UNDERGRADUATE HANDBOOK

2016

Faculty of Engineering
South Eastern University of Sri Lanka


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Faculty of
Engineering
South Eastern
University
of Sri Lanka

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Published by:

Faculty of Engineering
South Eastern University of Sri Lanka
Oluvil # 32360
Sri Lanka

May 2016

The policies and regulations set out here are for the information of the students admitted to the BSc Engineering programme from 2013 until otherwise subsequently amended. The conduct of the academic work for the award of the degree is performed according to the 'Academic Policies and Regulations for the Degree of Bachelor of Science Honours in Engineering' as approved by the Senate on the recommendation of the Faculty of Engineering. This Handbook presents the pertinent information, policies and regulations following the Academic Policies and Regulations, but in the case of any discrepancy, the 'Academic Policies and Regulations for the Degree of Bachelor of Science Honours in Engineering' takes precedence.

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South Eastern University of Sri Lanka

VISION

To be an Internationally Renowned Centre in South Asia for Higher Learning and Innovations in Sciences, Technologies and Humanities

MISSION

To Provide Expanded Opportunities for Higher Learning of International Standards through Generation and Dissemination of Knowledge and Innovations Focused on Regional and National Needs, Social Harmony and Stakeholders' Empowerment and Satisfaction

Faculty of Engineering

VISION

A Centre of Engineering Education and Innovation, Internationally recognized and nationally most preferred

MISSION

To create opportunities for stakeholders in the field of engineering by providing technically competent and well-rounded education, developing an environment that fosters high quality learning, student centred teaching, and research, and promoting collaboration with state and private sectors for sustainable development of the nation

Graduate attributes

Engineering Knowledge: Apply knowledge of mathematics, basic sciences, engineering fundamentals, and specialist knowledge in the chosen engineering discipline to the solution of complex engineering problems.

Problem Analysis: Identify, formulate, research literature, analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, basic and engineering sciences.

Development of solutions: Design systems, components or processes for complex engineering problems that meet specified needs with appropriate health, safety, societal, and environmental considerations.

Investigation: Conduct investigations of complex problems using research-based knowledge and research methods to provide valid conclusions.

Use of modern tools: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools to complex engineering problems with an understanding of the limitations.

Role of Engineering in society: Apply reasoning with contextual knowledge to assess societal, health, safety, legal, cultural issues and the consequent responsibilities related to professional engineering practice and solutions to engineering problems.

Sustainable Development: Understand the impact of engineering work in societal and environmental context and demonstrate broad knowledge of sustainable development concepts and practices required to deal with contemporary issues related to professional engineering practice.

Ethics: Demonstrate broad knowledge of ethical responsibilities and commit to professional ethics and standards of engineering practice.

Team work: Demonstrate ability to function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary / multi-cultural settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project Management: Demonstrate broad knowledge and understanding of management and business practices, including financial management, risk and change management.

Life-long learning: Recognize the need for life-long learning and Engage in independent and lifelong learning in the broad context of technological change.

Contribution to community: Understand the responsibilities as a member of the community and commit to make a positive contribution to the community.

Note: These are adapted from the Washington Accord Graduate Attribute Profiles of 'Graduate Attributes and Professional Competency Profiles, Version 3: 21 June 2013, International Engineering Alliance'.

CONTENTS

1 INTRODUCTION OF THE UNIVERSITY

1.1 About the University

The South Eastern University of Sri Lanka (SEUSL) was first established as the South Eastern University College of Sri Lanka and commenced to function from 27th July 1995. It was then upgraded to the status of a fully-fledged university, SEUSL, from 15th May 1996. There are five faculties in SEUSL at present. Faculty of Arts & Culture, Faculty of Management & Commerce, Faculty of Islamic Studies & Arabic Language and Faculty of Engineering are located in Oluvil and the Faculty of Applied Sciences is located in Sammanthurai.

1.2 Administrative Structure

(i) Council

Council is the executive body and governing Authority of the University as provided in the Universities Act No. 16 as amended and consists of Vice Chancellor, Deans of Faculties, two members elected by the Senate from its members, persons appointed by the University Grants Commission. The Chairman of the Council is the Vice Chancellor who presides over the meetings of the Council. The Council without prejudice to the generality of the powers conferred upon it by the University Act will discharge such powers and duties to hold, control and administer the property and funds of the University.

(ii) Senate

Senate is the academic authority of the University. Senate of the University consists of Vice Chancellor, Deans of Faculties, Heads of Departments of Study, Permanent Professors, Librarian and two teachers elected by each Faculty Board. The Senate is the ultimate authority to decide on all academic matters.

(iii) Chancellor

His Excellency the President of the Democratic Socialist Republic of Sri Lanka appoints the Chancellor who is the titular Head of the University, and holds office for a period of five years reckoned from the date of his appointment. The Chancellor shall preside at convocations of the University.

(iv) Vice Chancellor

Vice Chancellor is appointed by the President of the Democratic Socialist Republic of Sri Lanka for a term of three years. The Vice Chancellor is the principal Executive and Academic Officer of the University, and an ex-officio member & Chairman of both the Council and the Senate. The Vice Chancellor is entitled to convene, be present, and speak

at, any meeting of any other authority of the University or other body. The Vice chancellor is also the Accounting Officer of the University and responsible for the execution of policies and measures approved by the Council in relation to the University and, subject to such policies, the direction, supervision and control of the University, including its administration, and for the maintenance of discipline within the university.

(v) Dean

Dean of each Faculty is a full time officer of the University and the Academic and Administrative Head of that Faculty. The Dean is elected by the Faculty Board from among the Heads of the Departments of study comprising such Faculty for a term of three years. The Dean is the ex-officio Chairman of the Faculty Board and an ex-officio member of the Council and the Senate. Dean will hold office for a period of three years reckoned from the date of the election.

(vi) Registrar

Registrar of the University is appointed by the Council. The Registrar is a full time officer of the University and is responsible for the custody of the records and the property of the University. He is also the ex-officio Secretary of the Council and the Senate, and the Assistant Accounting Officer of the University. Subject to the direction and control of the Vice Chancellor, the Registrar is responsible for the general administration of the University and the disciplinary control of the non-academic staff.

(vii) Bursar

Bursar is appointed by the Council. Subject to the direction and control of the Registrar, the Bursar is responsible for the custody of the funds of the University and its administration.

(viii) Librarian

Librarian is appointed by the Council. The Librarian is a fulltime officer of the University and is responsible for the administration of the library subject to the direction and control of the Vice Chancellor. The librarian is also an ex-officio member of the Senate.

1.3 Officers of South Eastern University of Sri Lanka

Chancellor

Prof. Achchi Mohamed Ishaq
BS (*Ceylon*), MS (*Washington*), PhD (*Wisconsin*), CEng MICE, FASCE

Vice Chancellor

Prof. M.M.M. Najim
BSc Agric. (Hons) (*PDN*), MEng (*AIT*), PhD (*UPM*)

Deans of Faculties

Faculty of Arts and Culture

Mr. M. Abdul Jabbar
BA (Hons) (*PDN*), MPhil (*PDN*)

Faculty of Applied Sciences

Dr. (Mrs.) M.I.S. Safeena,
BSc (Hons) (*PDN*), MSc (*PDN*), PhD (*PDN*)

Faculty of Engineering

Dr. S.M. Junaideen
BSc Eng (Hons) (*PDN*), MPhil (*HKU*), PhD (*HKU*), CEng, MIE(*SL*)

Faculty of Islamic Studies and Arabic Language

Mr. S.M.M. Mazahir
BA (Hons) (*PDN*), MPhil (*PDN*)

Faculty of Management and Commerce

Dr. S. Gunapalan
BBA (Hons) (*JFN*) M.Com (*KLN*), PhD (*India*)

Librarian

Mr. M.M. Rifaudeen
BSc Agric. (Hons) (*EUSL*); MLS (*UOC*); ALA

Registrar

Mr. H. Abdul Saththar
BA (*PDN*), MHRPD (*India*)

Bursar (Acting)

Mr. K.L. Mohamed Nazeer
HNDA (*SL*), SAT (*SL*), CBA (*CASL*), FPFA (*CASL*)

2 INTRODUCTION OF THE FACULTY

2.1 About the Faculty

The Faculty of Engineering of South Eastern University of Sri Lanka was established on December 5, 2012 at Oluvil. This is the fourth engineering faculty in Sri Lanka established to offer full-time engineering courses after the engineering faculties at University of Peradeniya, University of Moratuwa, and University of Ruhuna.

The Faculty was declared open on February 5, 2013. The first batch of engineering students was admitted in May 2013. The faculty offers a four-year full-time undergraduate program leading to the degree of Bachelor of Science Honours in Engineering. The Faculty consists of (1) Department of Civil Engineering, (2) Department of Electrical and Telecommunications Engineering, (3) Department of Mechanical Engineering, (4) Department of Computer Science and Engineering, and (5) Department of Interdisciplinary Studies.

The Faculty at present offers the following fields of specialization of the degree of the Bachelor Science Honours in Engineering; (a) Civil Engineering, (b) Electrical & Electronic Engineering, and (c) Mechanical Engineering. Department of Interdisciplinary Studies offers the modules in the areas of mathematics, engineering management, humanities, and social sciences which are common to all the disciplines. Department of Computer Science and Engineering similarly offers computer engineering modules to all the disciplines.

The degree programme has been designed in line with the graduate attributes (outlined on pages *v* and *vi*) that should be acquired by the undergraduate students on completion the engineering degree programme. The curriculum comprises a set of core modules that provides a foundation in mathematics, sciences and computing; and a set of integrated modules that provides a broad base in engineering sciences, engineering design, and laboratory and project work in the chosen field; industrial training to provide an exposure to professional practice; and a set of complementary non-technical subjects.

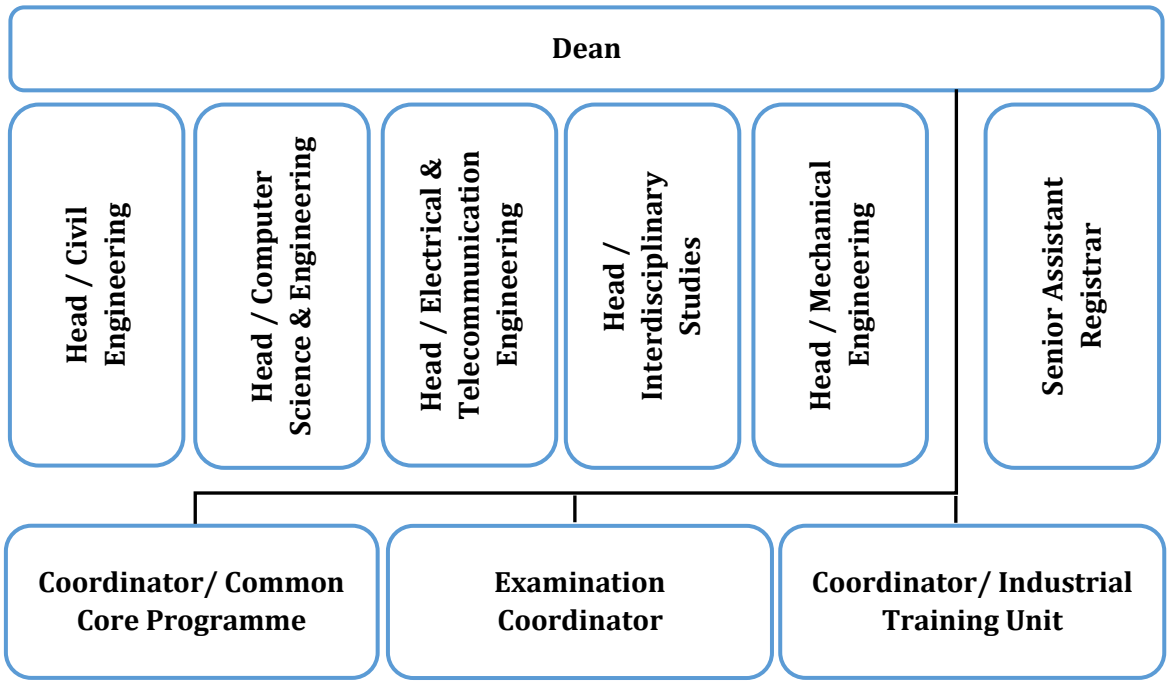
The primary goals of the Faculty are:

- To produce graduates of distinction who will have the set of qualities, knowledge, skills, and abilities outlined in *Graduate Attributes*,
- To constantly advance the curricula to the current trend so that the programmes stay nationally and internationally relevant,
- To equip with state-of-the-art infrastructure, laboratory, and library facilities for learning, student-centred teaching, and research,

- To develop academic and social spheres that attract and nurture high quality staff and students,
- To be a faculty in close collaboration with state-owned and private industries and institutions, and
- To engage actively in the activities of professional institutions and communities, and dissemination of knowledge.

