technical staff.
2. Demonstration of the uses of electronic equipment by technical staff.
3. Briefing on the technical contents of the experiments by laboratory supervisors.
4. Supervision of laboratory work.
5. Experimental work conducted and data collected by students.
6. Data analysis and report writing by students after the class.
7. Feedback laboratory reports after marking

A document describing each laboratory experiment should be handed to the students at the beginning of every session.

9. ASSESSMENT STRATEGY

9.1 To assess practical skills through demonstration by students and report writing
9.2 The laboratory reports will be written in groups but individual reports will be required for some laboratory experiments as judged by the staff member.

Assessment Criteria:

The Electronics Engineering Laboratory assessment criteria will be used. *(*copy attached as Appendix).

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Demonstration	**20%**	**2.1, 2.2, 2.3, 3.1-3.10**
Group reports	**50%**	**2.1, 2.2, 2.3, 3.1-3.10, 4.1, 4.2**
Individual reports	**30%**	**2.2, 2.3, 3.1-3.10, 4.1, 4.2**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Before all experiments there will be a demonstration of use of relevant pieces of equipment.
- Laboratory experiments will be done in groups so that the learners could learn from each other.
- Staff member will be there throughout the performance of the lab experiments to clarify any doubts about them.
- Marked laboratory reports with comments will be handed back to students

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory space and equipment

- Single Power Supply 0-30V, 3 A
- Dual Power Supply (2 X 0-30V , 3A)

- Multiple DC Power Supply 0-30V/ 2A ,5V/2A, 0 to +/- 15V/1A
- 100MHz (250 MS/S RTS & 50GS/s ETS) Digital Storage Oscilloscope
- 20MHz Analogue Oscilloscope
- 1 MHz Function Generator with Digital Readout for Frequency and Amplitude
- 3½ Digit Multimeter, Manual Ranging
- DC Ammeter (200 mA, 2,20 mA, 0 - 2 mA)
- DC Voltmeter (0-1/2/5/10/30V)
- Bread Boards
- Discrete Components – R, L, C
- R – fixed range, Assorted collections, Variable
- L – Fixed range/Variable – Decade Inductance box
- C – Fixed range/Variable – Decade Capacitance box
- MHz Microcontroller based AM/FM Function - Pulse Generator with PWM
- Logic Gates
- Universal Gate- NAND/NOR
- Multiplexer / Demultiplexer
- Flip-Flops (R-S, D, J-K,T)
- Shift register (4 bit SIPO)
- Digital to Analog Converter (R-2R ladder)
- Analog to digital converter (Counter Type)
- bit Parallel Adder / Subtractor
- Monostable Multivibrators
- CMOS and Crystal Oscillators
- Adder/ Subtractor (4bit/8bit)
- Decoder /Demultiplexer
- Digital comparator circuit and components
- JK Asynchronous counter, D Flip Flop synchronous counter.
- CMOS Logic circuits, DTL NAND gates, TTL Inverter gate, ECL NOR gate,
- Combining different logic families.

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	

	Print Name	
Quality Office	Signature	
	Print Name	

Appendix: Assessment Criteria:

1. Laboratory Experiment

Two elements, Group Report – max 12; Individual Report – max 8

	Excellent	Good	Fair	Weak	Poor	Very Poor
	12,11	10,9	8,7	6	5	4 - 0
Report - Group mark	Results correct, Graphs good	Minor errors, graphs satisfactory	Some errors, graphs not clear	Errors or omissions, but some results acceptable	Errors mean results just fail to be acceptable	Significant errors, unacceptable results
	8,7	6	5	4	3	2 - 0
Individual Report	Good comments on all points	Good comments on several points	Some relevant comments	Comments acceptable, but lack depth	Comments just not acceptable, lacking thought	Poor comments lacking significance

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3215
2. **Module Title: Electrical Engineering Lab and Design I**
3. **Level: 2 SEMESTER: 1 Credits: 5**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

   Engineering Electromagnetics I, Engineering Systems Analysis I, Network Analysis

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours _____50_____	**Student hours**	**Staff hours**
Lectures	0	0
Seminars/workshops	0	0
Practical classes/laboratory	24	24
Structured exercises	8	8
Set reading etc.		----------
Self-directed study	6	----------
Assignments – preparation and writing	12	18
Examination – revision and attendance		
Other:		

6.2 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The aim of this module is to study the principles and operations of Electrical Power Engineering fundamentals.

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:

1.4 The working principles and the characteristics of passive and active electrical components

1.5 The various network combinations and their equivalences, Ammeters and voltmeters, coupled with their construction principles and sensitivity

2. Cognitive/Intellectual skills/Application of Knowledge

Upon successful completion of module, students should be able to:

2.1 Combine electrical components in series-parallel; obtain equivalences, connect measuring instruments using proper polarity for working circuits

2.2 Determine the unknown resistance using ammeter-voltmeter method

2.3 Carry out delta-star conversion, impedance matching, and network simplification

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Upon successful completion of module, students should be able to:

3.1 Solve practical industrial applications problems

3.2 Determine the effective impedance, errors in measurements, load, current and voltage sources, active and reactive power of single phase load and phase angles

4. General transferable skills

Upon successful completion of module, students should be able to:

4.1 Solve subject specific numerical and conceptual problems

4.2 Undertake self-learning of electrical engineering
4.3 Produce simple reports

7. INDICATIVE CONTENT

Unit 1: Introduction to electrical design
Unit 2: Basic electrical safety tips, waste disposal and environment safety
Unit 3: Cables, cable color codes, cable sizes, electric current carrying capacity of Cables, Single-core, two-core, three-core, and four-core cables. Cable Insulation
Unit 4: Single-phase circuits, 2-cable and 3-cable single phase circuits, determining cable sizes for specific circuits, lighting circuits
Unit 5: Types of electrical installation, Switches, type's electric current carrying capacity of switches, indoor and outdoor switches.
Unit 6: Power sockets, types, current carrying capacities, Determining cable sizes for circuits, socket outlet circuits, 13A S.S.O, twin 13A S.S.O, !5A S.S.O, 20A D.P., CCU etc.
Unit 7: Introduction to CBs, types of CBs, Distribution board, types of DBs, types of fuses.
Unit 8: Introduction to illumination, working plane illumination
Unit 9: PRACTICE: electrical installation design of 2no. 2bedroom semi-detached bungalow

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through laboratory experiments. Laboratory manuals are used so that students can concentrate on the materials of the lecture. There shall be gaps where students either have to fill in or make separate notes. The experiments are structured such that students can undertake some private investigation on how to develop ideas and apply them. They are also required to produce reports for each experiment conducted.

9. ASSESSMENT STRATEGY

The assessment strategies are:

- To assess practical skills through the report of the experiments already conducted
- To assess self-learning, judgment, time and self-management, understanding and application through the laboratory reports presented.
- To determine the level of independence in a group setting

Assessment Criteria:

- For examination setting and marking, the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report		
Experiment and report	50	3.1, 3.2, 4.1, 4.2, 4.3
Final assessment:		
Examination (2 hour)	50	1.1, 1.2, 2.1, 2.2, 3.1,3.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecture style, with opportunities for questions and feedback, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be led through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments for improvement.
- Opportunities to consult lecturer and/or tutorial assistant during office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

- Lab Manual

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial Assistant
1 Lab Instructor

Laboratory space and equipment

Laboratory equipment and space for Measurement and Instrumentation experiments
Equipments:

- Potentiometers, Rheostats
- Resistors, Capacitors, Inductors (Different values, types and ranges)
- R/C/L Decade Boxes
- DC power supplies and DC meters
- Centre Tapped Galvanometers
- Ammeters (Various types and ranges)
- Voltmeters (various types and ranges)
- Wheatstone bridge, Kelvin bridge, Schering bridge, Maxwell bridge, Hey'bridge, Anderson bridge
- 1-phase and 3-phase R-L-C load bank
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

YEAR 2 SEMESTER II

MODULE DESCRIPTION FORM

1. **Module Code: ENG 3201**
2. **Module Title: English for Science and Technology**
3. **Level: 2, SEM 2 Credits: _0**
4. **First year of presentation: 1997 Administering Faculty: KIST Language Center (KLC)**
5. **Pre-requisite or co-requisite modules, excluded combinations ENG 3101 General English**
6. **Allocation of study and teaching hours (See Notes of Guidance)**

Total student hours : 96	**Student Hours**	**Staff Hours**
Lectures	48	48
Seminars/workshops	24	24
Practical classes/laboratory	24	24
Structured exercises	24	
Set reading etc.		
Self-directed study	32	
Assignments – preparation and writing	24	
Examination – revision and attendance	24	
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT

This is a one-academic-year course (24 weeks) to be taught in two (2) SEMESTERs of 12 weeks each. It aims at improving students' proficiency in a view to enable them to perform various tasks in English. In the first part (SEMESTER1), students will be given opportunity to reinforce language structures learned in ENG 3101 (General English), but the emphasis will be more on listening, speaking, reading and writing good paragraphs and relatively longer essays by using activities based on current issues of everyday life, their culture, but most of which based on science and technology.

In the second part (SEMESTER 2), students will be given opportunities to develop their analytical skills, critical thinking, understanding and decoding science or technology related materials through the practice of the four skills: listening, speaking, reading and writing, write assignments, memos, business letters, application letters, resumes/CVs,

6.2 LEARNING OUTCOMES

A. Knowledge and understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

A.1 the writing process: prewriting (Finding and exploring a topic, Determining purpose and audience, Brainstorming, ordering ideas, planning, drafting;

A.2 the listening process of dialogues, news, short stories, radios, etc. in order to respond appropriately and critically in a wide range of situations;

A.3 the structure of spoken information from peers or other sources in order to participate actively in various group discussions and to do oral presentation on topics related to current issues;

A.4 the strategies used for reading various written materials strategies (e.g. Skimming, scanning);

A.5 the importance of grammar accuracy in order to understand and interpret written and oral information

B. Cognitive/Intellectual skills/Application of knowledge

Having successfully completed the module, students should be able to:

B.1 Structure and organize different types of essays in a coherent way;

B.2 Produce different types of informal and formal letters in English;

B.3 Produce a short and coherent essay-type summary of a long text;

B.4. Listening for specific and general information, listening to casual and prepared speeches, listening to radio and/or broadcasts or recorded documentaries, listening to English speakers in various conditions;

B. 5. Reading for critical appreciation and thinking

C. Communication/ICT/Numeric/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C.1 Listen ***to speakers of English*** for specific information in and outside classroom;

C.2 ***Speak to users of English to exchange*** information for different purposes,

C.3 ***Read different types of texts:*** skimming/scanning,

C.4 ***Write*** short and coherent essay-type summary of a relatively long text, letters and note taking;

D. General transferable skills

Having successfully completed the module, students should be able to:

D.1 Undertake self-learning: reading extensively and intensively a variety of materials;

D.2. Participate in discussion, debates, on science and technology related topics;

D.3 Write comprehensibly for different purposes.

7. INDICATIVE CONTENT

Integrated Skills: Listening, speaking, reading and writing skills development;

Review of grammatical structures: tenses, passive voice, reported speech, complex sentences, noun clauses, etc

7.1 ***Listening:*** Listening for specific and general information, listening to casual and prepared speeches, listening to radio and/or broadcasts or recorded documentaries, listening to English speakers in various conditions and listening to **TOEFL based materials**;

7.2 ***Speaking:*** Presentations about and discussions on contemporary issues and other topics (e.g. HIV/AIDS, Gender ; development, environment, science and technology), etc;

7.3 **Reading**: Apply different reading strategies to different text types and reading TOEFL based materials; applying the three phases/tasks in the reading process (pre-reading task, while reading task, post reading task) and applying the reading techniques (reading for specific information, reading for critical thinking, skimming, scanning**);**

7.4 **Writing**: the use of subordinating conjunctions, the quality of a good paragraph, topic cohesions and coherence, Introduction to letter writing, the use of different punctuation marks, connectors, **note-taking, memo writing, official/ business letter writing, writing CVs/resume,** and writing TOEFL

essay types, Applying the writing process (Selecting the topic, Brainstorming, Planning, Wring the first draft, Editing, Writing the final draft, etc

7.5 ***Language*** **structure:** Revision of verb tenses (simple and compound tenses), the if-clauses, modal auxiliaries, the use of articles, the gerund, the passive, subordinating conjunctions and the adverbials.

8. LEARNING AND TEACHING STRATEGY

1. General principles

The course is delivered using learner-centred and communicative approaches. The teacher will bear in mind that learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production. This can be achieved by getting learners work in groups, pairs, individually or as a whole class. As much as possible, activities (speaking, reading and writing and listening) should be authentic-sounding and relevant to the learner's needs.

Although the four skills (listening and speaking, reading and writing) are presented as separate outcomes, they should be integrated when taught and assessed. Therefore, as much as possible all activities will try to offer opportunities to practice the four language skills with emphasis put on the skill targeted by the lesson, since all the four skills are interrelated.

Special effort should be made to select the language teaching/learning material relating to science and technology.

The grammar issues are addressed as **revision and reinforcement** of what students learned in year1, SEMESTER 1 & 2.

The grammar issues addressed are the recurring mistakes/difficulties from learners' speaking and writing and not a systematic teaching of grammar or phonology. Some remedial teaching should be provided so as to address those issues when necessary.

At the beginning of a lesson, the teacher may get learners talk about experiences/events/latest news etc. as a warm activity in an improvised way. This should be short (about 5 minutes) but on a regular basis

Suggested procedures for conducting learning activities

A. **Reading/Listening**

A reading/listening activity could include the following 3 phases:

1. ***A pre-reading/pre-listening task*** whose aim is to give students a reason to read by giving them something to look as they read/listen the text. The task should focus on the main points/ideas of the text so that after the first reading, they have a good idea of what the text is about.

2. ***A while-reading/listening task***

This type of task aims at checking the full understanding of the text. This can be achieved through:

Multiple – choice questions (MCQ)

True (False questions (T/F).
Open – ending questions (WH-questions)
Completing a table
Listening and note-taking
Listening and gap-filling

3. ***A post-reading/listening task***

This type of task aims at bringing students to react in a personal way relating to their opinions, feelings and experiences. Activities can comprise the following:

- *Creating new texts : e.g. change a narrative into a drama role play an interview with a character in the text, create a similar text modelled on the one just read,*
- *Recreating the text : e.g. reconstruct it from keys words, write a summary*
- *Expressing views on the subject of the text and relating it to their own experience.*
- *Exploiting the text for grammar and vocabulary learning: e.g.: rewrite it in a different tense, find verbs to correspond to the selected adjectives or nouns; find synonyms, antonyms.*

Note: It is to be understood that the teacher will select tasks which are appropriate for a given text.

9. ASSESSMENT STRATEGY

Continuous Assessment Test (CAT): 60% of the final grade. Calculated from take home teacher marked assignments and in class marked activities:

- Writing short type essays, writing formal and informal letters, memos, writing Summaries,
- Reading comprehension activities,
- Listening to pieces of authentic recordings for general and specific information,
- Individual and group oral presentations,

Final Examination (2 hour examination): 40% of the final grade. By setting the final examination, lecturers aim at giving students the opportunity to demonstrate evidence of their understanding of the material and ability to skilfully use them rather than their ability to memorize masses of information.

Total mark for the module: 100. This is to evaluate the student's ability to effectively use the learned listening, speaking, reading and writing skills.

Because this is a one academic year course, SEMESTER mark will constitute half (50%) of the final (end of year) mark and the final mark will be the sum of the two SEMESTERs. This being so, only the final mark (out of 100%) will be submitted to the Examination office for respective faculties and departments.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:	**40**	**2.4, 3.4, 4.3**
Mid-SEMESTER CAT	**20**	**2.1, 2.2, 2.3, 3.1,3.2, 3.3, 4.1**
Final Exam:	**40**	**1.1, 1.2, 1.3, 1.4, 2.4, 3.4, 4.3 2.1, 2.2, 2.3, 3.1,3.2, 3.3, 4.1**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

●Interactive/communicative approach with a lot of opportunity of students' full involvement in group and pair work.

●Tutorial group presentations on topics related to Science and Technology, as well as some current issues such as HIV/AIDS, environment, etc followed by peer comments and discussions

●Marked summative assessment (Written assignment, and test) handed back to students with comments.

●Students are given opportunities to consult their lecturers during working hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Michael Swan & Catherine Walter. The New Cambridge English Course .CUP

Background Texts (include number in library or URL) (inc ISBN)

English Grammar in Use
Audio Cassette & Cassette player
A kind of Marriage (from KIST Library)
Journals
None

Key websites and on-line resources

http://www.grammar.ccc.commnet.edu
http://www. Writeexpress.com

Teaching/Technical Assistance

9 Lecturers

Laboratory space and equipment

1 Language lab (American Corner) to be reallocated wider office space
To fix computers belonging to the American corner for CALL practices

Also, similar free space should be provided to students for listening practice, Video viewing and other related language practice.

Computer requirements

Set 10 more computers for language practice in the American Corner

Others

KIST Library to purchase 12 new cassette players/recorders and blank tapes for listening activities.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

The lecturer and tutor are encouraged to use any written or recorded document relevant to the target group's core subjects of science or engineering.

14. TEACHING TEAM

Three (3) more staff will be needed for a smooth running of the course in 2011.

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
2. Department of English	Signature	**10/12/2010**
	Print Name: Joseph MAGAMBO	
2 KLC Directorate	Signature	**10/12/2010**
	Print Name: John-Baptist RUSINE	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _ _ __ _ MAT 3221 _____**
2. **Module Title: (ENGINEERING MATHEMATICS IV)**
3. **Level: 2 Semester: 2 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Science**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Eng Maths I, II and III
6. **Allocation of study and teaching hours**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory		
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**18**	**16**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

The Module aims to introduce students to the various properties of
Unit I curve fitting and numerical solution of equations
Unit II finite differences and interpolation
Unit III numerical differentiation and integration
Unit IV numerical solutions of ordinary differential equations
UnitV numerical solutions of ordinary differential equations

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Upon Completion of this Module students,

1.1 should have a reasonable understanding of the definitions and terms related to the Module aims at as well as the Course Contents.

1.2 Should have a reasonable understanding of the statements, proofs and implications of the basic results.

1.3 should be able to present simple arguments and conclusions using Calculus and Complex Analysis arguments with clarity.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Developed their Problem solving Skills related to Calculus.

2.2 Have acquired reasonable facility for Symbolic and Numerical Calculation with Random Variables and Other Related Concepts.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Apply Calculus concepts Principles and Methods to solve problems of any Branch of Mathematics.