These goals are integrated with the outcomes of the Corporate Plan of the South Eastern University of Sri Lanka and included in the Faculty Strategic Plan 2014-2018.

2.2 Organizational Structure of the Faculty of Engineering



2.3 Staff of the Faculty of Engineering

ADMINISTRATIVE STAFF

Dean
Dr. S.M. Junaideen
BSc Eng (Hons) (*PDN*), MPhil (*HKU*), PhD (*HKU*), CEng, MIE(*SL*)

Head / Department of Civil Engineering
Dr. J. Ajith Thamboo
BSc Eng (Hons) (*PDN*), PhD (*QUT*), AMIE(*SL*)

Academic Coordinator / Department of Computer Science & Engineering
Eng. (Ms.) A. L. Fathima Shanaz
BSc Eng (Hons) (*PDN*), AMIE(*SL*)

Academic Coordinator / Department of Electrical and Telecommunication Engineering
Eng. M.F.M. Abdul Cader
BSc Eng (Hons) (*MRT*), MSc (*MRT*), AMIE(*SL*)

Head / Department of Interdisciplinary Studies
Eng. M.I. Ilham Jazeel
BSc Eng (Hons) (*PDN*), MEng (*MRT*), CEng, MIE(*SL*)

Head / Department of Mechanical Engineering
Dr. A. M. Muzathik
BSc Eng (Hons) (*MRT*), MEng (*MRT*), PhD (*UMT*), CEng, CMarSci, MIE(*SL*), MIAE(*SL*), FIMarEST(*UK*)

Senior Assistant Registrar
Mr. S. Sivakumar
BSc Agric. (Hons) (*EUSL*) PG Dip. In Mgt

OFFICE OF THE DEAN

Dean

Dr. S.M. Junaideen
BSc Eng (Hons) (PDN), MPhil (HKU), PhD (HKU), CEng, MIE(SL)

Senior Assistant Registrar

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Mr. M.I. Abdul Jaleel *HNDA (SL)* (Clerk)

Mr. I.L. Nilamudeen

Mr. M.M. Mohamed Ali

Mr. A.J. Abdul Razzak

DEPARTMENT OF CIVIL ENGINEERING

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Academic Staff

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Lecturer (Prob.)

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BSc Eng (Hons) (*PDN*), AMIE(*SL*)
Lecturer (Prob.)

Eng. A.C.A. Suja
BSc Eng (Hons) (*MRT*), AMIE(*SL*)
Lecturer (Prob.)

Dr. Shiran Pradeep Jayakody
BSc Eng (Hons) (*MRT*), PhD (*QUT*), AMIE(*SL*)
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Eng. (Mrs.) W.M.M.M. Wijesinghe
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Lecturer (On contract)

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Temporary Assistant Lecturer

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Temporary Instructor

Non-Academic Staff

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Mr. A.J.M. Haaris B.A. *(SEUSL)* (CAA)

Mr. S. Rifaideen

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Academic Coordinator

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Mr. U.L.M. Hameed B.A. *(SEUSL)*

DEPARTMENT OF ELECTRICAL AND TELECOMMUNICATION ENGINEERING

Academic Coordinator

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Mr. A. Sarook

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Temporary Instructor

Non-Academic Staff

Mrs. Nisaya F. Ameer (Stenographer)

DEPARTMENT OF MECHANICAL ENGINEERING

Head

Dr. A. M. Muzathik
BSc Eng (Hons) (*MRT*), MEng (*MRT*), PhD (*UMT*), CEng, CMarSci, MIE(SL), MIAE(SL), FIMarEST(UK)

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Mr. A.R.A Haseem *HNDA* (*SL*) (CAA)
Mr. M.C. Sufeen
Mr. M.H. Hanizar
Mr. R. Nowzad
Mr. M.M.M. Arafath

ENGINEERING WORKSHOP

Workshop Engineer

Eng. M.S.A Sabry
HND (Eng), BEng, Dip in Industrial Quality Control (SLSI)

Non-Academic Staff

Mr. J. Anaston Prasanna
Mr. M.A.M. Hibini
Mr. T. Sirajul Muneer
Mr. U.L. Mohamed Fareeth
Mr. S. Javees
Mr. I.L.M. Harees
Mr. V. Narendiren (On assignment basis)
Mr. A.M.M. Niyas (On assignment basis)
Mr. A.C.M. Irshad (On assignment basis)
Mr. A.M.M. Haroos (On assignment basis)
Mr. M.M. Nazar (On assignment basis)
Mr. A.R.M. Nafees (On assignment basis)
Mr. Y.G.T.L.T. Karunarathne (On assignment basis)
Mr. R.P.C. Priyashan Wijesinghe (On assignment basis)

3 PROGRAMME DETAILS

3.1 Admission

Admission requirements for the degree programme are determined by the UGC in accordance with the government policy on university admissions. The minimum requirements are passes in Combined Mathematics, Physics and Chemistry at the GCE Advanced Level Examination.

Applicants with foreign qualifications referred for admission by the UGC may be admitted only with the consent of the Faculty, subject to approval by the Senate.

3.2 Medium of Instruction

The medium of instruction at the Faculty is English.

3.3 Credits

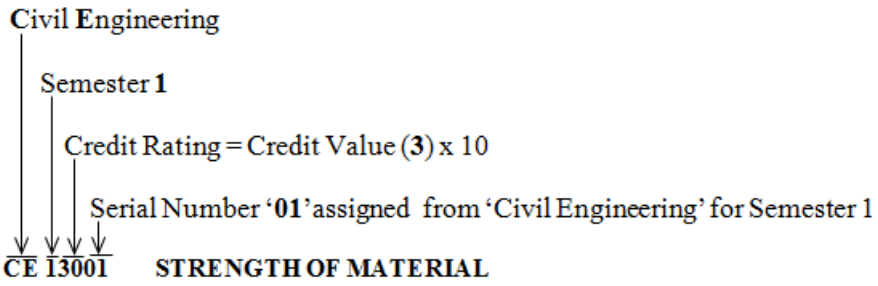
The degree programme is offered on a Credit-unit or Credit System where each module/ component is assigned Credits to indicate its work load relative to the total work load under the degree programme. One Credit is equivalent to 15 hours of lectures or 30-45 hours of laboratory studies or 45 hours of field studies/ design work/ tutorial sessions. For other activities such as projects, training modules, camps, and course works, Credit values assigned are commensurate with the respective workloads.

3.4 Module Code

A particular subject is denoted by an alpha-numeric code comprising two letters and five digits. The first two letters denote 'Module Discipline' viz:

CE: Civil Engineering
CS: Computer Science and Engineering
EE: Electrical Engineering
EN: Electronic Engineering
ME: Mechanical Engineering
ID: Interdisciplinary studies

The first digit denotes 'Semester' which varies from 1 to 8. The second and third digits denote 'Credit Rating' which is 10 × Credit value of the course. The last two digits denote 'Serial Number' of the subject from the particular area of study of the semester. For example:



3.5 Grade Point Average

A student's academic achievement in modules taken is expressed as 'Grade Points' as presented in Section 7.2. 'Grade Point Average' (GPA) is a numerical measure of a student's academic achievement over a specified period of time. Each module attempted (including each failed module) is assigned a numerical value which is the product of grade points earned for the module and the credit value of that module. GPA is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum_{i=1}^{n} (Module\ Grade\ Point)_i \quad \times \quad (Module\ Credit\ Value)_i}{\sum_{i=1}^{n} (Module\ Credit\ Value)_i}$$

where 'n' is the total number of modules offered over a specified period that are valid for the calculation of the GPA, and the GPA is rounded to the nearest second decimal place.

Semester Grade Point Average (SGPA) is the GPA in respect of modules attempted by a candidate (including failed modules) during a particular semester.

Current Grade Point Average (CGPA) is the GPA in respect of modules attempted by a candidate (including failed modules) at the time of calculation.

Overall Grade Point Average (OGPA) is the GPA in respect of modules attempted by a candidate (including failed modules) during a programme.

3.6 Programme Structure

The program comprises eight academic semesters offered over four years; with the first year Common Core Programme followed by three-year Specialization Programme with compulsory Industrial Training and other academic activities such as Projects / Training Modules /Camps that may be specified for a given field as outlined in Table 3.1.

Table 3.1 - Programme Structure

<table>
<tr><td>Common Core Programme
(36 Credits)</td><td>Academic Year 1</td><td>Semester 1 and Semester 2 (Compulsory and Elective modules; 18 Credits per semester)</td></tr>
<tr><td rowspan="3">Specialization Programme
(114 Credits)</td><td>Academic Year 2</td><td rowspan="3">Semester 3 to Semester 8 (Compulsory and Elective modules; about 20 Credits per semester)
+
Compulsory Industrial Training
(6 Non-GPA Credits)
+
Projects / Camps / Other Training Modules (credits assigned commensurate with the work load)</td></tr>
<tr><td>Academic Year 3</td></tr>
<tr><td>Academic Year 4</td></tr>
</table>

Prior to the commencement of the Common Core Programme, a pre-academic term is incorporated to prepare the students for more effective learning in the academic programme.

3.7 Academic Calendar

The official academic calendar is announced prior to the commencement of each academic year which consists of two semesters, period of industrial training, any other periods allocated for projects / camps / training modules, and vacation.

The minimum duration of industrial training is 22 weeks.

An academic semester generally consists of 20 weeks of duration:

Academic Activities (1st half)	: 8 weeks
Mid-Semester Vacation	: 1 week
Academic Activities (2nd half)	: 7 weeks
Study Leave	: 2 weeks
End of Semester Examination (ESE)	: 2 weeks

3.8 Modules

Modules are either Compulsory or Elective. Some modules in the Specialization Programme may have pre-requisites. Where prerequisite module or modules are prescribed for any module in the Specialization Programme, a student shall be permitted to follow that module only if he / she has successfully followed the prerequisite module or modules.

The modules on offer are subject to variation by the Faculty with the approval of the Senate. Any change will be notified to the students in advance before it takes into effect.

4 COMMON CORE PROGRAMME

The Common Core Programme conducted in the first academic year is common for all students at the Faculty of Engineering. There are 14 Compulsory modules and 01 Elective module to be completed in the Common Core Programme (Tables 4.1 & 4.2). The modules are subject to change by the Faculty with the approval of the Senate.

Table 4.1 Semester 1 Modules

No	Code	Title	GPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
1	CE 13001	Strength of Materials	3 C	2	3/2	3/2	20	80
2	CS 13001	Introduction to Computing	3 C	2	3		50	50
3	EE 13001	Principles of Electrical Engineering	3 C	2	3/2	3/2	20	80
4	ID 11001	English-I	1 C			3	50	50
5	ID 13002	Mathematics- I	3 C	3		1	20	80
6	ME 13001	Applied Mechanics	3 C	2	3/2	3/2	20	80
7	ME 12002	Engineering Drawing	2 C	1	3		50	50
		Total	18 C					

Table 4.2 Semester 2 Modules

No	Code	Title	GPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
1	EN 23001	Principles of Electronics	3 C	2	3/2	3/2	20	80
2	ID 22001	Engineer in Society	2 C	2		1	20	80
3	ID 21002	English-II	1 C			3	50	50
4	ID 23003	Mathematics- II	3 C	3		1	20	80
5	ME 23001	Engineering Materials and Processes	3 C	2	3/2	3/2	50	50
6	ME 22002	Presentation of Engineering Information	2 C	1	3		50	50
7	ME 23003	Thermo Fluids	3 C	2	3/2	3/2	20	80
8	ID 21004	Introduction to Sinhala Language	1 E	1			20	80
9	ID 21005	Introduction to Tamil Language		1			20	80
		Total	17C+1E					

4.1 Requirements to continue the Specialization Programme

A student should have satisfactorily followed the Common Core Programme, and should have got selected to a field of specialization to continue his / her studies. A student is deemed to have satisfactorily followed if he / she

(a) has obtained 80% attendance in each module offered based on the total number of **equivalent lecture hours** of the module, and

(b) has sat for both End-Semester-Examinations in Semester 1 and Semester 2, and has achieved SGPA ≥ 1.50 in each of these semesters

4.2 Requirements for successful completion of the Common Core Programme

A minimum of OGPA of 2.00 in the Common Core Programme and grade in any of the modules is not below D; and completion of any other mandatory requirements prescribed by the Faculty.

4.3 Special Session

The Faculty may decide to conduct a Special Session after completion of the final evaluation of the modules in the Common Core Programme in each academic year.

4.3.1 Eligibility & Entitlement

(a) For a student to follow a module in the Special Session, he / she should have satisfactorily followed the same module when it was offered.

(b) A student who fails to complete the common core programme, shall be allowed to follow up to 12 credits in the special session subject to (a) above, provided that the grades accumulated by the student will potentially allow the student to successfully complete the common core programme.

(c) The maximum grade accruing to a student repeating a module shall be C.

(d) A student who has successfully completed the Common Core Programme in the same academic year and wishes to improve grades up to C, shall be allowed to register for up to a maximum of 12 credits subject to (a) above during the Special Session.

(e) A student who has not qualified in a module by the end of the Special Session will be required to follow the module in a subsequent semester in which the module is offered in order to qualify in that module.

4.3.2 Academic Concession

In case a student is eligible for an academic concession which may be given for medical reasons and other compelling reasons in accordance with Section 7.6, the following will apply:

(i) If the student is eligible for an academic concession for one or more modules of the Semester 1 and Semester 2, he/she can.

(a) Request for approval from the Dean to follow the particular modules in the special session, provided that the grades accumulated will potentially allow him/her to successfully complete the common core programme. Approval may be granted by the Senate with the consent of the Faculty,

or

(b) Request to sit the entire End of Semester Examinations with the next available intake of students as a first attempt candidate.

(ii) If the student is granted an academic concession for the entire First Year of Studies (Semester 1 and Semester 2), he/she shall join the next available intake of students entering the Faculty as a first attempt candidate.

In case a student has missed any part of Semester 1or Semester 2, but is not considered eligible for an academic concession, in accordance with Section 7.6, any modules missed will be considered as failed or incomplete in accordance with Section 7.2.

4.3.3 Registration

Students who are eligible to follow modules offered during the special session are required to register the modules during the period announced for registration at the beginning of the special session. No change to module registration is allowed after this period.

4.3.4 Maximum Allowed Duration

Notwithstanding the fact that he / she may otherwise be eligible, a student shall not follow any of the modules of the common core programme after a period of three academic years from the time of admission to the Faculty. However, a student may be permitted to follow any of the modules of the common core programme after a period of three academic years with special approval of the Senate granted on the recommendation of the Faculty.

5 SPECIALIZATION PROGRAMME

5.1 Fields of Specialization

The Faculty is at present offering the following fields of specialization viz Civil Engineering, Electrical & Electronic Engineering, and Mechanical Engineering. The fields of specialization are subject to change.

5.2 Selection to the Fields of Specialization

5.2.1. Admission to each field is limited and determined by the Senate on the recommendation of the Faculty based on the viability of providing facilities commensurate with quality standards.

5.2.2. While a place in at least one of the fields of specialization is assured for every student who successfully followed the Common Core Programme, it may not be possible to accommodate every student's first choice of field.

5.2.3. Streaming of a student into a field of specialization is based on available positions under different fields, and his/her preference and performance in the Common Core Programme.

5.2.4. In situations where the number of applicants for a field of specialization exceeds the number of places available in the Specialization Programme concerned, the places would be allocated based on the GPA obtained at his/her first attempt in the Common Core Programme modules [F-GPA] excluding Engineer in Society, English-I, English-II, and Introduction to Sinhala or Introduction to Tamil.

5.2.5. In situations where two or more applicants with the same F-GPA compete for a vacancy of a particular field, the allocation of the field will be based on the performance in the modules, weighted as per credit rating, indicated against the field in question in Table 5.1.

Table 5.1 – Tie breaking modules for field selection

Field of Specialization	**Modules**
Civil Engineering	CE 13001 Strength of Materials & ID 23003 Mathematics-II
Electrical & Electronic Engineering	EE 13001 Principles of Electrical Engineering EN 23001 Principles of Electronics & ID 23003 Mathematics-II
Mechanical Engineering	ME 13001 Applied Mechanics & ID 23003 Mathematics-II

5.2.6. Transfer from a field of specialization would be permitted only in case: when a student may be offered a placement in the field of a preferred choice due to a vacancy available therein. Such a transfer would only be permitted within two weeks of assigning the fields.

5.3 Academic Advisors

5.3.1. Academic Advisors will be appointed each academic year from among the members of the academic staff of the Faculty.

5.3.2. Students are required to consult and obtain the consent of his / her respective Academic Advisors prior to applying for registration at the beginning of each semester.

5.3.3. Students are also required to consult and obtain the Academic Advisors' consent prior to changing academic load after registration and obtaining leave from academic activities.

5.4 Academic Load

5.4.1. The academic load of a student (norm) in a semester differs depending on the specialization to which the student belongs. However, the total credit requirement in each semester varies between 18 and 22.

5.4.2. Irrespective of the norm, maximum credits a student could register for a semester is 28. Minimum requirement is 12 credits in a semester, however if a student deviates from the norm for a semester, it should be done with the consent of the Academic Advisors. This limit is considered for Dean's list, Scholarships, etc.

5.4.3. The credits per module are normally restricted to 1 to 3 credits, other than projects, training, camps or similar modules.

5.4.4. Student's Industrial training is considered a full-time commitment and assigned 6 credits.

5.4.5. Students are required to register for modules to satisfy normal academic load specified by the respective Department of Study in any semester. However, with the consent of the Academic Advisors, a student may be permitted to deviate from the norm within the specified credit limits. The additional modules may include the previously taken modules repeated for purposes of passing or upgrading of final grade.

5.5 Registration

5.5.1. At the commencement of each Academic Year students are required to complete a registration form and pay any fees as may be required by the University and maintain registration during the period of study.

5.5.2. Students are required to register for modules with the Faculty for each semester in consultation with Academic Advisors.

5.5.3. Once the module registration period is over, the Dean's Office will send the relevant Department of Study the initial module registration details to be displayed on the notice board.

5.5.4. At the commencement of the semester, two weeks of Add/Drop period will be given for students to do necessary changes to their initial module registrations as per Section 5.6.

5.5.5. The Dean's Office will send the final module registration details to the Departments after Add/Drop period for confirmation by the students.

5.5.6. In situations, where the number of applicants for an Elective module is more than the number of places available, such places as would be allocated on the basis of the Current Grade Point Average (CGPA) of the applicants or any other suitable criteria approved by the Faculty and the field of specialization of the applicants until all places are filled. In case when registration for a module is not possible, the student is expected to register for alternative module(s).

5.5.7. A student repeating End of Semester Examination (ESE) or Continuous Assessment (CA) of a module is required to complete the registration prior to the end of the Add/Drop period of the respective semester, and if necessary register for the academic year.

5.5.8. Each student is responsible for the completeness and accuracy of his/her module registration and for registering prior to the set deadlines.

5.5.9. It is also the responsibility of the student to plan and select the modules as may be required to satisfy graduation requirements.

5.5.10. A student who has successfully completed the graduation requirements set out in Section 8.2 will not be permitted to register for any new module(s). However, upgrading of modules up to a grade C as per Section 7.2.3 in the next available module examination may be permitted on written application by the student.

5.6 Changes to Module Registration

5.6.1. A student who wishes to de-register from a module should do so within the Add/Drop period of that semester with the consent of the Academic Advisors.

5.6.2. De-registration of compulsory modules, even during the Add/Drop period, will be allowed only under exceptional circumstances and should be approved by the Senate on the recommendation of the Head of the Department and the Dean of Faculty of Engineering. Such compulsory modules must be subsequently completed in order to be eligible for the award of the degree.

5.6.3. Discontinuing a module after the Add/Drop period will not be allowed and will be considered as an attempt, even if the student does not face any assessments and/or examinations in that module.

5.6.4. A student who wishes to take an additional module or a replacement for a de-registered module may do so within the Add/Drop period of the semester. In either case, the consent of the Academic Advisors would be required for the change. Under exceptional circumstances, late registration may be permitted by the Faculty, with the concurrence of the Lecturer in Charge of the module and the Head of the relevant Department of Study.

5.7 Withdrawal of a Module Registration

5.7.1. A student can request to withdraw from a module after the Add/Drop period under the following conditions.

i. The relevant Academic Advisor and the Head of the Department should recommend the request;

ii. Requests for withdrawal will not be entertained for compulsory modules and modules for which registration was done on competitive basis;

iii. Withdrawn modules will appear in the Academic Transcript as “Withdrawn”;

iv. Withdrawal requests should be made before the last day of classes of the relevant semester;

v. Module(s) cannot be added in place of the withdrawn module(s);

vi. If a student later decides to register for a withdrawn module, he/she will be considered as a repeat candidate with an F grade for that module; and

vii. The grade is not counted in the calculation of the SGPA.

5.7.2. Requests for withdrawal should be approved by the Senate on the recommendation of the Head of the Department and the Dean of the Faculty of Engineering

5.8 Leave from Academic Activities

5.8.1. The following two categories of leave from academic activities are available to students: (a) Leave for Long Durations and (b) Leave for Short Durations, complying with the conditions specified in Sections 5.8.2 to 5.8.8.

5.8.2. Leave for Long Duration: A student may apply for this category of leave, when he/she has to be away from academic work for a long period due to medical reasons or circumstances deserving compassionate consideration. The duration of leave a student could apply under this category is a combination of full academic semesters to the maximum limit of one academic year.

5.8.3. Leave for Short Duration: A student may apply for this category of leave, when he/she has to be away from academic work for a short period for compelling reasons including but not limited to conferences, competitions, sports, community services, company start-ups, family commitments and medical grounds. Maximum duration of leave a student could obtain under this category is 15 working days per normal semester (Refer Section 3.7). It is the student's responsibility to consult the respective examiners in order to make sure that the leave obtained does not affect any of his/her CA or other mandatory evaluation requirements.

5.8.4. In case of a student traveling abroad, the Vice Chancellor upon the recommendation of the Senate may grant leave.

5.8.5. Any approved Leave of Long Duration will be a part of the course period for the completion of the Degree.

5.8.6. Only Leave for Long Duration granted under medical grounds will add-on to the maximum period for the purpose of awarding class honours and the maximum period for the completion of the Degree.

5.8.7. Under exceptional circumstances, the Vice Chancellor upon the recommendation of the Senate may grant Leave for Long Duration for circumstances beyond the provisions of Section 5.8.2. The Senate may also recommend the period of leave granted be added-on to the maximum period for the completion of the Degree.

5.8.8. All leave which fall during End of Semester Examinations will be granted according to by-law governing the conduct of examinations; and the student shall apply separately for the same following the guidelines therein.

5.9 Industrial Training

5.9.1. All students should undergo the training programme after the second and third years of study over a period of 12 weeks duration each time.

5.9.2. Students should successfully complete the following to fulfil the training requirement for the award of the degree: (i) Undergo full time training in the industry for the prescribed period, (ii) Maintain a "Daily Diary", (iii) Submit the Employers reports, (iv) Submit a Training Report on completion of training acceptable to the faculty, (v) Obtain a "Pass" at the training assessment (Viva) conducted by a "panel of examiners" appointed by the faculty.

5.9.3. All the details related to industrial training (eligibility, placement, assessment etc.) can be found in 'Guidelines for Industrial Training' issued by the Industrial Training Unit of the Faculty.

5.10 Civil Engineering Curriculum

Semester 3

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 32001	Calculus	2 C		2		1	30	70
02	ID 32002	Differential Equations	2 C		2		1	30	70
03	ID 32003	Engineering Economics	2 C		2		1	30	70
04	ID 31004	Presentation Skills	1 C				2	50	50
05	CE 32001	Construction Materials	2 C		2	3/4		30	70
06	CE 33002	Fluid Mechanics	3 C		2.5	3/4	3/4	30	70
07	CE 33003	Mechanics of Materials	3 C		2.5	3/4	3/4	30	70
08	CE 33004	Surveying I	3 C		2	3		30	70
09		Subject from ID Electives (Basket A)*	1 E						
		Total	18 C + 01 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 4

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 42001	Accounting for Engineers	2 C		2		1/2	30	70
02	ID 42003	Linear Algebra	2 C		2		1	30	70
03	ID 42004	Probability & Statistics	2 C		2		1	30	70
04	ID 41005	Report Writing	1 C				2	50	50
05	CE 42001	Civil Engineering Construction	2 C		2	3/4		30	70
06	CE 42002	Design of Steel Structures	2 C		1.5		3/2	40	60
07	CE 43003	Hydraulic Engineering	3 C		2.5	3/4	3/4	30	70
08	CE 43004	Soil Mechanics and Geology I	3 C		2	3/2	3/2	30	70
09	CE 42005	Structural Analysis I	2 C		2		1	30	70
10	CE 43006	Surveying II	3 C		2	3		30	70
11		Subject from ID Electives (Basket B)**	2 E						
		Total	22 C + 02 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
12	ID 03001	Industrial Training (Duration 12 weeks)		3 C				100	-
		Total		3 C					

Semester 5

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 52002	Numerical Methods	2 E		2		1	30	70
02	CE 53001	Construction Planning and Cost Estimation	3 C		2.5		3/2	30	70
03	CE 52002	Design of Reinforced Concrete Structures I	2 C		1.5		3/2	40	60
04	CE 53003	Engineering Hydrology	3 C		2.5	3/4	3/4	30	70
05	CE 53004	Highway and Traffic Engineering I	3 C		2.5		3/2	30	70
06	CE 53005	Principles of Environmental Engineering	3 C		2.5	3/4	3/4	30	70
07	CE 53006	Soil Mechanics and Geology II	3 C		2	3/2	3/2	30	70
08	CE 52007	Structural Analysis II	2 C		2		1	30	70
09		Subject from ID Electives (Basket A)*	1 E						
		Total	19 C + 03 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 6