3.2 Analyse and Evaluate Problems.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Assimilate Abstract Ideas

4.2 Communicate information having Probability and Statistics content accurately.

7. INDICATIVE CONTENT

UNIT I CURVE FITTING AND NUMERICAL SOLUTION OF EQUATIONS

Method of least squares- Fitting a straight line- Fitting a Parabola- Fitting an Exponential Curve- Fitting a curve of the form axb- calculation of the sum of the squares of the residuals- Newton- Raphson method- Gauss Elimination Method- Gauss Jacobi Method Gauss Seidel method.

UNIT II FINITE DIFFERENCES AND INTERPOLATION

First and higher differences- forward differences and backward differences and central differences- differences of a polynomial Properties of operators Factorial polynomials Shifting operator E Relation between the operators, Interpolation Newton Gregory Forward and Backward Interpolation formulae Divided differences Newton's divide difference formula- Lagrange Interpolation formula- Inverse Interpolation.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION

Numerical Differentiation and integration: Newton forward and backward differences formula to compute first and higher order derivatives The Trapezoidal Rule- Simpson's one third rule and three eighth rule.

UNIT IV NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

Solution by Taylor series Euler's method Improved and modified Euler method Runge- Kutta methods of fourth order (No Proof) Milne's method Adam Bashforth Methods.

UNIT V NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

Classification of Partial differential equations of the second order- Difference quotients Laplace's equation and its solutions by Liebmann' process Solution of Poisson Equation Solutions of Parabolic and Hyperbolic equations.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination. The students therefore will not just rely on memory but also show understandings of the principles in application to exam problems.

- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- Computer Laboratory assessment criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	40	2.1, 2.2, 3.2, 4.1, 4.2
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

Mann P.S. Introductory Statistics

Background Texts (include number in library or URL) (Inc ISBN)

5 Advanced Engineering Mathematics by E. Kreysig

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,

1 Tutorial assistant

Laboratory space and equipment

None

Computer requirements

Matlab, Maple.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	

	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3221**
2. **Module Title: Electrical Machines I**
3. **Level: 2 Semester: 2 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

   Electrical and Electronics Laboratory & Design, Network Analysis, Electrical Power Engineering
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	12	24
Practical classes/laboratory		
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

Electrical machines is a subject where a student will deal with various types of electrical machines which are employed in industries, power stations, domestic and commercial appliances etc. After studying this subject, an electrical degree holder must be competent to repair and maintain these machines and give suggestions to improve their performance. Practical aspects of the subject will make the students capable of performing various tests on the machines.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 The magnetic properties affect the output power of static and dynamic electrical machines: energy conversion.

1.2 The principles governing transient and steady state operation of electrical machines.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Select appropriate transformer or DC machine and/or drives for various electrical applications.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to

3.1 Identify various machines of special interest to electrical engineers

3.2 Carry out analysis of advantages/disadvantages related to various electrical machines.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Explain transient and steady state behaviour of transformer or DC machines.
4.2 Teach others, the fundamental principles governing the transformers and DC machines behaviour related to energy conversion.

7. INDICATIVE CONTENT

1. Introduction to Electrical Machines

1.1 Magnetic Circuit components
1.2 Analogy between magnetic and electric circuits
1.3 Definition of motor and generator
1.4 Torque development due to alignment of two fields and the concept of torque angle
1.5 Electro-magnetically induced emf
1.6 Elementary concept of an electrical machine
1.7 Comparison of generator and motor

2. DC Machines

2.1 Main constructional features, Types of armature winding
2.2 Function of the commutator for motoring and generation action
2.3 Factors determining induced emf equation
2.4 Factors determining the electromagnetic torque
2.5 Significance of types of dc generators: shunt, series and compound
2.6 External characteristics of dc generators
2.7 Performance and characteristics of different types of DC motors
2.8 Speed control of dc shunt/series motors
2.9 Need of starter, three point dc shunt motor starter and 4 point starter
2.10 Applications of DC motors
2.11 Faults in dc machines and their retrospective
2.12 Losses in a DC machine

3. Transformers (single phase)

3.1 Introduction
3.2 Constructional features of a transformer and parts of transformer
3.3 Working principle of a transformer
3.4 EMF equation
3.5 Transformer on no-load and its phasor diagram
3.6 Transformer on load (including voltage drops and its phasor diagram)
3.7 Transformer – neglecting voltage drop in the windings – Ampere turn balance – its phasor diagram
3.8 Mutual and leakage fluxes, leakage reactance
3.9 Equivalent circuit
3.10 Relation between induced emf and terminal voltage, regulation of a transformer mathematical relation
3.11 Losses in a transformer
3.12 Open circuit and short circuit test. Calculation for efficiency, condition for maximum efficiency
3.13 Auto transformer construction, working and applications
3.14 Different types of transformers

4. Three phase Transformers

4.1 Construction of three phase transformer
4.2 Types of three phase transformer i.e. delta-delta, delta-star, star-delta and star-star
4.3 Conditions for parallel operation (only conditions are to be studied)
4.4 Difference between power and distribution transformer

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions. The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	40	2.1, 3.1, 3.2, 4.1, 4.2
Experiment and report		
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 2.1

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

- Design electrical machines: Author: Mittle, V.N.; Mittal, A. -- Delhi: Standard Publishers distributors, 2004.
- Analysis of electric machinery and drive systems, Second edition, Author: Paul C.Krause; Oleg Wasynczuk; Scott D. Sudhoff, Perdue University, John Willey & Sons, Inc. Publication U S A 2002.
- Electrical machines, Author: BHATTACHARYA, S.K. -- New Delhi: Tata McGraw-Hill, 1998.

- Electric machines and power systems, Volume I, Author: Syed A.Nasar, University of Kentucky
- Electrical machines, Drives, and Power systems / Wildi, Theodore. – New Delhi: Pearson education, 2004.
- An introduction to electrical machines and transformers, Author: McPherson, George; Laramore, Robert D. -- New York: John Wiley, 1990.

Background Texts (include number in library or URL) (inc ISBN)
Journals
Key websites and on-line resources

Teaching/Technical Assistance
1 Lecturer,
1 Tutorial assistance
Laboratory space and equipment
Computer requirements
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3222
2. **Module Title:** NETWORK ANALYSIS AND SYNTHESIS
3. **Level: 2 Semester: 2 Credits:_10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Engineering Mathematics II, Network Analysis
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours _____100_____	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

The aim of this module is to provide the basic knowledge on time domain and frequency domain analysis of electric circuit. The module attempts to explain the analysis of electrical networks by using graph theory with the help of cut-set matrix, incident matrix and tie-set matrix. It covers synthesis of RL, RC, LC, RLC electric networks.

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 Time domain and frequency domain analysis
1.2 Characterization of Two port network
1.3 Can analyse the network by using graph theory
1.4 Can synthesis RL, RC, LC and RLC network

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Apply time domain and frequency domain analysis in electrical networks
2.2 Apply synthesis technique to various networks

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Analyse network synthesis methods
3.2 Apply methods of solution to general electrical network problems

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Undertake self-learning in electrical and electronics networks
4.2 Produce simple models and reports

7. INDICATIVE CONTENT

S – Domain Analysis – Pole – zero method
Frequency Domain Analysis- Immittance Loci
Network Topology - Graph theory
Two Port Networks - Z, Y, H and T parameters
Elements Of Network Synthesis – Hurwitz, P.R. functions, synthesis of RL, RC, LC & RLC

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.
The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.
Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.
The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 4.1, 4.2
Experiment and report	20	3.1, 3.2, 4.1, 4.2
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.

- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

1. Theory and Problems of Circuit Analysis, Iyer T.S.K.V, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2008

2. Sudhakar. A., Electric circuits Analysis' Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2008

3. Van Valkenburg, M.E., 'Network Analysis', Prentice – Hall of India Private Ltd, New Delhi, Third Edition, 1974.

4. Kuo F.F., 'Network Analysis and Synthesis', Wiley International Edition, Second Edition, 1966

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for circuit analysis experiments

Computer requirements

Access to Circuit maker, Pspice, MATLAB

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3223
2. **Module Title:** CONTROL SYSTEMS
3. **Level:** 2 **Semester:** 2 **Credits:** 10
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations:**
   Level 1 module
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	36	72
Seminars/workshops		
Practical classes/laboratory	24	48
Structured exercises		
Set reading etc.		----------
Self-directed study	18	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	10	24
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

This module provides the students with sound knowledge in the basic concepts of linear control theory and design of control system. It covers Control System Modelling, Time Response Analysis of systems, Frequency response Analysis, and Study of Stability of Systems in time and frequency domains, Analysis of Digital Control Systems and the Study of Compensation techniques.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

- 1.1 Block diagrams and transfer functions
- 1.2 Time response of dynamic linear systems
- 1.3 Stability analysis methods
- 1.5 Frequency response and Bode diagrams
- 1.6 Digital control systems
- 1.7 Different compensation techniques

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

- 2.1 Represent systems using block diagrams and signal flow graphs
- 2.2 Assess the stability of a linear system
- 2.3 Plot root locus and use it to design simple PID and Phase lag/lead compensators
- 2.4 Plot Bode diagrams and use them to design classical compensators

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

- 3.1 Measure the step transient response of a system
- 3.2 Measure the frequency response of a system

3.3 Tune a PID controller based on Ziegler-Nichols tuning rules
3.4 Use Oscilloscopes and other instruments.
3.5 Simulate control systems using appropriate tools such as MATLAB

4. General transferable skills

Having successfully completed the module, students should be able to:
4.1 Able to communicate effectively
4.2 Apply measurement and instrumentation techniques

7. INDICATIVE CONTENT

Control System Modelling

System concept; Differential equations, Transfer functions, modelling of electric systems, Translational and rotational mechanical systems, simple Electro - mechanical systems.

Block diagram representation of systems. Block Diagram reduction methods**,**

Closed loop transfer function, determination of Signal flow graphs. Mason's gain formula, Examples

Time Response Analysis

First Order Systems, Impulse and Step Response analysis, Second Order system Analysis, Steady state error, Error Coefficients and Generalized error series. Principle of PI, PD and PID Compensation, Servo Motor, Synchros & Stepper Motor

Stability in Time Domain

Stability Analysis, Routh - Hurwitz Criterion. Root locus Method, Construction of root, locus diagrams. Stability Study, Application of root locus diagram.

Stability In Frequency Domain

Frequency response analysis, Frequency domain specifications, Polar plot, Bode's Plot, Magnitude - Phase plot, Constant M and N Circles. Nichol's Chart

Nyquist Stability Criterion, Relative Stability - gain Margin and Phase margin, determination from Polar plot, Bode's Plot and Magnitude – Phase Plot, Use of Nichol's Chart in system analysis to determine relative stability, Bandwidth, Resonance peak and resonance frequency

Digital Control System

Characteristics of sampling - Data extrapolation – Review of Z transform theory - characteristic response of a sample and ZOH combination – stability analysis by mathematical tests and root locus diagrams – design using Root loci.

Compensation Techniques

Cascade and feedback compensation, Lag, Lead and Lag- lead Compensation. Design of Cascade Compensators - Using Bode's Plot.

8. LEARNING AND TEACHING STRATEGY

Students will acquire understanding of different concepts of this module through lectures and directed reading. Tutorials will be used to apply the basic principles. Laboratory work will be used to demonstrate concepts and show differences between theory and reality.

Lecture notes will be given to students prior to all lectures. That would help the learners to clarify their doubts during lecture time and make it more interactive.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

9. ASSESSMENT STRATEGY

Assessment strategy is:

Knowledge and understanding will be assessed using the mid-term assessment test and the final examination. Application of knowledge and ability of self-learning will be assessed through open-ended assignment. Practical skills, team work ability and

communication ability will be assessed by laboratory demonstration by students and laboratory report writing.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the EEE Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assessment Test	20%	1.1, 1.2, 1.3, 2.1, 2.2
Laboratory demo./Report	10%	3.1, 3.2, 3.3, 3.4, 4.1,4.2
Assignment	10%	2.1, 2.2, 2.3, 4.1, 4.2
Final assessment:		
Final examination	60%	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7 2.1, 2.2, 2.3, 2.4

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked assessments handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. Norman S. Nice, 'Control Systems Engineering', Fourth edition, John Wiley and Sons Inc., 2004

2. I.J.Nagrath & M.Gopal, 'Control System Engineering' Wiley Eastern, 2001.

Background Texts (include number in library or URL) (inc ISBN)

1. Katsuhiko.ogata, 'Modern Control Engineering', Peakson Education - Asia, Fourth Edition, 2002.

2. Benjamin. C.Kuo, 'Automatic Control Systems, Prentice hall of India, 1995.

3. Learning and Teaching Strategy John J.Diazo & Constantine H.Houpis, 'Linear Control Systems Analysis and Design' McGraw-Hill, Inc., 1995.

4. Schaum's Outline Series,' Feedback and Control Systems' McGraw-hill, 1986.

5. Richard C.Dorf, Robert H.Bishop, 'Modern Control Systems' Addison - Wesley, 1999.

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,

1 Tutorial assistant

1 Laboratory technician

Laboratory space and equipment

Laboratory equipment and space for Control and Measurement lab. with equipment to be set up.

Computer requirements

Computer laboratory with the MATLAB software.

Others

None

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decide

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	**Dean/Head of Department**	**Date**
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** **EEE 3224**
2. **Module Title:** **Signals and systems**
3. **Level: II Semester: II** **Credits: 10**
4. **First year of presentation: 2009** **Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   EEE 3213. EEE 3214
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours ___100___	**Student Hours**	**Staff hours**
Lectures	**24**	**24**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory		
Structured exercises	**6**	**12**
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 Brief description of aims and content **(NOT MORE THAN FIVE LINES)**

This course introduces the representation, classification and properties of continuous and discrete time signals, continuous and discrete systems, sampling of continuous time signals, realization structures of finite duration and infinite duration impulse response filters. This course also gives the basic concepts of signals and their different application to communications.

6.2. LEARNING OUTCOMES

1. Knowledge and Understanding

   Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

   1.1 – Mathematics relevant to signals and systems

   1.2 – Basic concepts of signals, systems and transformers

2. Cognitive/Intellectual skills/Application of Knowledge

   Having successfully completed the module, students should be able to:

   2.1 – Select and apply relevant mathematical methods and tools for modelling and analysis of communication systems

   2.2 – Use system analysis in development of solutions to problems in the design and development of the communication systems

   2.3 – Apply knowledge of system analysis to produce novel designs of hardware and Software systems

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

   Having successfully completed the module, students should be able to:

   3.1 – Observe and store system input and output accurately in lab and in real world

   3.2 – Analyze, evaluate and interpret input and output signals and apply them to solution of problems and system.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1– Demonstrate computational skills in solving problems associated with systems

4.3 – Use competently commercial software for analysis and design of systems

7. INDICATIVE CONTENT

Classification of Signals and Systems

Continuous-Time signals (CT signals), Discrete-Time signals (DT signals) – Unit Step, Ramp, Pulse, Impulse and Exponential signals. Classification of CT and DT signals – Periodic and Aperiodic, Energy and Power, Even and Odd, Deterministic and Random signals, Transformation on Independent variables. CT systems and DT systems, Properties of Systems – Linearity, Causality, Time Invariance, Stability, Invertibility and LTI Systems

Analysis of Continuous-Time (CT) Signals

Fourier Series Analysis, Spectrum of CT signals, Fourier Transform and Laplace Transform in Signal Analysis. Parseval's Theorem, Sampling Theorem and Aliasing.

Linear Time-Invariant (LTI) Continuous-Time (CT) Systems

Differential Equation, Block Diagram Representation, Impulse Response, Convolution Integral, Frequency Response, Fourier Methods and Laplace Transforms in Analysis, State Equations and Matrices.

8. LEARNING AND TEACHING STRATEGY

The module will be delivered as a series of lectures supported by tutorial, laboratory sessions and directed study in which the students will undertake set exercises. The emphasis of the module is to introduce students the classification, properties and representation of discrete time and continuous time signals and systems, the analysis, sampling theory, structures and interconnection of systems and the exercises will be designed to reflect this. An assignment will cover key topics such as convolution, interconnection of systems, and realization structures of discrete time systems. Students will be assessed on the appropriateness of their solution and on their ability to apply specified tools to the design.

9. ASSESSMENT STRATEGY

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

The Institute policy requires the internal moderation of assessments. Each Module shall have a Module Leader, and a Co-Leader, Module Co-Leader shall serve as the internal moderator of the module.

Below are listed some sections of the examination regulations that are applicable:

- Unless otherwise stated, the modules will be subject to Continuous Assessment and final end of module examination.
- Continuous Assessment (CAT) will consist usually of written tests, assignments, and/or short quizzes, laboratory exercises, all of which will contribute no more than 40% of the total mark.
- The final examination shall be held during the examination period at the end of the semester, and will contribute 60% of the total mark.
- A minimum score of 40% of the CAT is needed for a candidate to qualify for the final examination.
- Candidates who fail to obtain a pass (50%), but who attain at least 40% from both CAT and exam will be allowed to write a supplementary examination, offered at the end of the academic year. Otherwise, the candidates will have to repeat the module at the earliest time when it is offered.

- Candidates who fail the supplementary examination shall repeat the module.
- The maximum mark for a supplementary examination will be 50%.
- A candidate who fails a course that was repeated shall be discontinued from studies.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Practical	**15%**	**A1,A2,B1,B2,B5,C1,C5,D1,D3**
MINI TEST	**25%**	**A1,A2,B1,B2,C5,D1**
Final assessment:	**60%**	**A1,A2,B1,B2,B5,C5,D1**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked assessments are handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours and during tutorial sessions.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Alan V.Oppenheim, Alan S.Willsky with S.Hamid Nawab, “Signals & Systems”, Second Edition, Pearson Education, 1997.

Background Texts (include number in library or URL) (Inc ISBN)

1. Michael J Roberts, "Fundamentals of Signals and systems" McGraw Hill, 2008.
2. Rodger E.Ziemer, William H.Tranter and D.Donald Fannain, “Signals & Systems Continuous and Discrete”, Pearson Education, 2002.
3. M.J.Roberts, “Signals and Systems Analysis using Transform Method and MATLAB”, McGraw Hill, 2003.
4. Simon Haykin and Barry Van Veen, “Signals and Systems”, John Wiley, 1999.
5. K.Lindner, “Signals and Systems”, McGraw Hill International, 1999.
6. Hwei Hsu, “Signals and Systems”, McGraw Hill Schaum’s Series, 1995

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3225**
2. **Module Title: Electrical Engineering Lab and Design II**
3. **Level: 2 SEMESTER: 2 Credits: 5**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Power Electronics, Drives and Control
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours _____50_____	**Student hours**	**Staff hours**
Lectures	0	0
Seminars/workshops	0	0
Practical classes/laboratory	24	24
Structured exercises	8	8
Set reading etc.		----------
Self-directed study	6	----------
Assignments – preparation and writing	12	18
Examination – revision and attendance		
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The aim of this module is to study the principles and operations of Electrical Power Engineering transient characteristics for RLC circuits.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:

1.1 The working principles and the transient characteristics of passive and active electrical components

1.2 The characterisation of Silicon, Germanium and Gallium-Arsenide diode curves, analyses of half-wave and full-wave rectifiers and study of smooth wave dc supply

2. Cognitive/Intellectual skills/Application of Knowledge

   Upon successful completion of module, students should be able to:

   2.1 Combine various passive and active components to determine their characteristics and application areas in engineering

   2.2 Determine the quality factor and resonance conditions of RLC circuits

   2.3 Use oscilloscope to measure time, frequency, and voltage, current and complex frequency domain

   2.4 Measure symmetrical and unsymmetrical three phase loads

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

   Upon successful completion of module, students should be able to:

   3.1 Solve practical industrial applications problems

   3.2 Determine frequency and phase measurements, errors in measurements, and sinusoidal steady-state response of RLC circuits

4. General transferable skills

Upon successful completion of module, students should be able to:

4.1 Solve subject specific numerical and conceptual problems

4.2 Undertake self-learning of electrical engineering

4.3 Produce simple reports

7. INDICATIVE CONTENT

Unit 1: Energy Utilization

Application of luminous effect of electric current; Luminaries: Introduction and working principles of the under listed luminaries Incandescent filament lamp, vapour lamp, neon lamp, night light, sodium vapour lamp, mercury vapour lamp, fluorescent lamps; Introduction to electroluminescence; The inverse square law of illumination

Unit 2: Application of thermal effect of electric current

Introduction and working principles of the under listed electrical devices; Devices employing heating elements: Electric room heater, electric soldering iron, electric flat iron, bimetallic disk switch, electric flasher, Plug and cartridge fuses, thermal circuit breaker, thermal circuit breaker using a bimetallic disk switch.

Unit 3: Maintenance of electrical installation and household electrical equipment

Unit 4: Introduction to street lighting installation design

Unit 5: PRACTICE: electrical installation design of a 2-floor guest house.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through laboratory experiments. Laboratory manuals are used so that students can concentrate on the materials of the lecture. There shall be gaps where students either have to fill in or make separate notes. The experiments are structured such that students can undertake some private investigation on how to develop ideas and apply them. They are also required to produce reports for each experiment conducted.

9. ASSESSMENT STRATEGY

The assessment strategies are:

- To assess practical skills through the report of the experiments already conducted
- To assess self-learning, judgment, time and self-management, understanding and application through the laboratory reports presented.
- To determine the level of independence in a group setting

Assessment Criteria:

- For examination setting and marking, the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report		
Experiment and report	50	3.1, 3.2, 4.1, 4.2, 4.3
Final assessment:		
Examination (2 hour)	50	1.1, 1.2, 2.1, 2.2, 3.1,3.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecture style, with opportunities for questions and feedback, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be led through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments for improvement.
- Opportunities to consult lecturer and/or tutorial assistant during office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

- Lab Manual

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial Assistant
1 Lab Instructor

Laboratory space and equipment

Laboratory equipment and space for Measurement and Instrumentation experiments
Equipments:

- Potentiometers, Rheostats
- Resistors, Capacitors, Inductors (Different values, types and ranges)
- R/C/L Decade Boxes
- DC power supplies and DC meters
- Centre Tapped Galvanometers
- Ammeters (Various types and ranges)
- Voltmeters (various types and ranges)
- Wheatstone bridge, Kelvin bridge, Schering bridge, Maxwell bridge, Hey'bridge, Anderson bridge
- 1-phase and 3-phase R-L-C load bank
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3226**
2. **Module Title: Electrical Machines Laboratory I**
3. **Level: 2 Semester: 2 Credits: 5**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

   Electrical and Electronics Laboratory & Design, Network Analysis, Electrical Power Engineering

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours 50	**Student Hours**	**Staff hours**
Lectures	0	0
Seminars/workshops	0	0
Practical classes/laboratory	24	24
Structured exercises	8	8
Set reading etc.		----------
Self-directed study	6	----------
Assignments – preparation and writing	12	18
Examination – revision and attendance		
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

- To illustrates the first principles of electric machinery and familiarizes students with fundamentals of DC machines.
- To learn about the characteristics of DC generators with different types of excitation (separately excited and self-excited shunt, series and compound). These characteristics for the machines under no-load and loading conditions.
- To be acquainted with the starting methods of DC motors, showing the torque-speed relationship during starting and running conditions.
- To determine the equivalent circuit parameters of single-phase transformers.
- To be aware with the different connections of the three phase transformers (star/delta, star/star...) showing the relationships between currents and voltages in phases and lines and how to measure the three phase powers at the supply and load sides.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.2 The characteristics of DC generators with different types of excitation
1.3 The starting methods of DC motors
1.4 The equivalent circuit parameters of single-phase transformers
1.5 The different connections of the three phase transformers

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:
Select appropriate transformer or DC machine and/or drives for various electrical applications.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to

1.1 Identify various machines of special interest to electrical engineers

3.2 Carry out analysis of advantages/disadvantages related to various electrical machines.

3.3 Conduct experiments on DC machines and Transformers to analyse their characters

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Explain transient and steady state behaviour of transformer or DC machines.

4.2 Teach others, the fundamental principles governing the transformers and DC machines behaviour related to energy conversion

7. INDICATIVE CONTENT

- DC Separately Excited Generator
- DC Self Excited Shunt Generator
- DC Self Excited Series Generator
- DC Compound Generator
- DC Motor Characteristics (Starting, Reversing Direction of Rotation, ..)
- Single Phase Transformer (A: Equivalent Circuit Determination)
- Single Phase Transformer (B: Loading and Efficiency Determination)
- Three Phase Transformer (Connections)
- Loaded Three-Phase Transformer

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through laboratory experiment. Laboratory manuals are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes. The experiment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the lab report will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report		
Experiment and report	50	3.1, 3.2, 3.3, 4.1, 4.2

Final assessment:		
Examination (2 hour)	50	1.1, 1.2, 1.3, 1.4, 2.1, 3.1, 3.2, 3.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecture style, with opportunities for questions and feedback, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be led through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments for improvement.
- Opportunities to consult lecturer and/or tutorial assistant during office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Lab Manual

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant
1 Lab Instructor

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	**Dean/Head of Department**	**Date**
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	

ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

YEAR 3 SEMESTER I

MODULE DESCRIPTION FORM

1. **Module Code: ENG 3301**
2. **Module Title: English for Academic Purposes (EAP)**
3. **Level : 3, SEM: 1 Credits: 00**
4. **First year of presentation: 1997 Administering Faculty:**
5. **KIST Language Centre (KLC)**
   Pre-requisite or co-requisite modules, excluded combinations ENG 3201 (English for Science and Technology)
   Co-requisite: None
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours: 24	**Student Hours**	**Staff Hours**
Lectures	12	24
Seminars/workshops	6	6
Practical classes/laboratory	6	6
Structured exercises	-	-
Set reading etc.	-	-
Self-directed study	12	-
Assignments – preparation and writing	6	6
Examination – revision and attendance	8	6
Other: Preparing Handouts	-	6

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

This is a one SEMESTER (12 weeks course). It aims at familiarizing students with the academic style, research question designing, etc. Students should be able to interpret graphs, tables and charts, to read and understand a piece of an academic piece of writing, to write good summaries, find specific information. The course comprises two main components: academic writing and academic reading which will be concurrently taught. Academic writing: writing good introduction, writing conclusion; coherence and cohesion in academic writing; design a questionnaire and interview questions; apply some grammar rules, referencing techniques, and writing a research paper.

6.2. LEARNING OUTCOMES

A. Knowledge and Understanding

Having successfully completed the module, students should be able to

A.1 Attempt any general academic writing,
A.2 use scientific research writing techniques,
A.3 Identify an overview of how a scientific piece of writing is made,
A.4. Have developed autonomy and analytical skills through academic reading,
A.5. Find a researchable topic in their areas of study.

B. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

B.1 Practice academic writing in their specific fields of study,
B.2 Develop their autonomy and analytical thinking through academic reading,

B.3 Respond to the four types of questions related to academic reading, i.e., overview questions, specific information questions, viewpoint questions, and summarizing questions,
B.4 Present and defend their research findings publicly,
B.5 Master academic reading based on IELTS and write examination on it
B.6 Speak in public, give a speech, and take part in discussions and debates.

C. <u>Communication/ICT/Numeric/Analytic Techniques/Practical Skills</u>

Having successfully completed the module, students should be able to:
C.1 Practice academic writing in their specific fields of study,
C.2 Develop autonomy and analytical thinking through academic reading passages
C.3 Respond to the four types of questions related to academic reading, i.e., overview questions, specific information questions, viewpoint questions, and summarizing questions,
C.4 Present and defend their research findings publicly,
C.4Master academic reading based on IELTS and write examination on it

D. <u>General transferable skills</u>

Having successfully completed the module, students should be able to:
D.1 Undertake a research-based paper not exceeding 2500 words,
D.2. Present research findings to peer students for appreciation
D.3 Write IELTS based examination, etc

7. INDICATIVE CONTENT

The first part of the course trains students in academic writing with techniques and practice of general academic writing and research based academic writing. The second introduces students to academic reading based on IELTS preparation and practice.

1. ***Reading:*** *Academic Reading including scanning, skimming, critical thinking, describing and interpreting charts, tables and trends.*

Writing:

- Research based academic writing: note-taking, selecting an appropriate topic, writing a thesis statement, research methodology, format of research paper, writing conventions, drafting, organizing, proofreading, finalizing, referencing, quoting, paraphrasing, writing an abstract, etc.
- Designing a questionnaire and conducting an interview
- Academic Essay Writing based on IELTS model: Comparison language, description, expression of cause and effect.

Speaking:

Oral presentation: Hints on oral presentation and public speaking, presentation of research findings.

Language structure: Revising recurring and serious grammar error as they occur during speaking and writing activities.

8. LEARNING AND TEACHING STRATEGY

All language skills will be developed and practiced in an integrated style:
Techniques to follow:
Interactive: team/group work, pair/peer work,
Participatory: students' inputs through discussions and debates
Group as well as individual work: every student shall be individually assisted in his/her own capacities.

9. ASSESSMENT STRATEGY

● **Continuous Assessment Test (CAT):** 60% of the final grade that is class assignments, presentation and the research paper. This is to evaluate students' ability to effectively use the learned writing and reading techniques.

Final Examination: 40% of the final grade. By setting the final examination, lecturers aim at giving students the opportunity to demonstrate evidence of their understanding of the material and ability to skillfully use them rather than their ability to memorize masses of information.

Regulations:

1. Missing a class assignment without sound justification beforehand results into a zero mark.
2. Failure to meet the deadline: provide a sound justification in writing to the course coordinator within 48 hours. Failure to comply with this results in awarding zero mark.
3. Copying one another's work: copies are marked as one and result is shared between or among the concerned students.
4. Plagiarism is an academic offense and therefore no tolerance shall be accepted. All sources of information are to be acknowledged.

Texts:

To own IELTS academic reading passages from preparation and practice book
Library reference: see course outline
To review online: see websites on the course outline
Handouts are to be provided by respective class teachers.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:	**60**	
- Assignments **- Research paper** **- Oral presentation**		**A.5, B.1, B.2,** **B.1, C.1** **B.4, B.6, C.3, D.2**
Final Examination:	**40**	**B.5, 3C.5, D.3,**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

●Interactive-lecturing style, with opportunity for questions, and requirements to write a research paper on field specific topics

●Individual and group presentations on field specific topics in less than 10 minutes

●Marked research paper (of a limited length of about 2500 words) handed back to students with comments.

●Students are given opportunities to consult their lecturers during working hours.

12 INDICATIVE RESOURCES

Core Text (include number in library or URL) (in. ISBN)

KIST Language Centre. (2006) *English for Academic Purposes Lecture Notes*: Kigali: KIST

Cambridge University Press (2000). *Examination Papers from the UC Local Examination Syndicate Cambridge IELTS 2* (revised Version) CUP.

Background Texts (include number in library or URL) (inc ISBN)

The British Council. *An Introduction to IELTS*. BC

Journals

None

Key websites and on-line resources

http://owl.english.purdue.edu/

Teaching/Technical Assistance

12 Lecturers

Laboratory space and equipment

1 Language lab (American Corner) to be reallocated wider office space

To fix computers belonging to the American corner for CALL practices

Also, similar free space should be provided to students for listening practice, Video viewing and other related language practice.

Computer requirements

Set 10 more computers for language practice in the American Corner

Others

KIST Library to purchase 12 new cassette players/recorders and blank tapes for IELTS preparation listening activities.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

- 1 Associate Professor, 2 Lecturers, 5 Assistant Lecturers and 7Tutorial Assistants

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	**Dean/Head of Department**	**Date**
1 English	Signature	**10/12/2010**
	Print Name Joseph MAGAMBO	
2 DKLC	Signature	**10/12/2010**
	Print Name: Jean Baptist RUSINE	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3311**
2. **Module Title: MICROPROCESSORS & ITS APPLICATIONS**
3. **Level: III Semester: 1 Credits: 10**
4. **First year of presentation__2009 Administering Faculty: ENG.**
5. **Pre-requisite or co-requisite modules, excluded combinations**
6. **Allocation of study and teaching hours: See Notes of Guidance**

Total student hours : 100	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**12**	**24**
Practical classes/laboratory		
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**16**	**12**
Examination – revision and attendance	**12**	**16**
Other:		

6.1 Brief description of aims and content (not more than five lines)

The aim of this module is to provide students who have no previous knowledge of microprocessor systems with a good understanding of Digital circuits. This includes an understanding of assembly language sufficient to analyse an assembly language programme and to write basic assembly language programmes. The students will also know about different data formats such as ASCII and 2's complement. and the various 8 bit and 16 bit microprocessors, study the architecture & special features of the Pentium processors.

6.2 Learning outcomes

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1-boolean mathematics as digital logic

1.2- underlying Principles in design, development and fabrication of microprocessor based circuits

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1-apply Boolean algebra and relevant mathematical logic

2.2-apply theoretical computing principles in development of microprocessor

3.3-analyse failure in microprocessor and microprocessor based systems

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1- use competently and safely microprocessor kits and power supplies

3.2- plan interfacing of relevant microprocessor in real time Digital control problems.

3.3-demonstrate practical application of microprocessor based control applications.

4. General transferable skills

Having successfully completed the module, students should be able to:

D1- Use of ICT skills in simulation of Microprocessor programs

7. INDICATIVE CONTENT

8-BIT MICROPROCESSOR

8085 Architecture and Memory interfacing, interfacing I/O devices, Instruction set, Addressing Modes, Assembly language programming, counters and time delays, interrupts, timing diagram, Microprocessor applications.

PERIPHERALS AND INTERFACING:

Serial and parallel I/O (8251 and 8255), Programmable DMA Controller (8257), Programmable interrupt controller (8259), keyboard display controller (8279), ADC/DAC interfacing. Inter integrated circuits interfacing (I^2C standard).

80X86 PROCESSORS

8086 Architecture, Pin Configuration, 8086 Minimum and Maximum mode configurations, Addressing modes, Basic Instructions, 8086 Interrupts, Introduction to 80186, 80286,80386, 80486 and Pentium processors.

MICROPROCESSOR BASED SYSTEMS DESIGN, DIGITAL INTERFACING

Interfacing to alpha numeric displays, interfacing to liquid crystal display (LCD 16 x 2 line), high power Devices and Optical motor shaft encoders, stepper motor interfacing, Analog interfacing and industrial control, microcomputer based smart scale, industrial process control system, Robotics and Embedded control, DSP and Digital Filters.

8. LEARNING AND TEACHING STRATEGY

The module will be delivered as a series of lectures supported by tutorial, laboratory sessions and directed study in which the students will undertake set exercises in programming and simulation with representative processors. The emphasis of the module is to introduce students to the microprocessor hardware software and applications. Students will have open access to laboratories. All lecture notes and support materials will be made available as soft and hard copies. Assessment Strategy CAT will cover Outcomes of the Indicative Content. Students will be assessed on the appropriateness of their solution and on their ability to apply specified tools to the specific problems given. The practical assignment will be supported by documentation, such as a written evaluation of the practical work. It is also possible to give a series of in-course assignments.

9. ASSESSMENT STRATEGY

The assessment strategy is:

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

1. To assess understanding by a written examination
2. To assess self-learning by an open-ended assignment

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the EEE Dept Assignment marking criteria.
- For the assessment of the laboratory work, the EEE Dept Laboratory assessment criteria will be used.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Practical	**15%**	**A1,A2,B1,B2,C1,C3**
CAT	**25%**	**A1,A2,A3,B1,B2,C2,C3**

Final assessment:	**60%**	**A1,A2,B1,B2,C3**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems.
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Ramesh S. Gaonkar, Microprocessor Architecture Programming and Applications with 8085, Fourth edition, Penram International Publishing 2000

Muhammad Ali Mazidi, Janice Gillispie Mazidi, The 8051 Microcontroller, and Embedded Systems, Prentice Hall 2000.

Douglas V.Hall, Microprocessor and Interfacing, Programming and Hardware, Tata McGraw Hill, Second Edition. 1999.

Background Texts (include number in library or URL) (inc ISBN)

Barry B.Brey, **"The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing"**, 6th Edition, Pearson Education/PHI, 2002.

Journals

Key websites and on-line resources

www.intel.com/products/server/processors/server/itanium2
www.hpl.hp.com/techreports/1999/HPL-1999-111.html
www.intel.com/design/network/products/npfamily
www.national.com/appinfo/imaging/processors.html

Teaching/Technical Assistant

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	

	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** EEE 3321
2. **Module Title:** POWER ELECTRONICS
3. **Level: 3 Semester: I Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Engineering Electromagnetic, Analogue Electronic Circuits
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours	**Student hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops	**6**	**12**
Practical classes/laboratory	**6**	**12**
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**16**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The aim of this module is to present the fundamentals of power electronics, with emphasis on the generic converter topologies that are used in most applications. The last unit of this module gives the basic knowledge of power electronics application in motor control.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 Fundamental principles of power electronics and be able to design the generic circuits and make performance predictions.