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	CE 62001	Advanced Structural Analysis	2 C		2		1	30	70
02	CE 63002	Construction Management	3 C		2.5		3/2	30	70
03	CE 62003	Design of Reinforced Concrete Structures II	2 C		1.5		3/2	40	60
04	CE 63004	Environmental Engineering Design	3 C		2.5	3/4	3/4	40	60
05	CE 63005	Geotechnical Engineering	3 C		2.5		3/2	30	70
06	CE 63006	Highway and Traffic Engineering II	3 C		2.5	3/4	3/4	30	70
07	CE 63007	Hydraulic Design	3 C		2.5		3/2	40	60
08	CE 61008	Survey Camp	1 C				45	100	00
09		Subject from ID Electives (Basket B)**	2 E						
		Total	20 C + 02 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
10	ID 03002	Industrial Training (Duration 12 weeks)		3 C				100	-
		Total		3C					

Semester 7

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	CE 72001	Coastal Engineering	2 E		2			30	70
02	CE 72002	Design of Masonry and Timber Structures	2 C		1.5		3/2	40	60
03	CE 72003	Design of Water Retaining and Pre-stressed Concrete Structures	2 C		1.5		3/2	40	60
04	CE 73004	Geotechnical Engineering Design	3 C		2.5		3/2	40	60
05	CE 72005	Highway Construction and Maintenance	2E		1.5	3/4	3/4	30	70
06	CE 72006	Project Management	2 C		1.5		3/2	30	70
07	CE 72007	Remote Sensing and Geographic Information Systems (RS and GIS)	2E		1.5		3/2	30	70
08	CE 72008	Water and Wastewater Engineering	2E		1.5	3/4	3/4	30	70
09	CE 72098	Comprehensive Design Project (Part 1)	2 C		4			100	-
10	CE 72099	Research Project (Part 1)	2 C		4			100	-
11		Subject from ID Electives (Basket A)*	1 E						
		Total	13 C + 09 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 8

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 82001	Entrepreneurship & Intellectual Property	2 C		2		1/3	30	70
02	CE 82001	Bridge Engineering	2 E		1.5		3/2	30	70
03	CE 82002	Computer Based Structural Analysis	2 E		1.5		3/2	30	70
04	CE 82003	Environmental Management	2 E		1.5		3/2	30	70
05	CE 82004	Ground Improvement Techniques	2 E		1.5		3/2	30	70
06	CE 82005	Irrigation Engineering	2 E		2			30	70
07	CE 82006	Transportation Planning	2 E		1.5		3/2	30	70
08	CE 82007	Water Resources Engineering	2 E		2			30	70

09	ME 83001	Building Services Engineering	3 E		2.5		3/2	30	70
10	CE 82098	Comprehensive Design Project (Part 2)	2 C		4			100	00
11	CE 82099	Research Project (Part 2)	2 C		4			100	00
12		Subject from ID Electives (Basket B)**	2 E						
		Total	06 C + 19 E						

** At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

ID Electives (Basket A)#

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 01001	Introduction to English Literature	1E		1		1/2	30	70
02	ID 01002	English Poetry and Short Story	1E		1		1/2	30	70
03	ID 01003	Classical English Fiction	1E		1		1	30	70

ID Electives (Basket B) #

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 02011	Climate Change	2E		2		1/2	30	70
02	ID 02012	Disaster Management	2E		2		1/2	30	70
03	ID 02013	Psychology for Life	2E		2		1/2	30	70
04	ID 02014	Ethnic Cohesion and Peace Building	2E		2		1/2	40	60

The Department of Interdisciplinary Studies will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

Credit Requirements for the Civil Engineering Field of Specialization

Programme	Common Core Programme		Specialization Programme								Minimum Credits Required
Semester	**1**	**2**	**3**	**4**		**5**	**6**		**7**	**8**	
Common Core Subjects	14	11			Industrial Engineering			Industrial Engineering			25
ID Core Subjects	4	6									10
ID Electives		2									1
Specialization Core Subjects			11	15		19	20		9	-	74
Specialization Electives			-	-		-	-		8^	17^	4*
Specialization Projects			-	-		-	-		4	4	8
ID Core Subjects			7	7		-	-		-	2	16
ID Electives			3 (Basket A - in Semesters 3/5/7)# + 8 (Basket B - in Semesters 4/6/8)# + 2 (in Semester 5)^								3*
Minimum GPA Credit Requirement	18	18	18	22		19	20		13	12	
Compulsory Non-GPA Credit Requirement					3			3			6
Total GPA Credit Requirement											144
Total Minimum Credit Requirement											150

At least one module shall be taken from each basket.
***** Minimum 10 credits shall be earned from Specialization Electives and ID Electives.
^ The respective department will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

SPECIALIZATION ELECTIVES		**CREDITS**
Water & Environmental Engineering		
CE 72001	Coastal Engineering	2E
CE 72008	Water and Wastewater Engineering	2E
CE 82003	Environmental Management	2E
CE 82005	Irrigation Engineering	2E
CE 82007	Water Resources Engineering	2E
Geotechnical & Highway Engineering		
CE 72005	Highway Construction and Maintenance	2E
CE 82006	Transportation Planning	2E
CE 82004	Ground Improvement Techniques	2E
Structural Engineering		
CE 82001	Bridge Engineering	2E
CE 82002	Computer Based Structural Analysis	2E
Other Subjects		
CE 72007	Remote Sensing and Geographic Information Systems (RS and GIS)	2E
ME 83001	Building Services Engineering	3E

5.11 Electrical and Electronic Engineering Curriculum

Semester 3

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 32001	Calculus	2 C		2		1	30	70
02	ID 32002	Differential Equations	2 C		2		1	30	70
03	ID 32003	Engineering Economics	2 C		2		1	30	70
04	ID 31004	Presentation Skills	1 C				2	50	50
05	EE 32001	Electrical Circuit Analysis	2 C		2		1	30	70
06	EE 32002	Electrical Measurements	2 C		2	3/2		30	70
07	EE 33003	Theory of Electricity	3 C		2	3/2	3/2	30	70
08	CS 33001	Computer Architecture	3 C		2	3		30	70
09	EN 33001	Digital Electronics	3 C		2	3/2	3/2	30	70
10	EN 33002	Introduction to Telecommunications	3 C		2	3/2	3/2	30	70
11		Subject from ID Electives (Basket A)*	1 E						
		Total	23 C + 01 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 4

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 42001	Accounting for Engineers	2 C		2		1/2	30	70
02	ID 42003	Linear Algebra	2 C		2		1	30	70
03	ID 42004	Probability & Statistics	2 C		2		1	30	70
04	ID 41005	Report Writing	1 C				2	50	50
05	EE 42001	Field Theory	2 C		2		1	30	70
06	EE 42002	Introduction to Power Systems	2 C		2		1	30	70
07	CS 43002	Operating Systems	3 C		2	3/2	3/2	20	80
08	EN 43001	Analog Electronics	3 C		2	3/2	3/2	30	70
09	EN 43002	Signals & Systems	3 C		2	3/2	3/2	30	70
10		Subject from ID Electives (Basket B)**	2 E						
		Total	20 C + 02 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
11	ID 03001	Industrial training (Duration 12 weeks)		3 C				100	--
		Total		3 C					

Semester 5

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 52001	Industrial Management	2 C		2		1/2	30	70
02	ID 52002	Numerical Methods	2 C		2		1	30	70
03	CS 53001	Computer Networks	3 C		2	3		30	70
04	CS 53003	Data Structures and Algorithms	3 C		2	3/2	3/2	30	70
05	EE 52001	Introduction to Electrical Machines	2 C		2		1	30	70
06	EE 53002	Power Systems I	3 C		2	3/2	3/2	30	70
07	EN 53001	Communication Theory	3 C		2	3/2	3/2	30	70
08	EN 52002	Power Electronics	2 C		2	3/2		30	70
09		Subject from ID Electives (Basket A)*	1 E						
		Total	20 C + 01 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 6

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	EN 63001	Communication Systems I	3 C		2	3/2	3/2	30	70
02	EN 63002	Control Systems	3 C		2	3/2	3/2	20	80
03	EN 62003	Electromagnetics	2 C		3/2	1/2	1	30	70
04	EE 63001	Electrical Installations	3 C		2	3/2	3/2	30	70
05	EE 63002	Electrical Machines & Drives I	3 C		2	3/2	3/2	30	70
06		Subject from ID Electives (Basket B)**	2 E						
		Total	14 C + 02 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
07	ID 03002	Industrial Training (Duration 12 Weeks)		3 C				100	-
		Total		3 C					

Semester 7

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 72001	Industrial Law	2 C		2		1/2	30	70
02	EN 73001	Robotics	3 C		2	3		30	70
03	EE 73001	Power Systems II	3 C		2	3/2	3/2	30	70
04	EE 74099 / EN 74099	Research Project (Part 1)	4 C		8			100	-
05		Subject from EE Electives or EN Electives	2 E						
06		Subject from ID Electives (Basket A)*	1 E						
		Total	12 C + 03 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 8

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 82001	Entrepreneurship & Intellectual Property	2 C		2		1/3	30	70
02	EN 83001	Communication Systems II	3 C		3		3/2	30	70
03	EN 83002	Mechatronic Applications	3 C		3	3/2	1	30	70
04	EE 84099 / EN 84099	Research Project (Part 2)	4 C		8			100	--
05		Subject from EE Electives or EN Electives	2 E						
06		Subject from ID Electives (Basket B)**	2 E						
		Total	12 C + 04 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

ID Electives (Basket A)[#]

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 01001	Introduction to English Literature	1E		1		1/2	30	70
02	ID 01002	English Poetry and Short Story	1E		1		1/2	30	70
03	ID 01003	Classical English Fiction	1E		1		1	30	70

ID Electives (Basket B) [#]

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 02011	Climate Change	2E		2		1/2	30	70
02	ID 02012	Disaster Management	2E		2		1/2	30	70
03	ID 02013	Psychology for Life	2E		2		1/2	30	70
04	ID 02014	Ethnic Cohesion and Peace Building	2E		2		1/2	40	60

[#] Department of Interdisciplinary Studies will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

EE Electives[##]

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	EE 02001	Energy Studies	2 E		2		1	30	70
02	EE 02002	Electrical Machines & Drives II	2 E		3/2	1	1/2	30	70
03	EE 02003	High Voltage Engineering	2 E		3/2	1	1/2	30	70

EN Electives[##]

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	EN 02003	Electronic Instrumentation	2 E		2		1	30	70
02	EN 02002	Industrial Electronics	2 E		2		1	30	70
03	EN 02001	Digital System Design	2 E		2			30	70

[##] The department will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

Credit Requirements for the Electrical and Electronic Engineering Field of Specialization

Programme	Common Core Programme		Specialization Programme							Minimum Credits Required
Semester	**1**	**2**	**3**	**4**		**5**	**6**		**7**	**8**	
Common Core Subjects	14	11			Industrial Training			Industrial Training			25
ID Core Subjects	4	6									10
ID Electives		2									1
Specialization Core Subjects			16	13		16	14		6	6	71
Specialization Electives			-	-		-	-		12^		4
Specialization Project			-	-		-	-		4	4	8
ID Core Subjects			7	7		4	-		2	2	22
ID Electives			3 (Basket A - in Semesters 3/5/7)# + 8 (Basket B - in Semesters 4/6/8)#								3
Compulsory GPA Credit Requirement	18	18	23	20		20	14		12	12	
Minimum Non-GPA Credit Requirement					3			3			6
Total GPA Credit Requirement											144
Total Minimum Credit Requirement											150

At least one module shall be taken from each basket.
^ The department will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

SPECIALIZATION ELECTIVES **CREDITS**

Electrical Engineering

EE 02001	Energy Studies	2 E
EE 02002	Electrical Machines & Drives II	2 E
EE 02003	High Voltage Engineering	2 E

Electronic Engineering

EN 02003	Electronic Instrumentation	2 E
EN 02002	Industrial Electronics	2 E
EN 02001	Digital System Design	2 E

5.12 Mechanical Engineering Curriculum

Semester 3

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 32001	Calculus	2 C		2		1	30	70
02	ID 32002	Differential Equations	2 C		2		1	30	70
03	ID 32003	Engineering Economics	2 C		2		1	30	70
04	ID 31004	Presentation Skills	1 C				2	50	50
05	ME 33001	Fluid Mechanics	3 C		2	3/2	3/2	30	70
06	ME 33002	Mechanics of Machines	3 C		2	3/2	3/2	30	70
07	ME 33003	Mechanics of Materials	3 C		2	3/2	3/2	30	70
08	EE 33080	Electrical Machines	3 C		2	3/2	3/2	30	70
09	CS 32080	Computer Programming	2 C		1	3		30	70
10		Subject from ID Electives (Basket A)*	1 E						
		Total	21 C + 01 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 4