1.2 The principles governing different converters: rectifiers, inverters, choppers, cycloconverters and AC voltage controllers.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Analyse mathematically the operation of the generic power electronic circuits at a level sufficient for their design and performance evaluation.

2.2 Describe and explain the operation of different types of converters and inverters

2.3 Describe the application of converters and inverters in motor control application

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Evaluate power electronic circuits using Simulation software like MATLAB

3.2 Design and test a controller

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Solve subject specific numerical and conceptual problems

4.2 Undertake self-learning of Power Electronics and their development

4.3 Produce simple reports

7. INDICATIVE CONTENT

Power Semiconductor Devices - Characteristics of Power diode, Power transistors, SCR, GTO, MOSFET and IGBT - Different turn-on methods of SCR - Commutation of SCR - Series and Parallel operation of SCR - Protection & Ratings of SCR.

AC to DC Converter – Review of uncontrolled Rectifier - Single phase and three phase Controlled rectifiers - Semi controlled and fully controlled rectifier - Dual converter - power factor improvement - Effects of load and source inductance on converter operation - Triggering circuits for such rectifiers.

DC to AC Converter - Principle and operation of single phase and three phase inverters - Series resonant inverter - Parallel inverter - Current source inverter - Voltage control - Waveform control – Harmonic distortion and Electro Magnetic Interference

DC to DC and AC to AC Converters - Step down and Step up DC choppers - Effect of source and load inductance - Single phase AC voltage controller with R and RL load - Principles of single phase cycloconverter

Motor Control

DC motor drives, Induction and Synchronous motor drives, Switched reluctance and brushless motor drives.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be ‘open ended’ so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered

In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3, 4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 4.1,4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2,2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

1. Muhammad H. Rashid - Power Electronics Circuits, Devices & Applications – Pearson Education India Publication, New Delhi, 2004.
2. MD Singh & KB Khanchandani - Power Electronics - Tata McGraw - Hill Publishing Company Ltd, New Delhi, 2004.
3. Ned Mohan, Tore Undeland & William Robbins - Power Electronics: Converters, Applications and Design – John Wiley & Sons, 2003.
4. P.S.Bimbhra -Power Electronics- Khanna Publishers, 2003.
5. Daniel W. Hart - Introduction to Power Electronics - Prentice Hall International Inc., 1997.
6. P.C.Sen- Power Electronics, Tata McGraw Hill publishers Pvt. Ltd., 2004.

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Power Electronics experiments

Equipments:

- Various power electronic components: Diodes, Transistors, UJTs, MOSFET, IGBT and SCR.
- DC variable source
- AC Variable source(single and three phase)
- Single phase bridge rectifier
- 3-phase bridge rectifier
- Pulse generator
- CRO
- Miniature Motors

Computer requirements

Other

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code:** **EEE 3312**
2. **Module Title:** **Object Oriented Programming**
3. **Level: 3 Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

CIT 3111. CIT 3121

6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours ___100___	**Student Hours**	**Staff hours**
Lectures	**24**	**24**
Seminars/workshops/tutorials		
Practical classes/laboratory	**12**	**24**
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

This course introduces the fundamental concepts of programming from an object-oriented perspective. The approach lends itself to more direct analysis, coding, and understanding of complex situations and procedures than other programming methods. The course begins with a review of control structures and data types with emphasis on structured data types and array processing. It then moves on to introduce the object-oriented programming paradigm, focusing on the definition and use of classes along with the fundamentals of object-oriented design and programming through C++ programming language.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 – Mathematics as applied for OOPS

1.2 –Basic concepts of Object technology

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 – Select and apply appropriate programming techniques with objects

2.2 – Apply knowledge of programming to create innovative software systems and object components

2.3 – Analyze faults in software systems using OOPS techniques.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 – Program using OOPS to solve engineering problems

3.2 – Evaluate and interpret data and apply them to object based programming problems

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1– Demonstrate skills in programming with object technology

4.2 – Work in team both as a member and as a leader in software development

7. INDICATIVE CONTENT

Fundamentals

Object-Oriented Programming concepts – Encapsulation – Constructors and Destructors -Programming Elements – Program Structure – Enumeration Types – Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call-by-Reference – Assertions – Standard template library

Implementing ADTs and Encapsulation

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields– Data Handling and Member Functions – Classes – Static Member – this Pointer – reference semantics – implemetation of simple ADTs

Polymorphism

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators

Templates

Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors

Inheritance

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run-Time Type Identifications – Exceptions – Handlers – Standard Exceptions

8. LEARNING AND TEACHING STRATEGY

The module will be delivered through lectures and tutorial sessions by the use of step-by-step worked examples. The project development will be undertaken during laboratory sessions. Labs will be used to enhance their practical knowledge and professional skills. Organized discussions and teamwork will help students to get cognitive, intellectual and key (transferable) skills.

9. ASSESSMENT STRATEGY

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

The Institute policy requires the internal moderation of assessments. Each Module shall have a Module Leader, and a Co-Leader, Module Co-Leader shall serve as the internal moderator of the module.

Below are listed some sections of the examination regulations that are applicable:

- Unless otherwise stated, the modules will be subject to Continuous Assessment and final end of module examination.
- Continuous Assessment (CAT) will consist usually of written tests, assignments, and/or short quizzes, laboratory exercises, all of which will contribute no more than 40% of the total mark.
- The final examination shall be held during the examination period at the end of the semester, and will contribute 60% of the total mark.
- A minimum score of 40% of the CAT is needed for a candidate to qualify for the final examination.

- Candidates who fail to obtain a pass (50%), but who attain at least 40% from both CAT and exam will be allowed to write a supplementary examination, offered at the end of the academic year. Otherwise, the candidates will have to repeat the module at the earliest time when it is offered.
- Candidates who fail the supplementary examination shall repeat the module.
- The maximum mark for a supplementary examination will be 50%.
- A candidate who fails a course that was repeated shall be discontinued from studies.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the EEE Laboratory assessment criteria will be used
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Practical	**15%**	**A1,A2,B1,B5,B6,C4,C5**
MINI TEST	**25%**	**A1,A2,B1,B6,C4,D1**
Final assessment:	**60%**	**A1,A2,B1,B5,B6,C4,C5,D1**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems with practical laboratory exercise also,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours and during practical sessions.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Ira Pohl, "Object-Oriented Programming Using C++", Pearson Education, Second Edition, 2003.

Background Texts (include number in library or URL) (inc ISBN)

1. Stanley B. Lippman, Josee Lajoie, "C++ Primer", Pearson Education, Third Edition, 2004.

2.Kamthane, "Object Oriented Programming with ANSI and Turbo C++", Person Education, 2002.

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

1 Computer Lab with relevant programming software

Computer requirements

40 Computers with relevant programming software

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: EEE 3314
2. Module Title: MICROPROCESSORS LABORATORY
3. Level: 3 Semester: 1 Credits: 5
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Pre-requisite:
Co-requisite: EEE 3313
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours ____50_____	**Student hours**	**Staff hours**
Lectures		
Seminars/workshops		
Practical classes/laboratory	**36**	**72**
Structured exercises		
Set reading etc.		
Self-directed study		
Assignments – preparation and writing		
Examination – revision and attendance		
Other: Report writing/marking	**14**	**60**

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
To provide the learner with hand on skills in programming using instruction sets of 8 bit processor. And to interface the required peripheral devices to develop a Micro processor based system.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
2. Cognitive/Intellectual skills/Application of Knowledge
Having successfully completed the module, students should be able to:
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
3.1 Having successfully completed the module, students should be able to:
3.2 Identifies resistors and capacitors of standard values.
3.3 Verify experimentally the diode V-I characteristic
3.4 Implement a simple power supply with a rectifier, filter and voltage regulator.
3.5 Verify experimentally the bipolar characteristic curves
3.6 Implement a simple bipolar transistor-based amplifier
3.7 Verify the JFET V-I characteristics
3.8 Bias FET transistors
3.9 Implement experimentally RTL and TTL logic gates
3.10 Design and implement counter circuits
3.11 Design and implement sequential circuits
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Undertake self-learning using laboratory experiments
4.2 Communicate technical ideas in writing

7. INDICATIVE CONTENT

1. Programming exercises involving looping loop with counting indexing.
    - Basic Block transfers
    - Additions / Subtractions / with and without carry
    - Data Manipulation using Array
    - To Generate Fibonacci Series
    - To find Factorial of a Number
    - Sorting (bubble Sort)
    - Time Delay
    - Counters – BCD, Hexadecimal, Modulo Counter
    - Real Time Clock
2. Multiplication and Division of signed and unsigned numbers.
3. Interfacing of Keyboard/display interface.
4. Interfacing of 8 bit D/A and A/D Converters.
5. Design and implementation of temperature control loop.
6. Design and implementation of Traffic Light control.
7. Design and implementation of Stepper Motor.
8. Interfacing of DMA Controller.
9. Interfacing of Programmable Interrupt Controller.

8. LEARNING AND TEACHING STRATEGY

The students will consolidate their knowledge in analogue and digital electronics by performing laboratory experiments. Each laboratory session could include the following steps depending on the relevancy as judged by the staff member:

- Briefing on safety guidelines by technical staff.
- Demonstration of the uses of electronic equipment by technical staff.
- Briefing on the technical contents of the experiments by laboratory supervisors. Supervision of laboratory work.
- Experimental work conducted and data collected by students.
- Data analysis and report writing by students after the class.
- Feedback laboratory reports after marking

A document describing each laboratory experiment should be handed to the students at the beginning of every session.

9. ASSESSMENT STRATEGY

1. To assess practical skills through demonstration by students and report writing
2. The laboratory reports will be written in groups but individual reports will be required for some laboratory experiments as judged by the staff member.

Assessment Criteria:

The Electronics Engineering Laboratory assessment criteria will be used. *(copy attached as Appendix).*

10. ASSESSMENT PATTERN

Component	**Weighting (%)**	**Learning objectives covered**
In-course assessment:		
Demonstration	**20%**	**3.1-3.10**
Group reports	**50%**	**3.1-3.10, 4.1, 4.2**
Individual reports	**30%**	**3.1-3.10, 4.1, 4.2**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Before all experiments there will be a demonstration of use of relevant pieces of equipment.

- Laboratory experiments will be done in groups so that the learners could learn from each other.
- Staff member will be there throughout the performance of the lab experiments to clarify any doubts about them.
- Marked laboratory reports with comments will be handed back to students.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Lab Manual

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory space and equipment

Microsystems Laboratory, 2nd Floor KIST-IV

- 8085 Microprocessor Trainer Kit with LCD Display, 101 ASCII keyboard & in-built Power supply.
- 8086 Microprocessor Trainer Kit with LCD Display & 101 ASCII keyboard. 72 I/O lines using 3 no.s of 8255. RS-232 interface thru 8251, Interrupt controller 8259.
- Z80 (Zilog) Microprocessor Trainer Kit
- MC68000 (Motorolla) Trainer Kit
- Interfacing Module for M-85
- Channel, 8 bit Analog to Digital Convertor card
- Channel, 8 bit Digital to Analog Convertor card
- bit Analog to Digital Convertor card
- Channel Digital I/O Cards
- Elevator Simulator Card
- IC-Tester Card
- Segment Display card
- Stepper Motor controller card with Motor
- 5X4 Matrix Keyboard Card
- 16X1 LCD Display Card
- 16X2 LCD Display Card
- Traffic Light Controller Card
- Temperature Measurement card
- DC Motor Controller Card with Motor
- Relay and Opto Coupler card
- 8X8 LED Matrix Display card

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	

2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3311
2. Module Title: Electrical Machines II
3. Level: 3 Semester: 1 Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Electrical and Electronics Laboratory & Design, Network Analysis, Electrical Power Engineering, Electrical Machines I
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	12	24
Practical classes/laboratory		
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The module attempts to explain the Construction, Synchronous Generator, principle of operation, emf. Equation of Synchronous Machines and highlights their various applications. The principles of distribution, pitch and winding factors, Armature reaction and equivalent circuit are covered, including voltage regulation and Parallel operation of Alternators.

This module presents an introduction on Synchronous Motors: starting methods, Nature of Torque, V-curves, Unique characteristics, Hunting, Power factor correction & other applications to enable electrical engineers to understand and compare various AC rotating machines in steady state and transient operation.

This module provides a foundation understanding on the construction and principle of operation, starting of three-phase induction motor, rotating field and cross-field theory, Characteristics of single-phase motors, magnetic properties of materials. The module provides an understanding of Various types: split winding, capacitor-start, resistance / reactance start; capacitor start-and-run motors, their comparison & applications. The module facilitates the student with skill on how to select appropriate AC rotating machines for various applications such as industrial, residential. Construction and principle of operation, Slip, Torque equation using rotor equivalent circuits, Torque-Slip curves, Performance and characteristics of Three phase induction motors, Rating of motors, Speed control methods and industrial applications are covered.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 The magnetic properties of machines affect the output power supplied to the load

1.2 The principles governing AC machines

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

Select ac machines for various electrical applications

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Identify various machines of special interest to electrical engineers

3.2 Carry out analysis of advantages/disadvantages related to various electrical machines.

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1Explain the behaviour of AC machines and relates them to the energy conversion.

4.2 Teach others, the fundamental principles governing the electrical AC machines

7. INDICATIVE CONTENT

Synchronous Machines

1- Synchronous generator:

Construction; principle of operation,
Magnetic rotating field,
Voltage regulation,
Salient-pole theory (two reactance), Characteristic curves,
Parallel operation and load sharing.

2- Synchronous motor:

V-curves
Motor starting
Synchronous condenser

Three-phase induction motor

1- Construction; principle of operation.

Wound-rotor, squirrel-cage rotor,
Equivalent circuit; phasor diagram,
Parameter reduction from the rotor to the stator,
Comparison induction machine-transformer,

2- Torque-speed Characteristic.

Starting torque and maximum torque

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions. The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	40	2.1, 4.1, 4.2, 3.1,3.2
Experiment and report		
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

- Design electrical machines : Author: Mittle, V.N.; Mittal, A. -- Delhi: Standard Publishers distributors, 2004.
- Analysis of electric machinery and drive systems, Second edition, Author: Paul C.Krause; Oleg Wasynczuk; Scott D. Sudhoff, Perdue University, John Willey & Sons, Inc. Publication U S A 2002.
- Electrical machines, Author: BHATTACHARYA, S.K. -- New Delhi: Tata McGraw-Hill, 1998.
- Electric machines and power systems, Volume I, Author: Syed A.Nasar, University of Kentucky
- Electrical machines, Drives, and Power systems / Wildi, Theodore. – New Delhi: Pearson education, 2004.
- An introduction to electrical machines and transformers, Author: McPherson, George; Laramore, Robert D. -- New York: John Wiley, 1990.

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3312
2. Module Title: Communication Engineering
3. Level: III Semester: I Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
EEE 3213, EEE 3226
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours ___100___	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory	**6**	**12**
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The course introduces the fundamental concepts of the classical analog modulation systems, associated theory of noise and radio transmitter and receivers. It also helps the students to learn in detail the building blocks of radio transmitters and receivers and noise performance of receivers

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 – Mathematics of differential equtions
1.2 - Fundamental concepts signals, analog modulation and demodulation
1.3 - Principles of design of analog communication systems

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:
2.1 – Suggest and formulate technical solutions for analog communication systems of low and medium complexity
2.2 - Show ability to handle new concepts, methods and results in analog communication

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:
3.1 – Use competently all test and measuring instruments in communication
3.2 – Analyze, evaluate and interpret input and output signals and apply them to solution of problems and system.
3.3 - Plan the installation and maintenance of analog communication systems
3.4 - Demonstrate practical applications of analog communications

4. General transferable skills

Having successfully completed the module, students should be able to:
4.1– Demonstrate computational skills in solving problems associated with systems
4.2 – Use competently commercial software for analysis and design of systems

7. INDICATIVE CONTENT

Linear Modulation/Amplitude Modulation

Need for modulation-Bandpass systems and signals-modulation index-maximum allowable modulation-power calculation-signals and spectra of AM, DSB, SSB and VSB signals-generation of AM waves: product modulator-square law and balanced modulator-switching modulator-Detection of AM: envelope detection and synchronous detection-Modulation and demodulation methods of DSB-SC, SSB, and VSB.

Exponential Modulation/Angle Modulation

Frequency modulation-phase modulation-relation between FM and PM-compare FM and AM-spectra for FM-power and bandwidth of FM signals-phasor diagram of FM signals-effect of the modulation index on bandwidth-generation of FM signals-indirect (Armstrong) method-direct method-demodulation of FM-narrowband and wideband modulation-compare NBFM and WBFM.

Noises Theory

Sources of noise - shot noise - resistor noise - calculation of noise in linear systems - noise bandwidth - available power - noise temperature - noise in two-port networks – noise figure-measurement of noise figure - signal in presence of noise - narrow band noises.

Radio Transmitter and Receiver

AM and FM radio transmitter-super heterodyne principle-broadcast receiver-communication receiver-Automatic gain control (AGC) - Automatic frequency control (AFC).

Noise Performance of AM and FM Receivers

Noise in AM receivers threshold effect, Noise in FM receivers capture effect, FM threshold effect, FM threshold reduction, Pre-emphasis and de-emphasis in FM, Comparison of performance of AM and FM systems.

8. LEARNING AND TEACHING STRATEGY

The module will be delivered as a series of lectures supported by tutorial, laboratory sessions and directed study in which the students will undertake set exercises. A course handbook will be provided in advance and this will contain in depth information relating to the course content and give an opportunity to the students to prepare the course. The lecture materials will be posted on the web page that will also contain comprehensive web links for further relevant information. The module will be delivered through lectures, tutorial/practice sessions and group discussions. In addition to the taught element, students will be expected to undertake a range of self-directed learning activities, which will comprise case studies and mini research projects. All supporting documents for the course will be made available on web, as printed copies and also as soft copies.

9. ASSESSMENT STRATEGY

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

The Institute policy requires the internal moderation of assessments. Each Module shall have a Module Leader, and a Co-Leader, Module Co-Leader shall serve as the internal moderator of the module.

Below are listed some sections of the examination regulations that are applicable:

- Unless otherwise stated, the modules will be subject to Continuous Assessment and final end of module examination.

- Continuous Assessment (CAT) will consist usually of written tests, assignments, and/or short quizzes, laboratory exercises, all of which will contribute no more than 40% of the total mark.
- The final examination shall be held during the examination period at the end of the semester, and will contribute 60% of the total mark.
- A minimum score of 40% of the CAT is needed for a candidate to qualify for the final examination.
- Candidates who fail to obtain a pass (50%), but who attain at least 40% from both CAT and exam will be allowed to write a supplementary examination, offered at the end of the academic year. Otherwise, the candidates will have to repeat the module at the earliest time when it is offered.
- Candidates who fail the supplementary examination shall repeat the module.
- The maximum mark for a supplementary examination will be 50%.
- A candidate who fails a course that was repeated shall be discontinued from studies.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the EEE Laboratory assessment criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Practical	**15%**	**A1,A2,A4,B1,B3,C3,C5,C7,C8,D1,D3**
MINI TEST	**25%**	**A1,A2,A4,B1,B3,C8,D1**
Final assessment:	**60%**	**A1,A2,A4,B1,B3,C3,C5,C7,C8,D1,D3**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems with practical laboratory exercise also,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours and during practical sessions.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Roddy and Coolen, Electronic communication, Prentice Hall, 4th Edition, 2003.

Background Texts (include number in library or URL) (inc ISBN)

1.Simon Haykin, Communication Systems, John Wiley & sons, NY, 4th Edition, 2001.

2. Taub and Schilling, Principles of communication systems, McGraw-Hill, 1995.
3. Bruce Carlson et al, Communication systems, McGraw-Hill Int., 4th Edition, 2002.
4. B. P. Lathi, "Modern Digital & Analog Communication", Prison Books Pvt. Ltd., 1989.

Journals

None

Key websites and on-line resources

None

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3313

2. Module Title: Electrical Machines Laboratory II

3. Level: 3 Semester: 1 Credits: 5

4. First year of presentation: 2009 Administering Faculty: Engineering

5. Pre-requisite or co-requisite modules, excluded combinations

Electrical and Electronics Laboratory & Design, Network Analysis, Electrical Power Engineering, Electrical Machines I, Electrical Machines Laboratory I

6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student Hours**	**Staff hours**
Lectures	0	0
Seminars/workshops	0	0
Practical classes/laboratory	24	24
Structured exercises	8	8
Set reading etc.		----------
Self-directed study	6	----------
Assignments – preparation and writing	12	18
Examination – revision and attendance		
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

- To understand the fundamental theory of AC motors and generators.
- To be acquainted with the different methods of starting of 3-ph IM
- To analyze the operation of electric machines under different loading conditions.
- To distinguish between the different types of 1-ph IM
- To be aware with the synchronization process of 3-ph alternators
- To be aware with the operation of synchronous machine as motor.

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 The fundamental theory of AC motors and generators

1.2 The different methods of starting of 3-ph IM

1.3 The operation of electric machines under different loading conditions

1.4 The synchronization process of 3-ph alternators

1.5 The operation of synchronous machine as motor

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Select ac machines for various electrical applications

3 Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to

3.1 Identify various machines of special interest to electrical engineers

3.2 Carry out analysis of advantages/disadvantages related to various electrical machines.

3.3Conduct experiments on AC machines to analyse their characters

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Explain transient and steady state behaviour of AC machines.

4.2 Teach others, the fundamental principles governing the Alternators and Induction Motors behaviour.

7. INDICATIVE CONTENT

- Three Phase Slip Ring Induction Motor
- Three Phase Squirrel-cage Induction Motor
- Single Phase Induction Motor (Capacitor start)
- Single Phase Induction Motor (Capacitor Run)
- Single Phase Induction Motor (Capacitor Start, Capacitor Run)
- Three Phase Synchronous Generator (Equivalent Circuit Determination)
- Loaded Three-Phase Synchronous Generator
- Synchronization of Three Phase Synchronous Generators(Parallel Operation)
- Operation of a Synchronous Machines as a Synchronous Motor

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through laboratory experiment. Laboratory manuals are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes. The experiment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the lab report will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report		
Experiment and report	50	3.1, 3.2, 3.3, 4.1, 4.2
Final assessment:		
Examination (2 hour)	50	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 3.1, 3.2, 3.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Lab Manual

Background Texts (include number in library or URL) (inc ISBN)
Journals
Key websites and on-line resources
Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant
1 Lab Instructor

Laboratory space and equipment
Electrical Machines Laboratory, Ground Floor, KIST-I
Computer requirements
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

YEAR 3 SEMESTER II

MODULE DESCRIPTION FORM

1. Module Code: ELE 3321
2. Module Title: Modelling and Analysis of Power Systems
3. Level: 4 Semester: II Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Electrical power Engineering
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to give a detailed overview of the field of power systems analyses and modeling. This module deals with the mechanical and electrical designs of overhead transmission lines and systems. The component parts, their uses, construction, physical, mechanical and electrical properties are also studied. Line parameters and means of reducing losses are also considered.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:
1.1 Mechanical design of overhead lines
1.2 Conductor materials commonly used for overhead transmission lines
1.3 Line support structures, their construction, limitations, types of material used and configuration
1.4 Insulator types, uses, construction, combination, limitations and efficiency
1.5 Corona: causes, effects on line and telecommunications equipment
1.6 Sag, wind and ice loadings on overhead lines
1.7 Performance of transmission lines
1.8 Effect of load power factor on regulation and efficiency
2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Carry out simple mechanical and electrical designs of overhead transmission lines
2.2 Analyse mathematically the capacitance-voltage contribution in overhead transmission lines, and able to convert cables capacitances from delta to wye
2.3 Select suitable support for the different overhead lines transmission requirements of the grid, for various locations

2.4 Configure type of support, tension, sag and line stability without dancing and uplift situations
2.5 Determine the desired line performance characteristics with reference voltage
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Upon successful completion of module, students should be able to:
3.1 Evaluate electrical power systems components from first principles
3.2 Design and test model power system networks for quality assurance and performance standards
3.3 Use different models and tools to study and analyse power systems with computer software
3.4 Compare and contrast conductor materials and able to select for system economy
4. General transferable skills
Upon successful completion of module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of power systems modelling analyses and their applications
4.3 Produce simple reports with confidence

7. INDICATIVE CONTENT

1. Overview of power systems
2. Poly-phase network analysis including symmetrical component analysis
3. Transformer modelling
4. Transmission line modelling
5. Computer-aided network analysis including graphs and solution of linear systems
6. Fault analysis including symmetrical and unsymmetrical faults

Computer usage:

1. MATLAB to automate evaluation of transmission line models.
2. MATLAB to produce PQ and PV characteristics for transmission lines.
3. MATLAB to implement Gauss-Seidel and Newton-Raphson power flow programs.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.
The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.
Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.
Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be ‘open ended’ so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. Principles of power systems, by Mehta and Mehta
2. Electrical Power systems by Wadhwa
3. Power system Analysis by Weedy and Cory
4. Power system by Grainger and Stevenson

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	**Dean/Head of Department**	**Date**
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3322
2. Module Title: TRANSMISSION & DISTRIBUTION
3. Level: 4 Semester: II Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Electrical Power Engineering
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student hours**	**Staff Hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to acquaint students with the various transmission and distribution processes employed in electrical power systems. Use the study to enhance the realisation that electrical power systems are large systems, which integrate other branches of science and engineering like mechanical, chemical, civil, control systems. Also that, the understanding of each of these component parts makes for the smooth, efficient, and reliable operations of any power system.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:
1.1 Transmissions Lines (Overhead)
1.2 Underground (Cables)
1.3 Distribution Systems
1.4 Analysis of current and voltage distribution along a transmission line
2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Understand overhead transmission lines components like conductors, insulators, supports and other ancillary equipment for power delivery
2.2 Analyse mathematically and design requisite transmission lines and distribution systems in power systems for disturbances and surges
2.3 Select suitable underground cables with the desired thermal and insulation coordination for aesthetics and long service life
2.4 Analyse current and voltage distributions along transmission lines
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Upon successful completion of module, students should be able to:
3.1 Evaluate electrical power systems transmission and distribution networks from first principles and analyse them

3.2 Design and test model power system networks transmission and distribution lines for quality assurance and performance standards
3.3 Use different models, methods, procedures and tools to study and analyse power systems network distribution and transmission lines with computer software like ETAP, MATLAB
3.4 Compare and contrast different analytical tools, methods and procedures and able to select transmission and distribution lines for system economy, stability, reliability and customer satisfaction
4. General transferable skills
Upon successful completion of module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of power systems transmission and distribution line, with their applications in solving industrial problems
4.3 Produce simple reports with confidence

7. INDICATIVE CONTENT

1. **Transmissions Lines (Overhead)**
   - **(a)** Conductor materials in common use
   - **(b)** Types of line supports, line insulators, and their mechanical properties
   - **(c)** Single-phase and 3-phase transmission lines
   - **(d)** Parameters of transmission lines, choice of operating voltage for AC and DC
   - **(e)** Voltage drop in DC and AC networks, line voltage regulation and compensation
   - **(f)** Equivalent T and π networks
   - **(g)** Determination of sag and tension of a given profile
   - **(h)** Surges, causes, effects and protection, corona and corona losses, interference between communication lines
2. **Underground (Cables)**
   - **(a)** Types of cables, selection of right type of cable for a particular system, parameter of single core cables, current rating, cable installation, breakdown of cables, cable faults and their location
   - **(b)** The grid system with particular reference to Rwanda National Grid system
   - **(c)** Application of computer control on grid system
3. **Distribution Systems**
   - **(a)** Principles of substation design and layout
   - **(b)** Feeder and distributor arrangements
   - **(c)** Calculation of distribution sizes
   - **(d)** Voltage drops and regulation
   - **(e)** Design of rural distribution system, planning and design of town electrification schemes
   - **(f)** Design of industrial distribution systems

Analysis of current and voltage distribution along a transmission line

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.
The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to

guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.
Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.
Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

1. Principles of power systems, by Mehta and Mehta
2. Electrical Power systems by Wadhwa
3. Power system Analysis by Weedy and Cory
4. Power system by Grainger and Stevenson

Background Texts (include number in library or URL) (Inc ISBN)

Journals
Key websites and on-line resources
Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment
Laboratory equipment and space for Drives and Control experiments.
Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements
Computers with simulation software.
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM
To be decided
15. UNIT APPROVAL
Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3323
2. Module Title: Electrical Machines III
3. Level: 4 Semester: 2 Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations

Electrical and Electronics Laboratory & Design, Network Analysis, Electrical Power Engineering, Electrical Machines I, Electrical Machines II

6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

- To determine the main dimensions of AC and DC machines
- To Analyse the most commonly used of special motors
- To be acquainted with the selection of electric motors

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 Design of ordinary and special electrical machines
1.2 Performance of electrical machines

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Appreciate the design of ordinary and special electrical machines
2.2 Explain the various types of special machines and their applications

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Analyze the performance of different types of ordinary and special electrical machines
3.2 Select the right type of machines to suit a particular application

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Independent learning
4.2 Problem solving and design skills

7. INDICATIVE CONTENT

Part -1: Design Aspects of Electrical Machines

1-1 Classification of Electrical Machines
1-2 Design of Three-phase Induction Motor
- Construction Details for Slip-ring and Squirrel-cage Rotor Types

- Output Equation and Design Procedure of a 3-ph Induction Motor

1-3 Design of Transformer
- Construction of Core and Shell Types
- Output Equation and Design Procedure of a 1-ph and 3-ph **Transformers**

1-4 Design of DC Machines
- Construction of DC Machines [Armature and Poles]
- Output Equation and Design Procedures

Part-2: Analysis of Special Motors

2-1 Permanent Magnet Motors
- Magnetic circuit with a permanent magnet
- Subfractional Hp PM Brushed DC Motors
- Torque/speed characteristics
- Power characteristics [Motor power and efficicency]
- Motor Drive [H-bridge converter]

2-2 Stepper Motors
- Types of stepper motors [Permanent Magnet , Variable Reluctance]
- Principles of Operation and Applications
- Winding Configurations [Bipolar , Unipolar]
- Full, Half and Microstepping motion
- Multi-stack Variable Reluctance Stepper Motors
- Transient Analysis of Stepper Motor

Part-3: Motor Selection Guides

3-1 Motor Nameplate Information

3-2 Types of Duty Cycles

3-3 Determination of Motor Power ratings

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be ‘open ended’ so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.

- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 4.1, 4.2
Experiment and report	20	3.1, 3.2, 4.1, 4.2
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 2.1, 2.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

- Direct Current Machines; Authors: M.G. Say & E.O. Taylor; Pitman Publishing Limited, 1986 edition.
- Polyphase motors, A direct Approach to Their design; Author: E. Levi; John Wiley & Sons, 1983 edition.
- Design electrical machines : Author: Mittle, V.N.; Mittal, A. -- Delhi: Standard Publishers distributors, 2004.
- Analysis of electric machinery and drive systems, Second edition, Author: Paul C.Krause; Oleg Wasynczuk; Scott D. Sudhoff, Perdue university, John Willey & Sons ,Inc. Publication U S A 2002.
- Electrical machines, Author: BHATTACHARYA, S.K. -- New Delhi: Tata McGraw-Hill, 1998.
- Electric machines and power systems, Volume I, Author: Syed A.Nasar, University of Kentucky
- Electrical machines, Drives, and Power systems / Wildi, Theodore. – New Delhi: Pearson education, 2004.
- An introduction to electrical machines and transformers, Author: McPherson,George; Laramore, Robert D. -- New York: John Wiley, 1990.

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3324
2. Module Title: DRIVES AND CONTROL
3. Level: 4 Semester: II Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Power Electronics, Electrical Machines I, Electrical Machines II
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours _____	**Student hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to give a detailed view of the field of controlled electrical drives. This module deals with converter and their applications in DC drives. It deals with the various methods of speed control of Induction motor and synchronous drives.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 Converters and their applications in DC drives
1.2 The various methods of speed control of Induction motor
1.3 The flux and field oriented control of Induction motors
1.4 Different ways of controlling synchronous drives
1.5 The application of Electric drives
2. Cognitive/Intellectual skills/Application of Knowledge
Having successfully completed the module, students should be able to:
2.1 Describe and explain the operation of different types of static converters
2.2 Analyse mathematically the operation AC drives
2.3 Select suitable controller for electrical machines
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1 Evaluate electrical drives using Simulation software like MATLAB
3.2 Design and test a controller
3.3 Use different controllers for electrical machines
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of drives and their application

4.3 Produce simple reports

7. INDICATIVE CONTENT

Static converter as a Power Actuator for DC drives

Electronic switching devices, Line commutated converter in single phase Bridge connection, Line commutated converter in Three phase Bridge connection, Line commutated converter with reduced reactive power. Control loop containing an electronic power converter. DC drives with line commutated converter and force commutated converters.

Adjustable speed AC Drives

Mathematical model of general AC machine, Starting of Induction motor, Symmetrical components, Single phase Induction motor, pulse width modulated voltage source transistor converter (IGBT), Voltage source PWM thyristor converter, Current source thyristor converters, Converters without DC link (Cycloconverters).

Control of Induction motor (IM) Drives

Control of IM based steady state machine model, Rotor flux oriented control of Current fed IM, control of voltage fed IM - field oriented control of IM with CSI, Control of IM with combined flux model. Wound rotor IM with Slip power recovery.

Variable frequency Synchronous (SM) Drives

Control of SM with PM excitation, SM with field and damper winding, SM with Load commutated Inverter (LCI) drive.

Applications of Controlled Electrical Drives

Speed controlled Drives, Linear position control, with fixed and moving reference; Time optimized position control with fixed and moving reference point.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be ‘open ended’ so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*

- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

1. Power electronics and AC drives – B.K. Bose, Prentice hall.
2. Power semiconductor circuits – Dewan S.B, Straughen, Wiley.
3. Static Power frequency changers – Gyugyi. L., Pelley. B.R, Wiley.
4. Fundamental of Electric Drives – G.K.Dubey.
5. Thyristorised power converters – P.C.Sen

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: __EEE 3313
2. Module Title: _Measurements and Instrumentation
3. Level: 4 Semester: 2 Credits:____ 10
4. First year of presentation: 2009____ Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Basic Electrical and Electronics, Network analysis
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours ___100_____	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops	**6**	**12**
Practical classes/laboratory	**6**	**12**
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**16**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
- 1.1 Various measuring instruments in both analog and digital with their operating principles, uses, and their limits, and
- 1.2 Understand the operation of Cathode ray oscilloscope, Digital voltmeters and Multimeters, , the wave form generators, Analysers,
- 1.3 The measurement of Non electrical quantities
- 1.4 Principles of design of signal conditioning devices.

2. Cognitive/Intellectual skills/Application of Knowledge
Having successfully completed the module, students should be able to:
- 2.1 To select the precise measuring instruments for a particular measurement,
- 2.2 The method of calculating the accuracy,
- 2.3 Analyse the waveforms in CRO and Analysers,
- 2.4 Design of signal conditioning circuits for a given specification

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
- 3.1 Acquire the practical knowledge in the measurement with precise devices like
- 3.2 Bridges, CRO, Wave form analysers,
- 3.3 Design of Signal conditioning circuits for any given application.

4. General transferable skills
Having successfully completed the module, students should be able to:
- D1. to guide any non technical person in selecting the type of measuring instruments
- D2. to be used for the given type of measurement. Their scale level, limits, and accuracy level. Etc. they could communicate the working principles and design of the signal conditioning circuits to be used for a given application.

7. INDICATIVE CONTENT
Introduction

Functional elements of an instrument - static and dynamic characteristics – errors in measurement - statistical evaluation of measurement data - standard and calibration.

Electrical And Electronics Instruments

Principle and types analog and digital ammeters and voltmeters – single and three phase Wattmeters and Energy meter - magnetic measurements – instrument transformers – instruments for measurement of frequency and phase.

Signal Conditioning Circuits

Bridge circuits – differential and Instrumentation amplifiers - filter circuits - V/f and f/V converters – P/I and I/P converters – S/H Circuit, A/D and D/A converters - multiplexing and demultiplexing - data acquisition systems – grounding techniques.

Storage and Display Devices

Magnetic disc and tape recorders – digital plotters and printers – CRT displays – digital CRO – LED, LCD and Dot matrix displays.

Transducers

Classification of transducers – selection of transducers – resistive, capacitive and inductive transducers – piezo electric transducers – optical and digital transducers, pH electrodes - transducers for measurement of displacement, temperature, level, flows, pressure, velocity, acceleration, torque, speed, viscosity and moisture.