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 42001	Accounting for Engineers	2 C		2		1/2	30	70
02	ID 42003	Linear Algebra	2 C		2		1	30	70
03	ID 42004	Probability & Statistics	2 C		2		1	30	70
04	ID 41005	Report Writing	1 C				2	50	50
05	ME 43001	Applied Thermodynamics	3 C		2	3/2	3/2	30	70
06	ME 43002	Basic Controls & Instrumentation	3 C		2	3/2	3/2	30	70
07	ME 42003	Design of Machine Elements	2 C		1	3		30	70
08	ME 43004	Manufacturing Engineering	3 C		2	3		30	70
09	EN 42080	Electronics	2 C		2		½	30	70
10		Subject from ID Electives (Basket B)**	2 E						
		Total	20 C + 02 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
11	ID 03001	Industrial training (Duration 12 weeks)		3 C				100	--
		Total		3 C					

Semester 5

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 52001	Industrial Management	2 C		2		1/2	30	70
02	ID 52002	Numerical Methods	2 C		2		1	30	70
03	ID 52003	Operational Research	2 C		2		1	30	70
04	ME 53001	Design of Machines	3 C		1	3	3	30	70
05	ME 53002	Fluid Machinery	3 C		2	3/2	3/2	30	70
06	ME 53003	Heating Ventilation Air-Conditioning and Refrigeration	3 C		2	3/2	3/2	30	70
07	ME 53004	Machine Dynamics & Controls	3 C		2	3/2	3/2	30	70
08	EN 52003	Industrial Electronics	2 C		2		1	30	70
09		Subject from ID Electives (Basket A)*	1 E						
		Total	20 C + 01 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 6

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 63001	Production & Operations Management	3 C		2		3	30	70
02	ME 63001	Automobile Engineering	3 C		2	3		30	70
03	ME 63002	Computational Fluid Dynamics	3 E		2	3/2	3/2	30	70
04	ME 63003	Computer Integrated Manufacturing	3 E		3	3/4		30	70
05	ME 62004	Energy Sources	2 E		2		1	30	70
06	ME 63005	Introduction to Agricultural Engineering	3 E		2	3/2	3/2	30	70
07	ME 63006	Mechatronics	3 E		2	3/2	3/2	30	70
08		Subject from ID Electives (Basket B)**	2 E						
		Total	06 C + 16 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
08	ID 03002	Industrial Training (Duration 12 weeks)		3 C				100	--
		Total		3C					

Semester 7

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 72001	Industrial Law	2 C		2		1/2	30	70
02	ID 73002	Introduction to Mathematical Modelling	2 E		2		1	30	70
03	ME 73001	Agricultural Plant & Machinery	3 E		2	3/2	3/2	30	70
04	ME 72002	Energy Conservation	2 E		1	3/2	3/2	30	70
05	ME 73003	Heat & Mass Transfer	3 E		2	3/2	3/2	30	70
06	ME 72004	Human Factors Engineering	2 C		2		1	30	70
07	ME 73005	Renewable Energy Technologies	3 E		2	3/2	3/2	30	70
08	ME 74099	Research Project (Part 1)	4 C		8			100	--
09		Subject from ID Electives (Basket A)*	1 E						
		Total	08 C + 14 E						

*At least one module shall be taken from Basket A of ID Electives offered in Semesters 3, 5 and 7.

Semester 8

No.	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 82001	Entrepreneurship & Intellectual Property	2 C		2		1/3	30	70
02	ME 83001	Building Services Engineering	3 E		2.5		3/2	30	70
03	ME 83002	Environment & Sustainability	2 E		2		1	30	70
04	ME 83003	Fluid Power Systems	3 E		2	3/2	3/2	30	70
05	ME 82004	Maintenance Management	2 C		2		1	30	70
06	ME 83005	Postharvest Technology	3 E		2	3/2	3/2	30	70
07	ME 84099	Research Project (Part 2)	4 C		8			100	-
08		Subject from ID Electives (Basket B)**	2 E						
		Total	08 C + 13 E						

**At least one module shall be taken from Basket B of ID Electives offered in Semesters 4, 6 and 8.

ID Electives (Basket A)[#]

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 01001	Introduction to English Literature	1E		1		1/2	30	70
02	ID 01002	English Poetry and Short Story	1E		1		1/2	30	70
03	ID 01003	Classical English Fiction	1E		1		1	30	70

ID Electives (Basket B) [#]

No	Subject Code	Subject Title	GPA Credits	NGPA Credits	L (h/w)	P (h/w)	T (h/w)	CA (%)	Final Exam (%)
01	ID 02011	Climate Change	2E		2		1/2	30	70
02	ID 02012	Disaster Management	2E		2		1/2	30	70
03	ID 02013	Psychology for Life	2E		2		1/2	30	70
04	ID 02014	Ethnic Cohesion and Peace Building	2E		2		1/2	40	60

[#] Department of Interdisciplinary Studies will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

Credit Requirements for the Mechanical Engineering Field of Specialization

Programme	Common Core Programme		Specialization Programme								Minimum Credits Required
Semester	**1**	**2**	**3**	**4**		**5**	**6**		**7**	**8**	
Common Core Subjects	14	11			Industrial Training			Industrial Training			25
ID Core Subjects	4	6									10
ID Electives		2									1
Specialization Core Subjects			14	13		14	3		2	2	48
Specialization Electives			-	-		-	14^		11^	11^	20*
Specialization Project			-	-		-	-		4	4	8
ID Core Subjects			7	7		6	3		2	2	27
ID Electives			3 (Basket A - in Semesters 3/5/7)# + 8 (Basket B - in Semesters 4/6/8)# 2 (in Semester 7)^								3*
Minimum GPA Credit Requirement	18	18	21	20		20	14		12	12	
Compulsory Non-GPA Credit Requirement					3			3			6
Total GPA Credit Requirement											144
Total Minimum Credit Requirement											150

At least one module shall be taken from each basket.

^ The respective department will announce the modules to be offered in a particular semester based on the availability of resource persons and number of students registering to follow the modules.

***** Minimum 25 credits shall be earned from Specialization Electives and ID Electives. This shall include a group of elective courses adding up to a total of 9 GPA Credits from one of the 3 streams of specialization given below in Thermo Fluids, Energy Technology or Agricultural Engineering.

SPECIALIZATION ELECTIVES **CREDITS**

Thermo Fluids

ME 63002	Computational Fluid Dynamics	3 E
ME 73003	Heat & Mass Transfer	3 E
ME 83003	Fluid Power Systems	3 E

Energy Technology

ME 62004	Energy Sources	2 E
ME 72002	Energy Conservation	2 E
ME 73005	Renewable Energy Technologies	3 E
ME 83002	Environment & Sustainability	2 E

Agricultural Engineering

ME 63005	Introduction to Agricultural Engineering	3 E
ME 73001	Agricultural Plant & Machinery	3 E
ME 83005	Postharvest Technology	3 E

Other Subjects

ME 63003	Computer Integrated Manufacturing	3 E
ME 63006	Mechatronics	3 E
ME 83001	Building Services Engineering	3 E

6 OUTLINE OF SYLLABI

6.1 Modules offered by Department of Civil Engineering

CE 13001 Strength of Materials (3 credits)

Learning Outcome: (1) Assess the response of structural elements to external loads, (2) Determine the stresses and strains of structural elements under external loads, (3) Determine the deflections of structural elements under external loads.

Course Contents: Introduction to Structural Elements, Loads and Reactions, Shearing Force and Bending Moment, Theory of Bending, Shear Stress, Deflection of Beams, Buckling of Columns, Torsion.

CE 32001- Construction Materials (2 Credit)

Learning Outcome: (1) Identify and use construction materials in construction applications based on Institute for Construction Training and Development (ICTAD) specifications and relevant standards, (2) Use new construction materials for construction work

Course Contents: Identification and Use of Suitable Building Materials which satisfy ICTAD Specifications and other relevant Standards for Foundations, Walls, Doors and Windows, Roofs, Ceiling, Floors and Finishes, Identification and Use of suitable Construction Materials for Roads, Bridges and Irrigation Structures, Introduction to suitable Construction Materials for services in Buildings including Water, Sanitary Facilities, Electricity, Fire Fighting, Air Conditioning and Lifts, Introduction to Sustainable Construction Materials, Manufacturing Processes, Properties, Specifications and Test Methods for main Construction Materials including Cement, Steel, Bricks, Timber, Concrete Aggregates, Sand, Roof Covering Materials, Pipes and Fittings.

CE 33002 - Fluid Mechanics (3 Credit)

Learning Outcome: (1) Apply the concepts in Fluid Statics to solve problems in engineering practice, (2) Apply continuity, momentum and steady flow energy equations to solve problems in engineering practice, (3) Assess the effects of boundary layer on the flow over solid surfaces, (4) Use the concept of Ideal fluid flow to simulate real fluid flow conditions, (5) Determine the flow rates and/or required diameter and power transmission in pipe flow, (6) Use the techniques of dimensional analysis and similarity to formulate solutions to problems in engineering practice

Course Contents: Applications of Fluid Statics in Engineering Practice, Applications of Continuity, Momentum and Steady Flow Energy Equations in Engineering Practice, Flow Over Solid Surfaces: Boundary Layer Theory, Ideal Fluid Flow, Pipe Flow, Pipe Networks, Dimensional Analysis and Similarity.

CE 33003 - Mechanics of Materials (3 Credit)

Learning Outcome: [1] Determine the bending and shear stresses in beams due to external loads [2] Determine deflections of statically determinate and indeterminate

beams due to applied loads [3] Evaluate buckling load of ideal and real struts with different support conditions [4] Determine the stresses and strains of structural elements under external loads [5] Describe different failure theories of materials used in design

Course Contents: Applications of Bending Theory in Flexural Members, Applications of Shear Formula in Flexural Members, Deflection of Statically Indeterminate Beams, Applications of Buckling Theory in Structural Element Design, Analysis of Stress and Strain, Application of Torsion, Theories of Elastic Failure

CE 33004 - Surveying I (3 Credit)

Learning Outcome: 1. Describe the importance and use of survey measurements in civil engineering 2. Use the chain/tape, Level and Theodolite in the field for survey measurements 3. Carry out field survey operations and produce survey maps by hand 4. Carry out levelling operations and produce longitudinal section and cross section drawings by hand

Course Contents: Introduction to Land Surveying, Linear Measurements and Chain Surveying, Levelling, Theodolite Surveying.

CE 42001 - Civil Engineering Construction (2 Credit)

Learning Outcome: 1. Carry out construction of buildings up to five stories based on detailed construction drawings, ICTAD specifications and relevant standards 2. Carry out construction of roads, bridges and irrigation structures based on detailed construction drawings, ICTAD specifications and relevant standards. 3. Select appropriate machinery/equipment for construction

Course Contents: Building Construction, Construction Equipment, Construction Drawings, Sustainable Construction

CE 42002 - Design of Steel Structures (2 Credit)

Learning Outcome 1. Identify load paths in a structure 2. Determine the loads on the different structural elements of a structure 3. Apply structural design principles in the use of Steel in Civil Engineering structures 4. Prepare structural design calculations adopting the relevant design standards 5. Communicate the structural design by means of appropriate drawings

Course Contents: Introduction to Structural Design, Loads and Load Paths, Steel as a Structural Material, Design of Structural Steel Elements, Design of Connections

CE 42005 - Structural Analysis I (2 Credit)

Learning Outcome:1. Determine the forces and moments in statically determinate and statically indeterminate structures due to static loads 2. Determine the deflections of statically determinate and indeterminate structures 3. Assess the response of structural elements under moving loads

Course Contents: Analysis of Statically Determinate Structures, Analysis of Statically Indeterminate Structures, Influence Lines for Beams and Trusses

CE 43003 - Hydraulic Engineering (3 Credit)

Learning Outcome: 1. Determine the transient pressures developed in pipes and to analyse and design protection measures 2. Determine operating conditions and design pump/turbine-pipeline systems 3. Analyse flow conditions leading to the design of open channels 4. Identify the suitable types of flow measuring devices/techniques and determine the flow rates in various engineering applications 5. Appreciate the significance of the Navier-Stokes equation in fluid flow

Course Contents: Unsteady Flow in Pipes, Fluid Machinery, Open Channel Flow, Flow Measuring Devices, Navier-Stokes Equation

CE 43004 - Soil Mechanics and Geology I (3 Credit)

Learning Outcome: 1. Identify the fundamental properties of soils and rocks and classify soils using standard classification systems 2. Determine the compaction of soils 3. Estimate pore water pressure, total and effective stresses in soils 4. Describe the formation of rocks and soils 5. Identify basic geological features and write the geological history of a given map area