8. LEARNING AND TEACHING STRATEGY

Apart from the practical assessment which is dome in the laboratories A course handbook will be provided in advance and this will contain in depth information relating to the course content and give an opportunity to the students to prepare the course. The lecture materials will be posted on the web page that will also contain comprehensive web links for further relevant information. The module will be delivered through lectures, tutorial/practice sessions and group discussions. In addition to the taught element, students will be expected to undertake a range of self-directed learning activities, which will comprise case studies and mini research projects. All supporting documents for the course will be made available on web, as printed copies and also as soft copies

9. ASSESSMENT STRATEGY

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

1. To assess understanding by a written examination
2. To assess self-learning by an open-ended assignment

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the EEE Dept Assignment marking criteria.
- For the assessment of the laboratory work, the EEE Dept Laboratory assessment criteria will be used.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz tutorial, Practical	**15%**	**A1,A2,A3,B1,B3,C1,D1,D2**
CAT	**25%**	**A1,A2,A4,B1,B2,**
Final assessment:	**60%**	**A1,A2,B1,B2,C1,C2,B4**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Doebeling, E.O., 'Measurement Systems – Application and Design', McGraw Hill Publishing Company, 1990.
H.S. Kalsi, 'Electornic Instrumentation', TMH Co., 1995.
Stout M.B., 'Basic Electrical Measurement', Prentice Hall of India, 1986

Background Texts (include number in library or URL) (inc ISBN)

Dalley, J.W., Riley, W.F. and Meconnel, K.G., 'Instrumentation for Engineering Measurement', John Wiley & Sons, 1993
Moorthy, D.V.S., 'Transducers and Instrumentation', Prentice Hall of India Pvt. Ltd., 1995

Journals

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory space and equipment

Brides and Various transducers used for measurements, A/D , D/A converter, PT, CT, single phase and three phase Energy meters.

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3325
2. Module Title: Electrical Power Systems Lab
3. Level: 3 Semester: 2 Credits: 5
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Power Electronics, Drives and Control
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student hours**	**Staff hours**
Lectures	0	0
Seminars/workshops	0	0
Practical classes/laboratory	24	24
Structured exercises	8	8
Set reading etc.		----------
Self-directed study	6	----------
Assignments – preparation and writing	12	18
Examination – revision and attendance		
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT
The aim of this module is to study the principles and operations of power systems modelling, analyses, and transmission and distribution techniques.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:
1.1 The working principles and the characteristics of transmission and distribution lines
1.2 The various factors that affect the amount of power delivered to the consumer from generation, transmission and distribution channels
2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Select the correct cables, apparatus, and equipment for a specific power systems engineering application
2.2 Determine the best power systems engineering solutions for specific locations, sites and topological presentations
2.3 Connect the different circuit configurations correctly and be safety conscious
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Upon successful completion of module, students should be able to:
3.1 Solve practical industrial applications problems
3.2 Determine how the load power factor affects power delivered, regulation and efficient performance of any power system
3.3 Device means of improving on quality, reduce losses and at minimum fuel consumption levels
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems

4.2 Undertake self-learning of electrical power systems modelling and analyses for informed and timely decision making processes
4.3 Produce simple reports that reveal independent thought while working in a group setting

7. INDICATIVE CONTENT

1. Performance of single phase short transmission lines
2. String combination and efficiency
3. Power factor measurement, voltage regulation and power delivered
4. Delta connected 3-core capacitance cable conversion to star
5. Analysis of long transmission line
6. Distribution lines fed from one end
7. Distribution feeders and transmission line fed from two ends
8. Interconnectors
9. Speed/Time curves
10. Effect of load power factor on regulation and efficiency

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through laboratory experiments. Laboratory manuals are used so that students can concentrate on the materials of the lecture. There shall be gaps where students either have to fill in or make separate notes. The experiments are structured such that students can undertake some private investigation on how to develop ideas and apply them. They are also required to produce reports for each experiment conducted.

9. ASSESSMENT STRATEGY

The assessment strategies are:

- To assess practical skills through the report of the experiments already conducted
- To assess self-learning, judgment, time and self-management, understanding and application through the laboratory reports presented.
- To determine the level of independence in a group setting

Assessment Criteria:

- For examination setting and marking, the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report		
Experiment and report	50	3.1, 3.2, 4.1, 4.2, 4.3
Final assessment:		
Examination (2 hour)	50	1.1, 1.2, 2.1, 2.2, 3.1,3.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecture style, with opportunities for questions and feedback, and requirement to work on simple problems
- Peer marking of tutorial questions for formative feedback.

- Tutorial classes where students can ask questions and be led through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments for improvement.
- Opportunities to consult lecturer and/or tutorial assistant during office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Lab Manual

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial Assistant
1 Lab Instructor

Laboratory space and equipment

Laboratory equipment and space for Measurement and Instrumentation experiments

Equipments:

- Potentiometers, Rheostats
- Resistors, Capacitors, Inductors (Different values, types and ranges)
- R/C/L Decade Boxes
- DC power supplies and DC meters
- Centre Tapped Galvanometers
- Ammeters (Various types and ranges)
- Voltmeters (various types and ranges)
- Wheatstone bridge, Kelvin bridge, Schering bridge, Maxwell bridge, Hey'bridge, Anderson bridge
- 1-phase and 3-phase R-L-C load bank
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	

	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3326
2. Module Title: Drives and Control Lab
3. Level: 4 Semester: 2 Credits: 5
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Power Electronics, Drives and Control
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours	**Student Hours**	**Staff hours**
Lectures	0	0
Seminars/workshops	0	0
Practical classes/laboratory	24	24
Structured exercises	8	8
Set reading etc.		----------
Self-directed study	6	----------
Assignments – preparation and writing	12	18
Examination – revision and attendance		
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to study the principle and operation of Electrical drives and their control techniques.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 The working principle and the characteristics of DC and AC motors
1.2 The various drives in electrical system
2. Cognitive/Intellectual skills/Application of Knowledge
Having successfully completed the module, students should be able to:
2.1 Select the correct type of machine and drive for a specific engineering application
2.2 Determine the steady state and dynamic performance of various motor/drive systems
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1 Solve practical industrial applications problems
3.2 Determine the effective load inertia and torque for a range of gearboxes, indexing ables, belt drives and lead screws, in order to assess a drives dynamic performance
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of electrical drives
4.3 Produce simple reports

7. INDICATIVE CONTENT

1. Study of Torque-speed characteristics of DC Motors
2. Study of Torque-speed characteristics of AC Motors
3. Controlled rectifier fed DC drives

4. Chopper controlled DC drives - Single, two and four quadrant operations
5. Closed loop control of drives
6. Stator voltage and frequency control
7. AC chopper and Inverter fed induction motor drives
8. Rotor resistance control
9. Slip power recovery scheme
10. Voltage and current source fed synchronous motors
11. Study of Operation and control of Brushless DC motor drives switched reluctance motor.
12. Study of Operation and control of switched reluctance motor

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through laboratory experiment. Laboratory manuals are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes. The experiment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the lab report will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report		
Experiment and report	50	3.1, 3.2, 4.1, 4.2, 4.3
Final assessment:		
Examination (2 hour)	50	1.1, 1.2, 2.1, 2.2, 3.1,3.2

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Lab Manual

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant
1 Lab Instructor

Laboratory space and equipment

Laboratory equipment and space for Measurement and Instrumentation experiments.

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3330
2. Module Title INDUSTRIAL ATTACHMENT
3. Level: 4 Semester: 2 Credits: 20
4. First year of presentation: 2009 Administering Faculty: ENG
5. Pre-requisite or co-requisite modules, excluded combinations
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours 10weeks	**Student Hour**	**Staff hours**
Lectures		
Seminars/workshops		
Practical classes/laboratory	**10 weeks**	
Structured exercises		
Set reading etc.		----------
Self-directed study		----------
Expt.s – preparation and writing		
Examination – revision and attendance		
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

This Training part has the main objective of familiarising the learners with the shop floor environment, by providing them with adequate practical skills and confidence in handling electrical and electronics equipment. The Training extends up to TEN weeks.

1. Knowledge and Understanding

Having successfully completed the TRAINING, students need not have to demonstrate knowledge and understanding of the principles and concepts of electrical and electronics engineering since this is a practice oriented module involving applications.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the TRAINING, students should be able to:

2.1. Select and apply appropriate mathematical methods for modelling and analysing real world engineering problems.

2.2. Use scientific and engineering principles in the development of solutions to problems in the design and development of electrical and electronics engineering products.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the Training, students should be able to:

3.1. Use competently and safely standard electrical/electronic/computer laboratory instrumentation in the shop floor.

3.2. Observe and record accurately data and experimental evidence both in the laboratory and in the industrial environment

3.3. Analyse evaluate and interpret measured or observed data in the shopfloor

3.4. Plan the installation and maintenance of computer hardware, software, computer systems and equipment in practical work environments.

3.5. Demonstrate an awareness of practical computing skills in terms of Hardware and Software required in Industrial Practice.

3.6. Use computational tools and packages appropriate to the area of production or manufacture.

4. General transferable skills

Having successfully completed the Training, students should be able to:

4.1. Work effectively in a team both as a member or leader in the work environment.
4.2. Efficiently manage both time and resources observing deadlines etc...
4.3, Communicate effectively the solutions arrived with the help of circuit Diagrams, Flow Diagrams and Design Charts in practical situations.
4.4. Demonstrate numerical skills and problem solving skills pertaining to real world problems.
4.5. Use competently information technology (ICT) and relevant tools.

7. INDICATIVE CONTENT

LIST OF ACTIVITIES:

SINCE THIS IS A PRACTICAL MODULE, IT INVOLVES THE APLICATION OF TECHNICAL KNOWLEDGE ON A SPECIFIC AREA

1. Shop Floor Training
   Real world applications already developed in the industry to be practised. Final Report to be submitted for the Skill Examination.
2. Revision of the Concepts already learnt over the semesters and their application in the Industry
3. Work on real world applications
4. Based on the Survey of Contemporary Developments already made in the work area develop a new application or improvement.
5. Learning about work Schedules, Production strategies etc.
6. Analysis of Time and Materials management etc.
7. Design and Develop Prototypes
8. Testing and Evaluation
9. Improve skills through constant Training and learning

THE ABOVE LIST IS ONLY COMPREHENSIVE AND MORE WORK CAN BE DONE DEPENDING ON THE INDUSTRY SELECTED AND THE AVAILABLE FACILITIES.

8. LEARNING AND TEACHING STRATEGY

The module will be delivered solely through Experimentation and practice with instructions from the floor supervisor. Periodic discussions with the supervisor will be required to do the work in a periodic manner. Organized discussions, presentations and teamwork will help students to acquire the required cognitive, intellectual and key (transferable) skills. Each learner will be trained individually and submit a report at the end of the training for the final skill examination.

9. ASSESSMENT STRATEGY

Assessment on the programme is undertaken in accordance with the current Academic Regulations of the Institute.

The Institute policy requires the internal moderation of assessments. Each Module shall have a Module Leader, and a Co-Leader, Module Co-Leader shall serve as the internal moderator of the module.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the EEE Laboratory assessment criteria will be used
- For the Experimentation, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria to test the skills attained.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Experimentation, Practical skills, participation, Regularity, report	**20%**	**B1,B2,C3,C4**
Interim Assessment	**20%**	**C6,C7,C8,D6,D7**
Final assessment: Final Skill Test	**60%**	**B1,B2,,C3,C5,C7,C8, D4,D5,D6,D7,D8**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive supervision, with opportunities for questions, and requirement to work on simple problems in the work environment,
- Individual contact with shop floor supervisor where students can ask questions and be led through demonstrations as required.
- Periodic summative assessments with instant feed-back to students
- Opportunities to consult experts from the academia as well as the industry

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

TEXT BOOK

Background Texts as appropriate (include number in library or URL) (inc ISBN)

REFERENCES

Appropriate books and manuals as suggested by the shop floor supervisor,
Relevant web information,
Publications like data manuals, Industrial Journals etc.
Other Technical literature from Industries and manufacturers

Laboratory space and equipment

Can be done either in the KIST Laboratories or in any of the approved Industries

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

A senior staff member as coordinator of Industrial Attachment and an expert from the Industry to supervise the trainees

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

YEAR 4 SEMESTER I

MODULE DESCRIPTION FORM

1. Module Code: ELE 3411
2. Module Title: Power Systems Analysis
3. Level: 5 Semester: I Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Modelling and analysis of power systems
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours _____	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to give a detailed study of power systems analyses tools and methods for reliable power systems control. This module deals with computation of load and power flows in lines, using conventional and modern methods for speed and accuracy trade-off. Simulation of faults and stability calculations for power quality requirements, loss reduction mechanisms, economic dispatch and flexible AC transmission systems operations.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 Load and power flow calculations
1.2 Formulae of the system (Y) array
1.3 Solving nonlinear algebraic equations by Newton-Raphson (N-R) method
1.4 Simplification of the N-R method: the fact decoupled power flow
1.5 Computer simulation of large power systems
1.6 Fault analysis, short-circuit calculations: balanced and unbalanced operations
1.7 Stability considerations
1.8 Economic load dispatch, frequency and voltage control, integrated grid operation
1.9 Power cost economics, power factor and var control
1.10 Synchronous condensers and static capacitor corrections
1.11 Flexible AC transmission systems operations (FACTS)

2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Analyse power systems networks of any size using computers for stability

2.2 Analyse mathematically models of the power system by simulation studies, which is cheaper, more convenient and safer than online implementation
2.3 Select suitable networks using diakoptics to simplify the algorithm, increase computer speed and reduce memory requirements for workable solutions and needed control
2.4 Develop confidence of being able to solve industrial problems with hands on experience of software packages like ETAP
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Upon successful completion of module, students should be able to:
3.1 Evaluate electrical power systems networks from first principles and analyse them
3.2 Design and test model power system networks for quality assurance and performance standards
3.3 Use different models and tools to study and analyse power systems network with computer software like ETAP, MATLAB
3.4 Compare and contrast different analytical tools, methods and procedures and able to select for system economy, stability, reliability and customer satisfaction
4. General transferable skills
Upon successful completion of module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of power systems modelling and analyses and their applications in solving industrial problems
4.3 Produce simple reports with confidence

7. INDICATIVE CONTENT

1 Load and power flow calculations
2. Formulae of the system (Y) array
3. Solving nonlinear algebraic equations by Newton-Raphson (N-R) method
4. Simplification of the N-R method: the fact decoupled power flow
5. Computer simulation of large power systems
6. Fault analysis, short-circuit calculations: balanced and unbalanced operations
7. Stability considerations
8. Economic load dispatch
9. Frequency and voltage control
10. Integrated grid operation
11. Power cost economics
12. Power factor and var control
13. Synchronous condensers and static capacitor corrections
14. Flexible AC transmission systems operations (FACTS)

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.
The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.
Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

1To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.

2 To assess practical skills through the report of the experiment

3 To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. Principles of power systems, by Mehta and Mehta
2. Electrical Power systems by Wadhwa
3. Power system Analysis by Weedy and Cory
4. Power system by Grainger and Stevenson

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3412
2. Module Title: High Voltage Engineering
3. Level: 5 Semesters: I Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Modelling and analysis of power systems, Transmission and distribution
6. Allocation of study and teaching hours

Total student hours	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT
The aim of this module is to assist students in developing and consolidating self-study, practical research, design and analytical skills to confidently and effectively demonstrate competency in the application of high voltage engineering theory and practice to make knowledge based decisions in the world of work.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 Introduction to High Voltage Engineering
1.2 Conduction and breakdown in gases
1.3 Conduction and breakdown in liquid dielectrics
1.4 Breakdown in solid dielectrics
1.5 Application of insulating materials
1.6 Generation of high voltages and currents
1.7 Measurements of high voltages and currents
1.8 Over voltage and insulation coordination
1.9 Nondestructive testing of materials
1.10 High voltage testing of electrical apparatus
1.11 Design planning and layout of high voltage laboratories
2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Understand breakdown in gases, liquids and solid dielectrics
2.2 Use the understanding of materials to apply them to high voltage requirements in industry
2.3 Select suitable configurations and circuits to produce high voltages and currents with reduced losses

2.4 Measure high voltages and currents with safety and security of equipment and personnel
2.5 Protect equipment, facilities and personnel from overvoltages and surges
2.6 Conduct nondestructive testing on equipment, and facilities for integrity
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Upon successful completion of module, students should be able to:
3.1 Use their high voltage techniques to solve power system, medical imaging, nuclear science and engineering problems for other applications areas like agriculture, transportation, new materials synthesis
3.2 Design and test high voltage equipment for stability, quality and effectiveness
3.3 Use different high voltage techniques for solving the problem at hand, which may be industrial in nature
3.4 Device and instrument nondestructive and noninvasive techniques for materials testing for enhanced reliability
4. General transferable skills
Upon successful completion of module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of high voltage engineering and their applications
4.3 Produce simple and credible reports as the case may be

7. INDICATIVE CONTENT

1 Introduction to High Voltage Engineering
2. Conduction and breakdown in gases
3. Conduction and breakdown in liquid dielectrics
4. Breakdown in solid dielectrics
5. Application of insulating materials
6. Generation of high voltages and currents
7. Measurements of high voltages and currents
8. Over voltage and insulation coordination
9. Nondestructive testing of materials
10. High voltage testing of electrical apparatus
11. Design planning and layout of high voltage laboratories

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.
The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.
Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.
Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

1To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
2 To assess practical skills through the report of the experiment

3 To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. High Voltage Engineering: Naidu and Karamaju (Latest Edition)
2. High Voltage Measurement Techniques: Adolf J Schwad (Latest Edition)

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments.
Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW

- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: _FIN 3450**
2. **Module Title: Engineering Economics and Finance**
3. **Level: 5 Semester: 1 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**

   Pre-requisite: None

   Co-requisite: None
6. **Allocation of study and teaching hours**

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	**24**	**48**
Seminars/workshops/tutorials	**6**	**12**
Practical classes/laboratory	**6**	**12**
Structured exercises		
Set reading etc.		**----------**
Self-directed study	**36**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT

- This course is designed to give engineering students an operational knowledge of financial analysis and planning in technology-based enterprises including publicly owned corporations and privately held consultancy and engineering service companies. This course equips the student to understand financial statements and financial performance of the business.
- To equip the students with an understanding of financial management aspects of business organizations with emphasis to sources, costs, uses and budgeting control of organizational funds
- Organizations acquire and utilize funds in order to accomplish organizational goals. Proper acquisition and deployment of funds influence the stability and success of an organization. Sub-optimal acquisition and utilization of funds lead to financial illness of an organization which may result into closure of business. Therefore, the decision making process, tools and techniques regarding finance are important to managers in organizations.

6.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1. Importance and role of finance decisions
1.2. Optimal position of the cost of funds
1.3. Optimal amount of liquidity a firm should hold
1.4. Appropriate investment decision given financial constraints
1.5. Various techniques to measure and control the financial health of a business.

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 . Apply finance decision in investment
2.2 Determine cost of capital of a company
2.3 Determine the necessary amount of capital
2.4 Determine the financial health of a business
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1 Calculate Net Present Value of a project
3.2 Calculate Internal Rate of Return
4. General transferable skills
Having successfully completed the module, students should be able to:
Give advice on business financial management

7. INDICATIVE CONTENT

Nature of business and financial planning

- Relationship between business and financial planning,
- Goals of the firm, agency theory,
- Tools of business finance;
- Time value of money,
- interest rates, cash flows,
- introduction to the concept of risk and returns

Source External sources: -

- Equity and Loan capital, hire purchase,
- Lease and Trade credit;
- Internal sources: - Retained earnings,
- Provisions and reserves;
- Sources of funds for Small and Medium Enterprises (SMEs of Business finance

Uses of Business finance

- Capital investment Decisions,
- Capital budgeting Techniques;
- Net Present Value (NPV),
- Internal Rate of Return (IRR),
- Pay Back Period,
- Accounting Rate of Return.

Working capital decisions

- Determinants of working capital
- Costs of Business funds
- Specific costs of capital:-
    - cost of debt, cost of equity,
    - cost of retained earnings and Weighted Average Cost of Capital(WACC)
    - Financial Leverage

Analysis of costs

- cost classification,
- CVP Analysis and interpretation

Measuring Business Performance

- understanding financial statements income statement and balance sheet,
- Financial Ratio analysis: -
- Profitability ratios,

- Solvency and Liquidity ratios,
- Activity ratios, Market ratios;
- Vertical and Horizontal analysis,

Budgets and Budgetary Control

- Meaning, Objectives and Limitations of Budgetary control.
- Types of Budget,
- Production quantity and cost budget,
- Raw Materials quantity and Cost Budget, Sales budget,
- Flexible budget and Cash Budget. (Receipts and Payments Method)

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial. The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

1. To assess knowledge and application skills though a written examination, but with open notes. The students therefore will not just rely on memory but also show understandings of the principles in application to exam problems.
2. To assess practical skills through the report of the experiment
3. To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	B.1, B.2, B.3, B.2, B.1, B.2
Experiment and report	20	C.1, C.2, D.1, D.2
Final assessment:		
Open note examination (2 hour)	60	A.1, A.2, A.3, B.1, B.2, B.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- INTERACTIVE LECTURING STYLE, WITH OPPORTUNITIES FOR QUESTIONS, AND REQUIREMENT TO WORK ON SIMPLE PROBLEMS,
- Peer marking of tutorial questions for formative feedback.

- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)
Financial Management by I.M Pandey Prentice Hall of India
Background Texts (include number in library or URL) (Inc ISBN)
Financial Management and Policy J .Van Horne Prentice Hall
Managerial Finance J. Fred and Thomas E. Copeland CBS College Publishing NY
Teaching/Technical Assistance
1 Lecturer,
1 Tutorial assistant
Computer requirements
Access to Excel (not essential)
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: CEE 3412
2. Module Title: Engineering ethics and professional conduct
3. Level 5 Semester 1 Credits: 5
4. Fourth year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Pre-requisite: General knowledge in the engineering field.
Co-requisite: None
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours 100	**Student Hours**	**Staff hours**
Lectures	**24**	**30**
Seminars/workshops/tutorials	**12**	**6**
Practical classes/laboratory		
Structured exercises		
Set reading etc.		
Self-directed study	**36**	
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**16**	**24**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The course aims to provide the basics of professional conduct as applied to Engineering practice. It covers the intent of the course in engineering, historical background and purpose of ethics in the engineering field. The philosophical intent of the course needs to be elaborated.

6.2LEARNING OUTCOMES

1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 Professional understanding in their relative professions
1.2 Conduct themselves in a conducive manner as far as their profession is concerned.
2. Cognitive/Intellectual skills/Application of Knowledge
Having successfully completed the module, students should be able to:
2.1 Behave in an acceptable manner in society.
2.2 Fight corruption where it is likely to occur.
2.3 Give good examples to subordinates.
2.4 Implement Government directives explicitly
2.5 Be a good leader and example in the society.
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1Discourage bad governance
3.2 Discourage nepotism
3.3 Teach by example good manners and how to solve problems in a professional manner.
4. General transferable skills
Having successfully completed the module, students should be able to:

4.1 Undertake self learning ethics and professional behaviour
4.2 Produce simple reports

7. INDICATIVE CONTENT

Introduction to Engineering ethics and Professionalism:, Engineering as a Profession, Moral and ethical Theories and methods, philosophical foundations of morals. Professional responsibility, confidentiality and loyalty, professional liability, forms and scope of corruption.

Codes of Ethics: history and purpose: Liability, obligation of Engineer, Employer and subordinate.

Contract Basics: Forms of contracts, Tendering Procedure, Legal disputes, Arbitration, Litigation, surety Bonds and Performance bonds. Types of contracts, Preparation of standard contract specifications, valuation of contracts , initiation and implementation, Tender Board procedures. Preparation and award of tenders.

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorial sessions and laboratory experiment.

The lecture includes interactive elements whereby students in groups apply principles to simple problems to ensure their involvement and so gain understanding. Handouts are used so that students can concentrate on the material of the lecture, but with gaps where students either have to fill in or make separate notes.

Problem sheets are given out to students and after time, the problems are discussed in class. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

The experiment and assignment will require the students to undertake some investigation on their own and to develop ideas and apply them. They will also produce a report for each.

9. ASSESSMENT STRATEGY

The assessment strategy is:

1. To assess knowledge and application skills though a written examination, but with open notes. The students therefore will not just rely on memory but also show understandings of the principles in application to exam problems.
2. To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3, 3.2, 4.1, 4.2
Tests	20	3.1, 3.2, 4.1, 4.2
Final assessment:		
Open note examination (2 hour)	60	1.1, 1.2, 1.3, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (reports and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)
Twort Rees: Civil Engineering Supervision and Management.
: Construction Law
: ICE Conditions of contract
: F.I.D.C. Conditions of contract
Background Texts (include number in library or URL) (Inc I
Journals
None

Key websites and on-line resources
None
Teaching/Technical Assistance
1 Lecturer,
1 Tutorial assistant
Computer requirements
Access to Excel (not essential)
Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	

Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ESD 3411
2. Module Title: Entrepreneurship Development
3. Level: 5 Semester: 1 Credits: 5
4. First year of presentation: ____ Administering Faculty: Faculty of Science Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours 100 hrs/semester	**Student Hours**	**Staff hours**
Lectures	45	45
Seminars/workshops	-	-
Practical classes/laboratory	10	12 hrs
Structured exercises		
Set reading etc.	7	----------
Self-directed study	10	----------
Assignments – preparation and writing	18	
Examination – revision and attendance	10	3
Other:		
Total	100	60

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

TO PREPARE STUDENTS TO BECOME JOB CREATORS

6.2LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to: Demonstrate knowledge and understanding of: entrepreneurship skills

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:
Understand about small businesses and how to create small businesses

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:
Produce candles, chalks, soaps, etc

4. General transferable skills

Having successfully completed the module, students should be able to:
Start their own businesses

7. INDICATIVE CONTENT

THE INDUICATUVE CONTENT IS AS FOLLOWS:

1. Introduction to entrepreneurial mindset
2. Theories of entrepreneurship
3. Identification, selection and business plan writing
4. Building the management team
5. Legal aspects
6. Analysing the market
7. Pricing of products and services
8. Marketing/ penetration tactics
9. Financial statements, ratios, budgeting and cash flow projections
10. Operation and managing the growth of an enterprises
11. Sources of finance

12. The entrepreneur and the community

Students' course work: to prepare the business plan of some of the projects related to your field of specialization which can be started in Rwanda with available raw material.

8. LEARNING AND TEACHING STRATEGY

To teach practical life skills of entrepreneur to students

9. ASSESSMENT STRATEGY

CAT 1, CAT2 and Assignment

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
CAT1	**15**	**Introduction to entrepreneur mindset**
CAT2	**15**	**Identification, selection and business plan writing**
Assignment	**10**	**Business plan writing skills**
Final assessment:	**60 %**	**Completed course**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

Students were given all required supports

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

Entrepreneurship development – B.S Gupta

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory space and equipment

Computer requirements

Others

Cottage Industry was used to demonstrate students about various practical aspects of entrepreneurship, on how to produce soaps, candles and small scale industry products.

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

Rajeev Aggarwal, Senior Lecturer

Rutamu Augustine, Lecturer

Johnson HIGIRO, Director of Finance

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	

4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. ***Module Code*: EEE 3410**
2. **Module Title: Research Project I**
3. **Level: 5 Semester: I Credits: 20**
4. **First year of presentation: 2009 Administering Faculty:Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   Pre-requisite: All modules in Electrical and Electronics Engineering up to Level 4
   Co-requisite: None
6. **Allocation of study and teaching hours**

Total student hours 100	***Student hours***	***Staff hours***
Lectures	***12***	***24***
Seminars/workshops/tutorials	***6***	***12***
Practical classes/laboratory		
Structured exercises	***10***	***20***
Set reading etc.		----------
Self-directed study	***36***	----------
Assignments – preparation and writing, quiz	***12***	***24***
Report writing	***16***	.....
Midi presentation	***8***	***0.5 hrs (per student)***

6.1. BRIEF DESCRIPTION OF AIMS AND CONTENT

The course aims to assist students to plan and better execute their final year projects. It addresses the essential concerns of the structure, conduct and reporting of research that necessarily includes proposal writing. It covers the constituent considerations and ordering of problem identification, assumptions, justification, scope, limitations, organisation, literature review and information sources, objectives, hypothesis setting and testing, research questions, theoretical and conceptual frameworks, research design-design of experiment (including manufacture of prototype or experimental rig), sampling, research methods, data collection methods, field tools and techniques, techniques of data measurement, statistical as well as computer supports for data analysis, interpretations, conclusions, recommendations and implications as well as financial and time budgeting (Scheduling and Gantt Charts). Technical report writing and approaches to referencing are also given emphasis.

6.2. LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1.1 The meaning and purpose of research
1.2 The import of methodology in inquiry
1.3 The scientific method and value of the scientific theory in inquiry

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1 Identify and delineate a researchable problem.
2.2 Produce a risk assessment for a proposed project.
2.3 Consider health and safety and environmental aspects of a technical project.
2.4 Conduct a critical review of literature
2.5 Develop consistent theoretical and conceptual frameworks
2.6 Prepare effective, valid and reliable research designs.

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1 Write competent project and research proposals.

3.2 Conduct repeatable scientific inquiry

3.3 Design suitable research methods relative to identified problem

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 Undertake self learning in the subject

4.2 Produce simple reports

7. INDICATIVE CONTENT

Fundamentals of Research: Meaning of research, Purpose of research, Understanding of methodology in inquiry, The scientific method, Value of scientific theory.

Research Process: Design of questionnaires. Data collection. Data analysis.

Writing a research or project proposal / Content of a proposal: problem identification, literature review, hypothesis, objectives, methodology, budget.

Planning and organization of project: Scheduling and Ghantt Chart.

Analytical Skills: Using spread sheets (Microsoft Excel) and other relevant computer based statistical packages for data analysis.

Assessment of proposed project: risk, social and environmental aspects

Research reporting and technical writing: Writing style,Referencing.

8. LEARNING AND TEACHING STRATEGY

The research methodology part will be taught so as to enable the student to apply it directly to the research project. Thus the lectures will be interactive and accompanied by some tutorial or workshop sessions to help the student realise how to make the applications. Assignments will require the students to undertake some investigation on their own, develop original ideas and apply them, while also producing requisite reports.

The student will also be expected to exercise initiative throughout the project under the guidance of the project supervisor, with whom he/she will meet once per week to review the previous work's week and to agree the targets for the following week. The outcome of these sessions will be recorded in the project log book. As much as possible the supervisor will encourage the student to generate ideas and carry out the work on his/her own, but directing the student where to find information and how to carry out investigations if required.

The aim will be to encourage the student to become an independent investigator, making use of various resources, including the supervisor, in the course of his/her research.

9. ASSESSMENT STRATEGY

The research methodology will be assessed through the course work. For that, assignments and structured exercises will be considered. This assessment will have as objective to ensure how well the RM is being applied to the project work of the student. The supervisor will also assess the level of independence and involvement of the student as well as the student's enthusiasm, application and effectiveness in the project. At the end of semester a progress report and presentation will provide evidence of the communication skills as well as the content of the work and the applications of the principles of research methodology. The report will be expected to contain details of the planning, budgeting, resource acquisition, etc. as well as a risk and health and safety assessment. It will also contain the results of initial investigations.

A matrix of assessment criteria for the module will be prepared and given to the student to encourage an appropriate approach to the work.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		

Assignments/quizzes/ structured exercise	**50**	**1.1, 1.2, 1.3, ,2.1, 2..2, 2.3, 2.4, 2.5, 2.6, 2.7,2.8, 2.9, 3.1, 3.2, 3.3, 4.1, 4.2**
Work input and Initiative of student in research project (by supervisor)	**20**	**2.1, 2..2, 2.3, 2.4, 2.5, 2.6, 2.7,2.8, 2.9, 3.1, 3.2, 3.3, 4.1, 4.2**
Midi Presentation	**30**	**2.1,2.2,2.3, 2.4, 3.1, 3.2, 3.3, 4.1, 4.2**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems
- Marked summative assessments (assignments, quizzes and exercises) handed back to students, with comments.
- Opportunities to consult lecturer and supervisor in office hours.

12. INDICATIVE RESOURCES

The research project will require access to a wide range of text books, journals and websites depending on the topic of the project. Access to good library resources and internet will be important. Some core text:

1. Panneerselvam, R.., 2004, "Research Methodology", Prentice-Hall of India Private Limited, New Delhi
2. Kothari C. R., 2004 (second revision), "Research Methodology: Methods and Techniques", New Age international (P) Limited Publishers, New Delhi, India,
3. Any book of Research Methodology, available in KIST library.

Journals

None

Key websites and on-line resources

Wikipedia

Teaching/Technical Assistance

1 Lecturer or Assistant Lecturer

Laboratory space and equipment

None

Computer requirements

Enough Pc terminals & relevant statistical analysis softwares once a week to be shared between two students for 3 hours.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

Name: Mr. Jean Ntilivamunda

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	**Signature**	
	Print Name	
2	**Signature**	
	Print Name	
3	**Signature**	
	Print Name	
4	**Signature**	
	Print Name	

Seen and agreed

Library	**Signature**	
	Print Name	
ICT	**Signature**	
	Print Name	
Quality Office	**Signature**	
	Print Name	

YEAR 4 SEMESTER II

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3421**
2. **Module Title Microcontroller and Embedded Systems**
3. **Level: 5 Semester: 2 Credits: 10**
4. **First year of presentation: 2009 Administering Faculty: ENGINEERING**
5. **Pre-requisite or co-requisite modules, excluded combinations**
6. **Allocation of study and teaching hours See Notes of Guidance**

Total student hours	**Student Hours**	**Staff hours**
Lectures	**36**	**72**
Seminars/workshops		
Practical classes/laboratory		
Structured exercises	**12**	**24**
Set reading etc.		**----------**
Self-directed study	**30**	**----------**
Assignments – preparation and writing	**12**	**12**
Examination – revision and attendance	**10**	**24**
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

This course provides a basic understanding of embedded computer systems: Hardware/software systems and co design. Models of computation for embedded systems. Modelling, specification, synthesis, and verification, Hardware/software implementation, Performance analysis and optimization. Design methodologies and tools. Design projects.

1.2 LEARNING OUTCOMES

1. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

1 - Principles of micro-computers, theory of computation and embedded programming

2 - Design develop hardware and software for embedded micro controllers

2. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

2.1- Use principles of software engineering to Embed software into computers

2.2 - Use programming knowledge to produce innovative advanced embedded systems

2.3 - Analyse failure in embedded systems and take preventive measures

3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

3.1-Prepare reports and technical reviews for embedded software development reviews

3.2-Use competently and safely micro controller programmers and other digital instruments

3.3- Plan installation and maintenance of embedded systems

3.4 -Demonstrate awareness of system programming skills for embedded applications

3.5- Demonstrate practical aspects of embedded systems

4. General transferable skills

Having successfully completed the module, students should be able to:

4.1 - Carry on independently investigation on embedded systems of their failure

4.2 - Communicate effectively using sketches block diagrams and wiring diagrams of embedded micro-controllers

4.3 - Demonstrate problem solving using embedded programs

4.4 - Use of ICT simulate embedded systems

7. INDICATIVE CONTENT

Definitions, Classifications and brief overview of micro controllers, microprocessors and DSP's, Embedded Processor architectural definitions. Typical application scenarios of embedded systems

Interface Issues Related To Embedded Systems

A/D, D/A Converters, timers, actuators, power, FPGA, ASIC, diagnostic port.

Techniques For Embedded Systems

State machine and state Tables in embedded design, simulation and emulation of embedded systems. High-level language descriptions of S/W for embedded system, Java based embedded system design.

Real Time Models, Language & Operating Systems

Event based, process based and graph based models, pertinent models – realtime languages – The real Time Kernel, OS tasks, task states, task scheduling, interrupt processing, clocking communication and synchronization, control blocks, memory requirements and control, kernel services.

Case Studies

Discussions of specific examples of complete embedded systems using MC68HC11, INTEL8051, ADSP2181, PIC series of micro controller.

8. LEARNING AND TEACHING STRATEGY

Apart from the practical assessment which is dome in the laboratories A course handbook will be provided in advance and this will contain in depth information relating to the course content and give an opportunity to the students to prepare the course. The lecture materials will be posted on the web page that will also contain comprehensive web links for further relevant information. The module will be delivered through lectures, tutorial/practice sessions and group discussions. In addition to the taught element, students will be expected to undertake a range of self-directed learning activities, which will comprise case studies and mini research projects. All supporting documents for the course will be made available on web, as printed copies and also as soft copies

9. ASSESSMENT STRATEGY

1. To assess understanding by a written examination
2. To assess self-learning by an open-ended assignment

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assignment, criteria will be drawn up appropriate to the topic, based on the EEE Dept Assignment marking criteria.
- For the assessment of the laboratory work, the EEE Dept Laboratory assessment criteria will be used.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment, quiz	**15%**	**A2,A3,B2,B5,C1,C3,C6,C7,C8,D6**

tutorial, Practical		
MINI TEST	**25%**	**A2,A3,B2,B3,B5,D6,D7**
Final assessment:	**60%**	**A2,A3,B2,B3,B5,D3,D6,D7**

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems.
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.