Course Contents: Phase Relationships, Classification and Characteristics of Soils, Compaction of Soils, Pore Water Pressure, Total and Effective Stresses, The Earth, Rocks and Soil on the Earth, Structural Geology

CE 43006 - Surveying II (3 Credit)

Learning Outcome: 1. Make computations for civil engineering works based on survey measurements 2. Use modern instruments for survey measurements in civil engineering applications 3. Set out civil engineering works for construction 4. Describe the use of field astronomy for survey and time measurements

Course Contents: Modern Techniques and Instruments, Tacheometry, Areas, Volumes and Earth-works, Field Astronomy and Time, Setting-out

CE 52002 - Design of Reinforced Concrete Structures I (2 Credit)

Learning Outcome: 1. Design Reinforced Concrete elements in Civil Engineering Structures 2. Prepare structural design calculations adopting the relevant design standards 3. Communicate the structural design by means of appropriate drawings

Course Contents: Introduction to Reinforced Concrete, Beam Sections in Flexure, Design of Reinforced Concrete Beams, Design of Reinforced Concrete Slabs, Design of Reinforced Concrete Columns, Design of Reinforced Concrete Pad Foundations

CE 52007 - Structural Analysis II (2 Credits)

Learning Outcome: 1. Analyse statically indeterminate structures 2. Model and analyse complicated structures using relevant software 3. Describe the behaviour of structures under dynamic loading

Course Contents: Matrix Methods of Analysis, Introduction to Finite Element Analysis, Dynamic Analysis of Structures

CE 53001 - Construction Planning and Cost Estimation (3 Credits)

Learning Outcome: 1. Read construction drawings and use of those for the preparation cost estimates and interim valuations 2. Prepare bills of quantities and interim valuations of a construction project for the requirements of standards and specifications 3. Prepare construction plans for a project using computer tools 4. Check the compliance of building to specified building regulations

Course Contents: Building Drawings, Estimating, Construction Planning, Introduction to Building Regulations

CE 53003 - Engineering Hydrology (3 Credits)

Learning Outcome: 1. Identify important hydrological processes associated with the hydrological cycle 2. Assess the availability of groundwater as a source of water supply 3. Derive flood hydrographs for design conditions 4. Carry out flood routing in channels and through reservoirs 5. Specify operating conditions for storage reservoirs 6. Carry out flood and drought forecasting

Course Contents: Introduction to Hydrology, Atmospheric Water, Sub-Surface Water, Surface Water, Hydrological Analysis

CE 53004 - Highway and Traffic Engineering I (3 Credits)

Learning Outcome: 1. Express basic traffic flow theory to describe traffic flow conditions and recognize the appropriateness of traffic management measures that are in use 2. Describe transport and highway planning process, identify its importance and calculate traffic demand based on given information 3. Identify basic elements in highway planning and design the geometric features of two lane two way roads

Course Contents: Introduction, Traffic Flow Theory, Fundamentals of Transport Planning, Highway Planning Considerations, Highway Capacity Design, Geometric Design

CE53005 - Principles of Environmental Engineering (3 Credits)

Learning Outcome: 1. Discuss the role of environmental engineering in achieving resource conservation, environmental protection and sustainability 2. Identify different pollution sources, their impacts and device mitigation strategies and/or control technologies 3. Describe principles of water and wastewater treatment systems and solid waste management 4. Comprehend national environmental legislation and compliance with regulatory framework related to environmental quality and protection 5. Discuss global environmental problems, agreements and treaties

Course Contents: Introduction to Environmental Engineering, Ecology and the Environment, Water, Air and Noise Pollution Control, Solid Waste Management, Principles of Water and Wastewater Treatment, Introduction to Environmental Legislation, Overview of Global Events.

CE 53006 - Soil Mechanics and Geology II (3 Credits)

Learning Outcome: 1. Carryout permeability and seepage related calculations and determine coefficient of permeability of soil 2. Estimate stresses in soil due to various loads 3. Estimate consolidation of clay and determine coefficient of consolidation of clay 4. Calculate the shear strength of soil and determine shear strength parameters of soil 5. Identify geological processes on the Earth surface and properties of rock and clay minerals

Course Contents: Permeability and Seepage, Stresses in Soil Mass, Consolidation, Shear Strength of Soils, Geological Processes on the Earth, Minerals

CE 61008 - Survey Camp (1 Credit)

Learning Outcome: 1. Use different survey methods and equipment for surveying and civil engineering applications 2. Prepare survey drawings and do associated computations

Course Contents: • Traversing with Theodolite and/or Total Station, Adjustment Computations, Plotting of Survey Plans • Contouring and Preparing Contour Maps • Levelling and Plotting Longitudinal and Cross-Sections • Surveying with the Global Positioning System • Setting Out Work (Building/Curves) • Field Astronomy Observations and Explanations • Demonstration/ Use Of Relate Surveying Software

CE 62001 - Advanced Structural Analysis (2 Credits)

Learning Outcome: 1. Determine the stress resultants of plates and shells 2. Describe different failure mechanisms of structures

Course Contents: Analysis of Plates and Shells, Plastic Analysis of Continuous Beams and Frames, Yield Line Analysis of Reinforced Concrete Slabs

CE 62003 - Design of Reinforced Concrete Structures II (2 Credits)

Learning Outcome: 1. Apply structural design principles in the use of Reinforced Concrete in Civil Engineering Structures 2. Prepare structural design calculations adopting the relevant design standards 3. Communicate the structural design by means of appropriate drawings

Course Contents: Frame Analysis and Moment Redistribution, Design of Reinforced Concrete Staircases, Design of Reinforced Concrete Slender Columns, Design of Reinforced Concrete Foundations, Design of Reinforced Concrete Flat Slabs, Design of Beams for Torsion, Serviceability Limit State Calculations, Design for Stability

CE 63002 -Construction Management (3 Credits)

Learning Outcome: 1. Perform site management as a Junior Engineer at a construction site 2. Prepare a contract document for a construction project based on ICTAD and government guidelines 3. Plan a new construction site for material storage, site offices, health and safety aspects and accommodation 4. Prepare routine management reports related to construction work 5. Perform work study in a construction site or in an office

Course Contents: Work Study, Contract Administration, Management of Quality and Health and Safety, Site Management

CE 63004 - Environmental Engineering Design (3 Credits)

Learning Outcome: 1. Use water quality regulations, standards and to determine the suitability of source water for specific uses ensuring human welfare, device source protection for water resources 2. Propose alternative solutions/designs for water supply projects (including conceptual designs for water treatment) and wastewater schemes (including wastewater collection), so that preliminary designs could be conducted for the selection of optimum solutions with a greater degree of sustainability 3. Apply standard methods in designing on-site wastewater disposal 4. Prepare a technical proposal/report based on preliminary designs

Course Contents: Water Quality and Regulation, Water Supply, Water Treatment, Wastewater Collection, Wastewater Treatment, On-site Treatment of Wastewater

CE 63005 -Geotechnical Engineering (3 Credits)

Learning Outcome: 1. Plan a site investigation programme for identifying basic geotechnical problems that can be encountered and determine essential soil tests for obtaining necessary soil parameters 2. Estimate lateral earth pressure in soil 3. Estimate bearing capacity of soil 4. Determine the stability of slopes with plane and circular failure surfaces

Course Contents: Site Investigation, Lateral Earth Pressure, Bearing Capacity, Stability Analysis of Slopes

CE 63006 - Highway and Traffic Engineering II (3 Credits)

Learning Outcome: 1. Choose and design an appropriate intersection control mechanism based on traffic flow and geometric conditions 2. Conduct soil, aggregate and bitumen testing and select appropriate material for pavement construction 3. Design a pavement for selected traffic and subgrade condition

Course Contents: Traffic Flow Models, Traffic Flow Analysis, Interchanges, Roundabouts and Traffic Circles, Traffic Signals, Highway Materials, Pavement Analysis and Design

CE 63007 - Hydraulic Design (3 Credits)

Learning Outcome: 1. Identify suitable types of structures required in a hydraulic system 2. Determine design hydrological parameters required for hydraulic design of structures 3. Carry our hydraulic designs of structures

Course Contents: Hydraulic Structures, Hydrological Design, Hydraulic Design

CE 72001 - Coastal Engineering (2 Credits)

Learning Outcome: 1. Determine the characteristics of ocean waves and quantify the nearshore transformation processes 2. Determine the statistical parameters related to random waves 3. Identify appropriate coast protection measure under given conditions 4. Determine the armour/rock sizes in porous coastal structural designs

Course Contents: Characteristics of the Coastal Zone, Linear Wave Theory, Nearshore Wave Transformations, Random Waves, Coastal Water Level Fluctuations, Coastal Sediment Transport, Estuaries, Coastal Structures, Coast Protection Measures, Coastal Investigations, Coastal Zone of Sri Lanka

CE 72002 - Design of Masonry & Timber Structures (2 Credit)

Learning Outcome: 1. Apply structural design principles in the use of timber and masonry in Civil Engineering Structures 2. Prepare structural design calculations adopting the relevant design standards 3. Communicate the structural design by means of appropriate drawings

Course Contents: Use of Masonry as a Structural Material, Limit State Design of Masonry, Use of Timber as a Structural Material. Design of Structural Timber Elements, Design of Connections in Timber

CE 72003 - Design of Water Retaining & Pre-Stressed Concrete Structures (2 Credits)

Learning Outcome: 1. Design of structural elements of a water retaining structure for serviceability limit state of crack control and ultimate limit state in accordance with relevant Codes of Practice (BS 8007 and BS 8110) 2. Selection of suitable materials and methods of construction of water retaining structures to achieve the required durability and performance 3. Describe basic Design Principles in designing pre-stressed concrete beams 4. Design statically determinate pre-tensioned pre-stressed concrete beams

Course Contents: Design of Water Retaining Structures, Design of Pre-Stressed Concrete Structures

CE 72005 - Highway Construction and Maintenance (2 Credits)

Learning Outcome: 1. Select and classify highway construction material for subgrade, subbase and base 2. Conduct material testing according to standard test methods 3. Describe the volumetric properties of the hot mix asphalt and design hot mix asphalt for given standards 4. Review road construction methods 5. Identify road distresses, quantify and assess the severity of distresses and select appropriate treatment/s for road distresses 6. Explain pavement maintenance practices and recognize the importance of pavement management systems

Course Contents: Subgrade Construction, Base/ Subbase Construction, Asphalt Mix Design, Road Surface Construction, Rigid Pavement Construction, Highway Maintenance

CE 72006 - Project Management (2 Credit)

Learning Outcome: 1. Plan and execute a project using project management tools and techniques 2. Produce project progress reports 3. Use of leading project management software

Course Contents: Project Management Knowledge Areas, Project Management Information Systems

CE 72007 - Remote Sensing and Geographic Information System (GIS) (2 Credit)

Learning Outcome: 1. Describe fundamentals of remote sensing and geographic information system 2. Appreciate the uses of RS and GIS in the industry 3. Use Remote Sensing and GIS software for engineering applications

Course Contents: Aerial Photogrammetry and Applications, Introduction to Remote Sensing, GIS Techniques

CE 72008 - Water and Wastewater Engineering (2 Credit)

Learning Outcome: 1. Select appropriate unit processes and propose alternative solutions for water and wastewater systems so that preliminary designs could be conducted to device optimum solutions with a greater degree of sustainability 2. Carry out design calculations for different unit processes and components of water and wastewater treatment systems 3. Apply standard methods of production of technical reports to communicate the outcome of the process design

Course Contents: Introduction to Water Treatment, Unit Processes, Pathogens and Microbial Quality of Drinking Water, Advanced Treatment processes (Physico-Chemical Treatment Processes), Introduction to Wastewater Treatment, Preliminary and Primary Treatment, Biological Aspects of Secondary Sewage Treatment, Fixed-Film Systems, Suspended Growth Systems (Activated Sludge), Other Biological Treatment Systems, Tertiary and Advanced Treatment Methods, Sludge treatment of Disposal, Household and Small-Scale Treatment Systems

CE 73004 - Geotechnical Engineering Design (3 Credits)

Learning Outcome: 1. Apply soil mechanics and geotechnical theories and concepts for designs of shallow and deep foundations, flexible and rigid retaining walls 2. Apply appropriate construction techniques for geotechnical structures 3. Use computer software for the analysis of slopes

Course Contents: Design of Shallow Foundations, Design of Deep Foundations, Design of Rigid and Flexible Retaining Structures, Design of Slopes

CE 82001 - Bridge Engineering (2 Credits)

Learning Outcome: Analyse and design bridges made of steel, reinforced concrete, masonry and pre-stressed concrete

Course Contents: 1. Classification of Bridges 2. Loading Systems on Bridges 3. Analysis and Design of Bridges- (Steel, Reinforced Concrete, Masonry and Pre-Stressed Concrete Bridges) 4. Introduction to Cable Stayed and Suspension Bridges 5. Design of Substructures and Foundations 6. Techniques adopted in Construction of Bridges 7. Routine Inspection and Maintenance of Bridges