Opportunities to consult lecturer and/or tutorial assistant in office hours

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

1. Ball. S.R, Embedded microprocessor Systems: Real world Design, Prentice Hall, 1996
2. Herma. K., Real Time Systems: Design for distribution embedded applications, Kluwer Academic 1997.
3. Gassle .J. Art of Programming Embedded systems, Academic Press 1992
4. Gajski. D.D., Vahid .F., Narayanan.S, Specification and Design of Embedded systems, PTR Prentice Hall, 1994.
5. Intel manual on 16 bit embedded controllers, Santa Clara 1991.
6.Slater M., Microprocessor based design, A Comprehensive guide to effective hardware design, Prentice Hall, New Jersey, 1989.
7. Peatman.J.B. Design with micro controllers, McGraw Hill International Ltd. Singapore, 1989.
8.Designing embedded systems with pic microcontrollers - principles and applications, by tim wilmshurst – nov 2006.

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Computer requirements

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	**Dean/Head of Department**	**Date**
1	Signature	

	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE3421
2. Module Title: Power Systems Operation & Control
3. Level: 5 Semester: II Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Power systems analysis
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours _____	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to be aware of power system components, understand the stability of a power system, study the effects of load characteristics on the power systems operations, control frequency and Voltage, conduct load management principles, and functions of load dispatching centres

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:
1.1 Introduction (Characteristics of Modern Power Systems)
1.2 Equipment and Stability Constraints
1.3 Frequency and Voltage Control
1.4 Electrical Load Management and Maximum Demand Control
1.5 Load Dispatch Centre Functions
2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Understand the characteristics of modern power systems
2.2 Analyse and obtain equipment and stability constraints on the power system
2.3 Select suitable methodologies for controlling frequency and voltage, which are vital for customer satisfaction
2.4 Wind-up or wind-down the load and demand side implications on the power systems operator
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1 Evaluate electrical power systems operation and control problems and take remedial action
3.2 Design and test a power systems network for reliability

3.3 Use different controllers for electrical power systems operations and control purposes
3.4 Ensure that the system does not lose synchronism nor suffer from cascading or catastrophic failures
4. General transferable skills
Having successfully completed the module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of drives and their application
4.3 Produce simple reports with confidence

7. INDICATIVE CONTENT

1) Introduction (Characteristics of Modern Power Systems)
   - Physical Structure
   - Operation and Control Functions
2) Equipment and Stability Constraints
   - Capabilities and Constraints of Generators/Exciters/Turbines/Network Elements (Lines, Transformers etc.)
   - Constraints of Energy Supply Systems
   - Load Characteristics
   - Introduction to Angle/Voltage Instability phenomena
   - Stability Constraints
3) Frequency and Voltage Control
   - Primary Control of Frequency: Governors
   - Secondary Control of Frequency
   - Voltage control: Automatic Voltage Regulators (generators),
   - Shunt Compensation, SVC
   - Introduction to Power Flow Control
   - Load Curves
   - Introduction to the use of Optimization Methods
4) Electrical Load Management and Maximum Demand Control
   - Load Curve Generation
   - Rescheduling of Loads
   - Shedding of Non-Essential Loads
   - Operation of Captive Generation and Diesel Generation Sets
   - Reactive Power Compensation
5) Load Dispatch Centre Functions
   - Contingency Analysis
   - Preventive, Emergency and Restorative Control

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.
The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.
Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

1. To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
2. To assess practical skills through the report of the experiment
3. To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments.

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz

- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3422
2. Module Title: Renewable Energy Sources
3. Level: 5 Semester: II Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
All other Power systems courses
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours _____	**Student hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT
The aim of this module is to provide a survey of the most important renewable energy resources, and the technologies for harnessing these within the framework of a broad range of simple to state-of the-art advanced energy systems.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:
1.1 Overview of wind energy in the past and today
1.2 Wind turbine theory / aerodynamics
1.3 Components and mechanical construction of wind turbines
1.4 Solar Energy
1.5 Biomass
1.6 Geothermal
2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Describe and explain the operations wind energy
2.2 Analyse mathematically wind turbine theory and aerodynamics
2.3 Select suitable components of the mechanical construction of wind turbines
2.4 Discuss the uses and myriad application solutions of solar energy
2.5 Sources, uses and replacement of biomass for climatic and ecological balance
2.6 Geothermal sources, exploitation and utilisation
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Having successfully completed the module, students should be able to:
3.1 Evaluate different non conventional renewable energy sources
3.2 Design and test suitable renewable energy conversion devices
3.3 Use different controllers for renewable energy conversion facilities with enhanced efficiency in use for appropriate technology solutions

4. General transferable skills

Upon successful completion of module, students should be able to:

4.1 Solve subject specific methodological and conceptual problems

4.2 Undertake self-learning of renewable and alternative energy and their application

4.3 Produce simple and credible reports with confidence

7. INDICATIVE CONTENT

Wind Energy

1. Overview of wind energy in the past and today:
2. Wind turbine theory / aerodynamics:

• How much power can be extracted from the wind?
• Aerofoil theory. Lift and drag forces.
• Simple drag force turbines. Tip speed ratio.
• Using the lift force in wind turbines. Horizontal axis lifts force turbines.
• Flow conditions and aerodynamic forces at the rotating blade.

3. Components and mechanical construction of wind turbines:

• Main components in a modern wind turbine. Typical nacelle layout.
• Manufacturing and testing of blades.
• Rotor shaft and hub.
• Gearboxes and brakes.
• Electrical machines. Synchronous and induction generators.
• Quality of produced electrical power.

Solar Energy

1. Solar radiation
2. Flat-plate collectors
3. Semi-conductors and P-N junctions
4. The behaviour of solar cells
5. Stand-alone photovoltaic systems
6. Grid connected photovoltaic systems

Biomass

1. Overview of the Basic Principles of Direct Combustion.
2. Basic Principles of Thermochemical Conversion:
3. Biochemical Conversion Processes:
4. Applications:
5. Technical Considerations of Biomass Conversion Processes.
6. Economic Considerations of Biomass Conversion Processes.

Geothermal

1. Geothermal Resources
2. Geothermal Power Technology
3. Binary Cycle
4. Economics Impacts

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.

The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.

Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.
Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

Background Texts (include number in library or URL) (Inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments.

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. Module Code: ELE 3413
2. Module Title: Power System Protection & Switchgear
3. Level: 5 Semester: II Credits: 10
4. First year of presentation: 2009 Administering Faculty: Engineering
5. Pre-requisite or co-requisite modules, excluded combinations
Power systems analysis, Transmission and distribution
6. Allocation of study and teaching hours See Notes of Guidance

Total student hours _____	**Student Hours**	**Staff hours**
Lectures	24	48
Seminars/workshops	6	12
Practical classes/laboratory	6	12
Structured exercises		
Set reading etc.		----------
Self-directed study	36	----------
Assignments – preparation and writing	12	12
Examination – revision and attendance	16	16
Other:		

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)
The aim of this module is to assist students develop, consolidate and acquire self-study, practical research, design and analytical skills in the application of electrical power systems protection theory, principles and practices for efficient, effective and optimal decision making on the field.

6.2 LEARNING OUTCOMES
1. Knowledge and Understanding
Upon successful completion of module, students should be able to demonstrate knowledge and understanding of:

1.1 Protection systems for transformers, transmission lines, switchgear and electrical machines
1.2 Use of relay
1.3 Characteristics of over current, differential and distance OHM and Mho relays
1.4 Study of different types of switchgears used in power systems-air, oil, air-blast and SF_6
1.5 Electromechanical relays
1.6 Static relays and their use
1.7 Protection against lightning and surges
1.8 Over current protection for phase and earth faults
1.9 Unit protection feeders
1.10 Distance protection and distance protection schemes
1.11 Electromagnetic interference
1.12 Power line carrier protection

2. Cognitive/Intellectual skills/Application of Knowledge
Upon successful completion of module, students should be able to:
2.1 Protect transformers, transmission lines, feeders, electrical machines, and generators using relays and other protection devices

2.2 Analyse mathematically the operations of protection equipment and the quantity change that signals the onset of trouble
2.3 Select suitable protection facilities, equipment and devices for the necessary reliability of service
2.4 Conduct power line carrier protection
3. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills
Upon successful completion of module, students should be able to:
3.1 Evaluate electrical power systems protection and switchgear technology and apply them
3.2 Design and test model power system networks for protection coordination and zones of coverage for quality assurance and performance standards
3.3 Use different models, methods, procedures and tools to study and analyse power systems protection strategies with computer software like ETAP, and MATLAB
3.4 Compare and contrast different analytical tools, methods and procedures and able to select protection equipment system economy, stability, performance, reliability and customer satisfaction
4. General transferable skills
Upon successful completion of module, students should be able to:
4.1 Solve subject specific numerical and conceptual problems
4.2 Undertake self-learning of power systems protection and switchgear technology, with their applications in solving industrial problems
4.3 Produce simple reports with confidence

7. INDICATIVE CONTENT

1. Protection systems for transformers, transmission lines, switchgear and electrical machines
2. Use of relay
3. Characteristics of over current, differential and distance OHM and Mho relays
4. Study of different types of switchgears used in power systems-air, oil, air-blast and SF_6
5. Electromechanical relays
6. Static relays and their use
7. Protection against lightning and surges
8. Over current protection for phase and earth faults
9. Unit protection feeders
10. Distance protection and distance protection schemes
11. Electromagnetic interference
12. Power line carrier protection

8. LEARNING AND TEACHING STRATEGY

The course is delivered mainly through lectures backed up by tutorials and laboratory sessions.
The lectures include interactive components in which students can be grouped using principles taught to solve simple problems through participation and involvement to enhance learning and understanding of concepts. Handouts/Lecture notes are used to guide students in order to concentrate on the materials of the lecture. Assignments also complement the lectures to make students develop confidence of the subject.
Problem sheets are also given to students and the problems are discussed in class, after the students might have tried their hands on them. Some of the problems will be handed in and then marked by peers to give formative feedback to fellow students.

Experiments and assignments will require that students undertake some individual investigations, which help them to develop ideas and apply them, as appropriate. They may also be required to produce reports for each of these.

9. ASSESSMENT STRATEGY

The assessment strategy is:

- To assess knowledge and application skills though a written examination to show understandings of the principles in application to exam problems.
- To assess practical skills through the report of the experiment
- To assess self learning, understanding and application through the assignment which will be 'open ended' so that the student has to some extent to formulate the problem and the solution.

Assessment Criteria:

- For the examination setting and marking the KIST generic marking criteria will be used.
- For the assessment of the laboratory work, the Electrical Engineering Laboratory assessment criteria will be used *(copy attached as Appendix).*
- For the assignment, criteria will be drawn up appropriate to the topic, based on the KIST generic marking criteria *(see Appendix)*

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Assignment and report	20	2.1, 2.2, 2.3,4.1, 4.2,4.3
Experiment and report	20	3.1, 3.2, 3.3,4.1, 4.2,4.3
Final assessment:		
Examination (2 hour)	60	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3

11. STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE

- Interactive lecturing style, with opportunities for questions, and requirement to work on simple problems,
- Peer-marking of tutorial questions for formative feedback.
- Tutorial classes where students can ask questions and be lead through solutions as required.
- Marked summative assessments (laboratory report and assignment) handed back to students, with comments.
- Opportunities to consult lecturer and/or tutorial assistant in office hours.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (Inc ISBN)

Background Texts (include number in library or URL) (Inc ISBN)

1. Principles of power systems, by Mehta and Mehta
2. Electrical Power systems by Wadhwa
3. Power system Analysis by Weedy and Cory
4. Power system by Grainger and Stevenson

Journals

Key websites and on-line resources

Teaching/Technical Assistance

1 Lecturer,
1 Tutorial assistant

Laboratory space and equipment

Laboratory equipment and space for Drives and Control experiments.

Equipments:

- 3-phase bridge rectifier
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- synchronous motors
- Chopper controlled DC drives
- Controlled rectifier fed DC drives
- AC chopper and Inverter fed induction motor drives
- Variable frequency converter (PWM), 10KW, 5-100 Hz
- Reluctance motor, 2.2 KW
- Power permanent Magnet machine, 4-5KW

Computer requirements

Computers with simulation software.

Others

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

To be decided

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	

MODULE DESCRIPTION FORM

1. **Module Code: EEE 3420**
2. **Module Title: Research Project - II**
3. **Level: 5 Semester: 2 Credits: 20**
4. **First year of presentation: 2011 Administering Faculty: Engineering**
5. **Pre-requisite or co-requisite modules, excluded combinations**
   EEE 3410 Research Project - I

a. Allocation of study and supervision hours

Total student hours 100	**Student hours**	**Supervisor hours**
Lectures	------	----------
Seminars/workshops	----------	----------
Practical classes/laboratory	----------	----------
Structured exercises	6	6 (per student)
Set reading etc.	----------	----------
Self-directed study / Research period	58	----------
Supervision	6	6
Project report writing	24	6 (per student)
Report Presentation	6	1 (per student)

6.1 BRIEF DESCRIPTION OF AIMS AND CONTENT (NOT MORE THAN FIVE LINES)

The aim is to continue the project work with application of Research Project I to their specific project. The project work will cover the initial parts of the project, which will be completed in this second semester. The student will produce a progress report, a final report and presentation.

6.2 LEARNING OUTCOMES

A. Knowledge and Understanding

Having successfully completed the module, students should be able to demonstrate knowledge and understanding of:

A.1. Project methodology
A.2. Risk management and social aspects of project work

B. Cognitive/Intellectual skills/Application of Knowledge

Having successfully completed the module, students should be able to:

B.1. Apply mathematical and engineering knowledge to a technical investigation.
B.2. Analyse published technical work through a literature review.
B.3 Assemble usable field tools that reflect practical data measurement scales.
B.4 Obtain credible representative filed data.
B.5 Carry out competent computer based statistical analysis.
B.6 Abstract convincing inferences from observed data trends
B.7 Prepare readable research reports that adhere to convention

C. Communication/ICT/Numeracy/Analytic Techniques/Practical Skills

Having successfully completed the module, students should be able to:

C.1. Specify, plan and initiate implementation of a technical project.
C.2. Prepare a technical report and give a technical presentation.
C.3. Carry out initial data acquisition and analysis for the project.
C.4. Carry out practical work or computational work as required.
C.5. Disseminate research results conventionally through seminars and/or reports

D. General transferable skills

Having successfully completed the module, students should be able to:

D.1. Acquire new knowledge and information on his/her own initiative.
D.2. Define and manage the resources required for the investigation.
D.3. Solve problems of implementation and analysis.

D.4. Communicate effectively both in written and verbal ways.
D.5. Use ICT in information gathering, analysis and presentation.

7. INDICATIVE CONTENT

Application of Research Methodology and execution of final year research project:

- Project monitoring and plan revision,
- Revision of literature review, risk, social and environmental aspects,
- Management of resources and time,
- Recording of progress,
- Data acquisition and analysis,
- Completion of investigations,
- Formulation of conclusions and future work,
- Progress report writing and presentation

8. LEARNING AND TEACHING STRATEGY

The research methodology taught in the first semester will provide the framework for the continuing project work.
The student will be expected to exercise initiative throughout the project under the guidance of the project supervisor, with whom he/she will meet once per week to review the previous work's week and to agree the targets for the following week. The outcome of these sessions will be recorded in the project log book. As much as possible the supervisor will encourage the student to generate ideas and carry out the work on his/her own, but directing the student where to find information and how to carry out investigations if required.
The aim will be to ensure the student are becoming independent investigators, making use of various resources, including the supervisor, in the course of his/her research.

9. ASSESSMENT STRATEGY

The supervisor will assess the level of independence of the student during the course of the project as well as the student's enthusiasm, application and effectiveness in the project. At the end of semester the project report and presentation will provide evidence of the communication skills as well as the content of the work and the applications of the principles of research methodology taught in the first semester. Levels of understanding will also be assessed through the oral examination. The report will be expected to contain details of the investigations carried out, the results and their analysis, a comprehensive discussion of the outcomes and a formulation of the important conclusions and significance of the work. If appropriate an updating of the literature review, risk, etc. from the first semester will be included together with indication of future work.
A matrix of assessment criteria for the module will be prepared and given to the student to encourage an appropriate approach to the work.

10. ASSESSMENT PATTERN

Component	Weighting (%)	Learning objectives covered
In-course assessment:		
Work input and Initiative	**20**	**A.1, B.1, B.2, C.1, C.3, C.4, D.1, D.4**
Project Report	**60**	**All**

Presentation / Oral	**20**	**A.1, C.1, C.2, C.3, C.4, D.1, D.2, D.3, D.4, D.5**

10. **STRATEGY FOR FEEDBACK AND STUDENT SUPPORT DURING MODULE**

The supervisor will give feedback through the weekly meetings, and the supervisor must make it very clear if the student is not performing well, and indicate how the student could improve.
The supervisor will also look through parts of the draft report and give feedback on the style and quality of the writing.

12. INDICATIVE RESOURCES

Core Text (include number in library or URL) (inc ISBN)

The research project will require access to a wide range of text books, journals and websites depending on the topic of the project. Access to good library resources and internet will be important.

Background Texts (include number in library or URL) (inc ISBN)

Journals

Key websites and on-line resources

Teaching/Technical Assistance

Laboratory technician or workshop manufacturing technical help will be required, depending on the topic.

Laboratory space and equipment

Laboratory space and equipment will depend on the topic

Computer requirements

Access to computer facilities is required for preparation of the report and presentation, and probably or data analysis. Some projects may involve computational work with specialist software as all Engineering projects should be design based.

Others

Some visits to sites or companies may be required, depending on the topic

13. PLEASE ADD ANYTHING ELSE YOU THINK IS IMPORTANT

14. TEACHING TEAM

All lecturers and professorial staff

15. UNIT APPROVAL

Deans and Heads of all Departments contributing to the programme to confirm agreement.

Department	Dean/Head of Department	Date
1	Signature	
	Print Name	
2	Signature	
	Print Name	
3	Signature	
	Print Name	
4	Signature	
	Print Name	

Seen and agreed

Library	Signature	
	Print Name	
ICT	Signature	
	Print Name	
Quality Office	Signature	
	Print Name	