CE 82002 - Computer Based Structural Analysis (2 Credits)

Learning Outcome: Analyse complicated structures by using relevant computer software

Course Contents: 1. Introduction to Structural Analysis Computer Software 2. Computer Modelling of Reinforced Concrete Framed Structures 3. Computer Modelling of Shell Type Structures 4. Computer Modelling of Space Trusses 5. Computer Modelling of Transmission Towers

CE 82003 - Environmental Management (2 Credits)

Learning Outcome: 1. Apprehend the current legislative and regulatory framework in Sri Lanka related to environment 2. Ability to carry out an EIA study, ability to propose predict impact and mitigation 3. Gain knowledge of the tools available for better management of the environment including ISO14000 4. Identify pollution sources, devise control strategies and formulate proper environmental management plans 5. Assess environmental risks and hazards, environmental audits at initial levels 6. Describe national and global environmental issues and emerging trends in environmental-related topics

Course Contents: Introduction to Environmental Management, Regulatory framework, Environmental Impact Assessment (EIA), Pollution Control, Risk Related Topics, ISO 14000, National and Global Environmental Issues, Emerging Topics

CE 82004 - Ground Improvement Techniques (2 Credit)

Learning Outcome: 1. Apply basic engineering concepts and techniques for ground improvements 2. Apply studied theories and concepts in ground improvement design works

Course Contents: Introduction to Ground Improvements, Surface and Deep Compaction, Preloading and Vertical Drains, Granular Piles, Surface and Deep Mixing, Reinforced Soil

CE 82005 - Irrigation Engineering (2 Credit)

Learning Outcome: 1. Demonstrate planning and design of an irrigation canal layout and associated structure locations 2. Carry out irrigation reservoir operation and water management scheduling 3. Apply the concepts of time values of money, rate of return etc., and to perform an economic feasibility study

Course Contents: Principles of Irrigation, Irrigation Requirement, Types of Irrigation Practices, Irrigation Systems: Planning, Design and Management, Feasibility Analysis, Irrigation in Sri Lanka

CE 82006 - Transportation Planning (2 Credit)

Learning Outcome: 1. Identify and formulate problems related to transportation planning and design 2. Identify appropriate tools for solving formulated problems mathematically 3. Conduct a basic traffic impact assessment 4. Identify accident risks and propose suitable remedial measures

Course Contents: Introduction to Transportation Systems, Transport Surveys, Transport Demand Estimation, Road safety and Accident Analysis, Traffic Impact Assessment (TIA), Feasibility Studies for transport Infrastructure

CE 82007 - Water Resources Engineering (2 Credit)

Learning Outcome: 1. Identify suitable types of flood, storm water control systems and carry out basic designs 2. Assess the hydro power potential and develop suitable layout of a hydro power scheme and carry out basic hydraulic designs

Course Contents: Flood Control, Storm Water Control, Hydro Power, Introduction to Integrated Water Resources Management

CE 72098 - Comprehensive Design Project _ Part 1 (2 Credits) & CE 82098 - Comprehensive Design Project _ Part 2 (2 Credits)

Learning Outcome: 1. Use the theory, design and practice in Civil Engineering for real engineering applications 2. Handle technical related matters in all stages of a Civil Engineering project independently

Course Contents: Concept Stage, Feasibility Study, Environmental Impact Assessment (EIA), Preliminary Design Stage, Detailed Design Stage, Preparation of Drawings, Preparation of Engineer's Estimate, Preparation of Tender Documents

CE 72099 - Research Project _ Part 1 (2 Credits) and CE 82099 - Research Project _ Part 2 (2 Credits)

Learning Outcome: 1. Describe the process of scientific research, techniques, and rationalisation 2. Plan and organise a research project incorporating key components and reasonable timelines 3. Carry out a research project by intelligently analysing a practical or conceptual problem and conclude in a scientific and logical manner

Course Contents: Problem Identification and Project Formulation, Research Methods, Research Project Planning, Conduct of Research Project, Research Report Preparation and Defence

6.2 Modules offered by Department of Computer Science and Engineering

CS 13001 Introduction to Computing (3 credits)

Learning Outcome: 1. Comprehend the capabilities and limitations of computers and technology. 2. Appreciate the theoretical foundations of computing that drive future computing and technological advancements. 3. Work with standard computing applications on multiple computing platforms. 4. Comprehend the basics of networking and the Internet 5. Demonstrate problem-solving skills in a logical step-by-step process. 6. Recognize the impact of computing technologies in a societal context.

Course Contents: Overview of computer systems—hardware, operating systems, and application software, including the Internet, Introduction to computer programming fundamentals, Fundamentals of computer networks and the Internet, Impact of computers and computing on individuals and on society

CS 32080- Computer Programming (2 Credits)

Learning Outcome: Demonstrate problem-solving skills in a logical step-by-step process, 2. Device algorithms to solve simple engineering and computational problems, 3. Develop procedural programs from algorithms using a high-level programming language such as C, 4. Use an Integrated Development Environment (IDE) for program development.

Course Contents: Introduction, Operators and Expressions, Conditional Control Structures, Loop Control Structures, Arrays and Functions, Pointers and Handling Files, Fundamentals of IDE-Based Development, Problem Solving & Recursion, Introduction to Data Structures, Introduction to Algorithms, Introduction to Software Engineering.

CS 33001 – Computer Architecture (3 Credits)

Learning Outcome: 1. List the architectural components of a given computer system 2. Explain the memory organization of a computer system 3. Illustrate the program execution on a given computer system architecture 4. Exemplify the functionalities of input output devices and their interfaces 5. Evaluate various performance enhancement mechanisms in computer systems

Course Contents: Introduction to the course, Foundation knowledge - Digital logic and Number Systems, CPU organization, Memory organization, Input output organization, Performance enhancement mechanisms

CS43002 – Operating Systems (3 Credits)

Learning Outcome: 1. Comprehend the capabilities and limitations of computers and technology. 2. Appreciate the theoretical foundations of computing that drive future computing and technological advancements. 3. Work with standard computing applications on multiple computing platforms. 4. Comprehend the basics of networking and the Internet 5. Demonstrate problem-solving skills in a logical step-by-step process. 6. Recognize the impact of computing technologies in a societal context

Course Contents: Operating System as a virtual machine and a resource manager, Processes and Threads, Process and Thread scheduling, Mutual Exclusion and Synchronization, Deadlocks, Memory management, I/O management and Disk scheduling, File systems, Protection and security

CS 53001 Computer Networks (3 Credits)

Learning Outcome: 1. Explain standard LAN protocols in wired and wireless networks, 2. Identify functionalities of different layers in the OSI and TCP reference models, 3. Perform different types of encoding and decoding of signals and analyse signals in frequency domain, 4. Illustrate various error detection and correction algorithms used in data communication, 5. Design and implement a simple wired or a wireless LAN and configure a simple internetwork

Course Contents: OSI and TCP/IP layered protocol architectures, Transmission media, Signal Encoding, Error Correction and Detection, Wired LANs – Link Layer Protocol, Wireless LANs – Link Layer Protocol, IP Addressing, Switching and Routing

CS 53003 Data Structures and Algorithms (3 Credits)

Learning Outcome: 1. implement and use common data structures 2. Implement and use basic sorting and searching algorithms 3. Analyze the complexity of basic algorithms 4. Select appropriate data structures and algorithms for a given situation 5. Apply basic algorithm design techniques for a given situation

Course Contents: Introduction, Sorting, Complexity Analysis of Algorithms, Searching, Basic Data Structures and Operations, Basic algorithm design techniques, Introduction to NP-Completeness

6.3 Modules offered by Department of Electrical and Telecommunication Engineering

EE13001 Principles of Electrical Engineering (3 credits)

Learning Outcome: 1. Solve DC circuits with linear or non-linear circuit elements 2. Explain and use vector and complex representation of AC quantities 3. Solve AC circuits both steady state and simple transient situations 4. Draw the complete wiring circuit of a household and explain the importance of components 5. Describe the Electrical power generation, transmission, distribution and utilization

Course Contents: DC circuit analysis, AC theory, Electrical Installations, Electrical Power Systems

EN 23001 - Principles of Electronics (3 Credits)

Learning Outcome: 1. Implement diode circuits. 2. Implement the transistor amplifier and the switch with BJT. 3. Construct simple digital circuits

Course Contents: Diode circuits, Transistor amplifiers and switches with BJT, Digital circuits

EN 33001 - Digital Electronics (3 Credits)

Learning Outcome: 1. Design, build and test combinational digital circuits 2. Design, build and test sequential digital circuits 3.Differentiate characteristics of logic families 4. Implement logic circuits with MSI chips 5. Compare different types of analog-to-digital and digital-to-analog converters

Course Contents: Combinational logic circuits, Sequential logic circuits, Logic families, MSI logic circuits, Analog to digital and digital to analog converters

EN 33002 - Introduction to Telecommunications (3 Credits)

Learning Outcome: 1. Review the historical evolution of the telecommunications industry. 2. Define the basic theoretical concepts and terminology related to telecommunications signals and systems. 3. Evaluate simple characteristics of signals and communication systems. 4. Classify and compare communication systems in different ways such as analog/digital, baseband/modulated, fixed/mobile, local area/wide area etc. 5. Discuss future trends in the telecommunications industry

Course Contents: Introduction, Basic theoretical concepts in telecommunications, Functional blocks in telecommunication systems, Telecommunication networks and services

EE 32001- Electrical Circuit Analysis (2 Credits)

Learning Outcome: 1. Analyse a circuit using both manual and computer based methods 2. Derive network functions for a given circuit and thereby explain the circuit properties 3. Synthesis networks and filter circuits 4. Simulate a circuit using computer software

Course Contents: The s-plane, Introduction to the state-space representation, Computer aided circuit simulation, Synthesis of passive networks, Classical filter design

EE 32002- Electrical Measurements (2 Credits)

Learning Outcome: 1. Explain and apply the basic concepts in measurement including the objectives of engineering measurements and the different characteristics of quantities to be measured 2. Explain and apply the concept of standards and their importance, the difference between absolute and working standards and the process of calibration of instruments 3. Explain the working principles of measuring instruments and their applications with special reference to moving coil and moving iron meters, dynamometer, induction, thermal, electrostatic and rectifier type meters, ballistic and vibration meters, bridge type measurements and cathode ray oscilloscope. 4. Select instruments considering accuracy, sensitivity and response time and select current and potential transformers in practical applications 5. Explain the working principles of basic active and passive transducers and apply them in measurements 6. Explain the working principle of digital meters and issues related to Interfacing covering how analogue signals are converted to digital signals, how Signal conditioning is accomplished, the necessity of amplification and filtering, steps involved in PC interfacing

Course Contents: General principles of measurements, Instruments to measure electrical quantities, Instrument transformers, Cathode ray oscilloscope, Bridge methods, Transducers, Digital meters, Signal conditioning. amplification and filtering. PC interfacing

EE 33080 - Electrical Machines (3 Credits)

Learning Outcome: 1. Explain the working principles of measuring instruments and their applications with special reference to moving coil, moving iron, rectifier type meters, Megger, CRO 2. Describe the action and features of single phase and three phase transformers and perform calculations using transformer equivalent circuit 3. Describe constructional features, operating principles, starting and speed control methods and application areas of dc motors/generators, induction motors/generators, synchronous machines and stepper motors 4. Calculate voltage drop and power loss in radial and ring type distribution systems 5. Describe different tariff systems and to calculate the monthly electricity bill of a household/industrial consumer 6. Describe techniques used to improve end use efficiency and to do necessary calculations with special reference to power factor correction, efficient lighting and drives, life cycle cost, load shifting and use of Time of Use tariff 7. Explain Electrical aspects of industrial heating and welding

Course Contents: Electrical Measurements, Transformers, Electric motors & generators, Power distribution, Electricity tariff, Efficient utilization of power, Electric heating and welding

EE 33003 - Theory of Electricity (3 Credits)

Learning Outcome: 1. Solve coupled circuits involving mutual impedance, dependant voltage/current sources and/or resonance phenomena 2. Apply network theorems in

solving circuits 3. Solve circuits containing three phase generators and loads 4. Analyse circuits with non-sinusoidal voltage/ current sources

Course Contents: Review of fundamentals and resonance circuits, Network theorems, Coupled circuits and dependent sources, Three phase analysis, None-sinusoidal waveforms, Transient analysis using Laplace transform

EN 42080 – Electronics (2 Credits)

Learning Outcome: 1. Design transistor amplifiers 2. Identify integrated differential and operational amplifier applications 3. Design power amplifiers, power supplies and voltage regulators 4. Describe power electronic devices and their uses 5. Design combinational and sequential digital circuits 6. Identify the use of programmable devices 7. Compare different types of A to D and D to A converters

Course Contents: Transistor amplifiers , Integrated differential and operational amplifiers, Power amplifiers, power supplies and voltage regulators, Power electronic devices and their uses, Combinational and sequential digital circuits, Memory devices, A to D and D to A converters

EN 43001- Analog Electronics (3 Credits)

Learning Outcome: 1. Analyse small-signal BJT and FET amplifiers 2.Identify the functionality and applications of operational amplifiers 3. Analyse different power amplifier classes and their characteristics 4. Build and test analog electronic circuits

Course Contents: Small-signal BJT and FET amplifiers, Functionality and applications of operational amplifiers, Power amplifier classes and their characteristics

EN 43002 - Signals & Systems (3 Credits)

Learning Outcome: 1. Classify signals and systems. 2. Analyse signals and systems using time, frequency, Laplace and Z-domain tools 3. Describe the relationship between the input and output of Linear Time Invariant (LTI) systems. 4. Apply appropriate tools and techniques for the evaluation of communication system building blocks.

Course Contents: Introduction, Fundamentals of Signals and Systems, Time domain representation of Linear Time Invariant (LTI) Systems, Fourier analysis of signals and systems. Laplace domain analysis of signals and systems, Z-domain analysis of signals and systems

EE 42001 - Field Theory (2 Credits)

Learning Outcome: 1. Solve electrostatic field problems involving simple electrode configurations 2. Solve electromagnetic field problems for standard and practical conductor configurations 3. Calculate the forces acting on a charge in electric and magnetic fields and determine its trajectory 4. Apply Maxwell's equations in typical situations 5. Solve problems related to plane wave propagation through lossless or lossy media considering boundary conditions

Course Contents: Electrostatics Field Theory, Electromagnetic field theory, Electrodynamics, Maxwell's equations, Quasi stationary fields, Plane waves, Plane waves as TEM waves, introduction to TE and TM waves

EE 42002 - Introduction to Power Systems (2 Credits)

Learning Outcome: 1. Explain the global and local situation of electricity sector 2. Describe the conventional and alternative methods of Electricity Generation 3. Calculate voltage drop and power loss in radial and ring type distribution systems 4. Describe issues related to distribution planning 5. Describe different tariff systems and to calculate the monthly electricity bill 6. Describe techniques used to improve end use efficiency and to do necessary calculations

Course Contents: Introduction to electricity supply and usage, Methods used for generation of electricity, Distribution systems, Electricity tariff, Efficient Utilization, Efficient lighting and other efficient industrial applications

EE 52001 Introduction to Electrical Machines (2 Credits)

Learning Outcome: 1. Demonstrate the knowledge of the operating principles of different types of electrical motors and generators 2. Perform steady state calculations of DC motors, stepper motors and single phase transformers and single phase induction motors 3. Select and apply DC motors, stepper motors and single phase transformers and single phase induction motors 4. Design the power circuit of a DC motor drive system for one, two or four quadrant operation.

Course Contents: Electromechanical energy conversion, DC machines, Single-phase transformers, Single-phase induction motors, Stepper motor drives

EE 53002 Power Systems I (3 Credits)

Learning Outcome: 1. Explain characteristics and construction features of underground and overhead transmission systems and their effects on environment and human life 2. Calculate parameters of a practical transmission line and evaluate its performance 3. Design an overhead line complying to standards 4. Explain the use and function of switchgear and methods of system grounding 5. Calculate fault currents in a practical power system 6. Explain the techniques used in transformer and generator and distance protection

Course Contents: Power transmission, Mechanical characteristics of lines, Transmission line modelling, Switchgear, Fault analysis, Introduction to power system protection, Transmission line protection, over current and distance protection

EN 53001 Communication Theory (3 Credits)

Learning Outcome: 1. Characterize random signals and processes 2. Analyze analog modulation/demodulation schemes and their performance in noise 3. Explain the principles related to pulse modulation 4. Analyze the behaviour of digital signals in noise

Course Contents: Signal and Systems Models, Analog modulation schemes, Random processes and noise, Digital Representation of Analog Signals, Introduction to Digital Communications

EN 52002 Power Electronics (2 Credits)

Learning Outcome: 1. Describe the fundamental principles of power electronic devices 2. Identify applications of power electronics 3. Build and test power electronics devices and circuits

Course Contents: Power electronic devices, Power supplies and voltage regulators, Motor controlling

EN 52003 Industrial Electronics (2 Credits)

Learning Outcome: 1. Identify sensors and actuators used in industrial applications 2. Identify controllers used in industrial application 3. Use sensors and actuators in automation applications 4. Use industrial controllers in automation applications 5.Identify electronics in machinery used in industrial applications

Course Contents: Industrial Sensors and Actuators, Industrial Controllers, Industrial Automation, Lightning Protection

EN 63001 Communication Systems I (3 Credits)

Learning Outcome: 1. Identify a variety of systems which enable subscribers to access different types of telecommunication services. 2. Identify key features of different generations of access networks and associated standards. 3. Compare the nature and capabilities of wired, wireless and optical access networks 4. Demonstrate awareness of the evolution of broadcasting, including new standards

Course Contents: Wired access networks, Wireless access networks, Optical communications and access networks, Broadcast networks

EN 63002 Control Systems (3 Credits)

Learning Outcome: 1. Derive the model of a plant2. Design a feedback control system for a plant 3. Work with control systems design tools in Matlab and Simulink 4. Analyse performance of control systems

Course Contents: Plant Modelling, Response and Feedback Control, Control systems design in time-domain, Control systems design in frequency-domain, Implementation of Control systems

EN 62003 Electromagnetics (2 Credits)

Learning Outcome: 1. Apply Maxwell's equations for time varying electromagnetic fields and identify electromagnetic wave propagation 2. Identify transmission lines and propagation of signals through twin lines and coaxial lines 3. Identify metal waveguides and their properties in RF and microwave signal propagation 4. Demonstrate an understanding of different antennas and their uses

Course Contents: Electromagnetic wave propagation, Transmission Lines, Metal Waveguides, Antennas and Radiation

EE 63001 Electrical Installations (3 Credits)

Learning Outcome: 1. Demonstrate the understanding of the structure of the IEE Wiring Regulations and apply it for electrical installation designs. 2. Distinguish the characteristics of different types of protective devices used in Electrical Installations, their principle of operation, advantages and disadvantages. 3. Assess the general characteristics of an electrical installation and differentiate among electrical wiring systems in Domestic, Commercial and Industrial applications. 4. Select correct type and size of cables in electrical installations. 5. Select the earthing system for a particular electrical installation at medium voltages. 6. Design electrical layouts and wiring diagrams for electrical installations according to the given environmental conditions. 7. Draw up complete wiring circuit using CAD package. 8. Prepare technical documents involved in electrical installations using technical documents in electrical installations 9. Carry out inspection and testing in electrical installations. 10. Carry out a lighting design for a building environment. 11. Practice safety regulations & standards and behave in a safe manner in the electrical working environment. 12. Manage resources of building environments. 13. Distinguish different requirements of special installations

Course Contents: Electrical Installations, Domestic and Industrial Lighting Design, Wiring Design,

EE 63002 Electrical Machines & Drives I (3 Credits)

Learning Outcome: 1. Operate a large generator and vary its output power within safe limits 2. Perform calculations of steady state behaviour of generators, three-phase transformers and three-phase induction motors 3. Select appropriate starting, braking, or speed control equipment for a three-phase induction motor for a given application. 4. Select and apply synchronous generators, three phase transformers and three phase induction motors

Course Contents: Synchronous generators for bulk generation, Three-phase transformers, Three-phase induction motors

EN 73001 Robotics (3 Credits)

Learning Outcome: 1. Describe different types of robots and their applications at present and future 2. Describe industrial applications of robots and their significance in development 3. Carry out static and differential kinematic analysis of a robot manipulator 4. Design a trajectory planner and control system for a robot manipulator 5. Implement force torque analysis of a constrained robot manipulator

Course Contents: Introduction to Robotics, Co-ordinate Transformation, Manipulator Static Kinematics, Manipulator Differential Kinematics, Trajectory planning and control of robot manipulators, Force Control of Manipulators

EE 73001 Power Systems II (3 Credits)

Learning Outcome: 1. Perform load flow analysis on power systems using standard techniques 2.Explain and perform calculations related to frequency and voltage control of a power system 3. Demonstrate knowledge of power system stability phenomena and use stability calculations to improve system performance 4. Perform economic dispatch of generating units taking system constraints into consideration 5. Calculate reliability indices and use them in power system planning

Course Contents: Load flow analysis, Power system control, Power System stability, Power system economics, Power system planning and reliability

EE 74099 / EN 74099 Research Project _ Part 1 (4 Credits) and EE 84099 / EN 84099 Research Project _ Part 2 (4 Credits)

Learning Outcome: 1. Describe the process of scientific research, techniques, and rationalisation 2. Plan and organise a research project incorporating key components and reasonable timelines 3. Carry out a research project by intelligently analysing a practical or conceptual problem and conclude in a scientific and logical manner

Course Contents: Problem Identification and Project Formulation, Research Methods, Research Project Planning, Conduct of Research Project, Research Report Preparation and Defence

EN 83001 Communication Systems II (3 Credits)

Learning Outcome: 1. Identify how the core of the telecommunication network supports global connectivity between services, content and subscribers 2. Demonstrate knowledge of the principles of electronic navigation and navigation systems

Course Contents: Microwave communication systems, Radar and Navigation, Optical transmission, Core networks

EN 83002 Mechatronic Applications (3 Credits)

Learning Outcome: 1. Input and output analog and digital signals to and from a microcontroller 2. Program a control algorithm onto a microcontroller 3. Interface sensors and actuators to a microcontroller

Course Contents: Introduction to Mechatronics, Data Acquisition, Sensor Interfacing, Actuator Control, Mechatronic System Design

EE 02001 Energy Studies (2 Credits)

Learning Outcome: 1. Evaluate the primary energy sources, their limitations and costs, 2. Assess the world/Sri Lanka energy demand and the demand growth, 3. Explain the different energy conversion processes, their efficiencies and associated economics, 4. Explain the Sri Lanka energy policy, 5. Evaluate the relationship between economic development and energy as a catalyst to all sectors of a macro economy. 6. Describe the importance of energy planning; Integrated Energy planning, 7. Explain the necessity of moving towards more sustainable energy sources such as Non-Conventional Renewable Energy and Environmental Impacts of Conventional Energy sources.

Course Contents: Conventional Energy Resources, Non-Conventional Energy Resources, Energy consumption in developed and developing countries, Energy conversion processes, Energy Policy; Energy planning, energy management, energy data bases, Economic comparison of energy supply systems, Environmental impacts of energy projects and related costs. Regulatory requirements, International protocols, carbon trading, Clean Development Mechanism.

EE 02002 Electrical Machines & Drives II (2 Credits)

Learning Outcome: 1. Demonstrate the knowledge of transient behaviour of a synchronous generator, 2. Design and implement a three-phase induction motor drive system covering wide speed range, 3. Identify where and how to apply brushless and synchronous motor drives in industry, 4. Select the type and size of a motor to serve a given application, 5. To perform thermal calculations for motors and generators, 6. Demonstrate the knowledge of AC and DC windings and associated calculations

Course Contents: Transient performance of synchronous generators, AC and DC windings, Brushless DC motor drives, Three-phase induction motor drives, Synchronous motor drives, Operational aspects

EE 02003 High Voltage Engineering (2 Credits)

Learning Outcome: 1. Calculate the dielectric constant and dissipation factor of dielectrics, 2. Identify and calculate the losses occurring in cables, 3. Carry out a theoretical design of a cable based on minimising its stress distribution, 4. Determine the current rating of a cable based on its thermal behaviour, 5. Analyse transients in high voltage transmission lines, 6. Design surge protection, 7. Measure high voltages used for testing and do calibrations on testing equipment, 8. Analyse circuits producing high voltages for testing purposes, 9. Apply alternating, direct and impulse high voltages to equipment under test, 10. Co-ordinate impulse insulation levels in the transmission system.

Course Contents: High Voltage Testing, Lightning Phenomena, High Voltage Transients, protection, testing, High Voltage Transient Analysis, Measurement of High Voltage, High Voltage Generators for Testing, High Voltage Surge Generators: High Voltage Impulse Generators, Definition of Wavefront and Wavetail times of practical waveforms, High Voltage Breakdown Phenomena

EN 02003 Electronic Instrumentation (2 Credits)

Learning Outcome: 1. Explain the operational principles of various electronic instruments, 2. Analyze measurement errors associated with instruments, 3. Select instruments to suit a given measurement environment and given accuracy

Course Contents: General Measurement Theory -Measurement errors and error reduction techniques, Factors influencing measurement errors, Static and dynamic characteristics of instruments; Operational principles of electronic instruments- Voltmeters and ammeters (analog & digital), Signal sources and function generators, Oscilloscopes and associated accessories, Electronic counters, Power supplies, Spectrum and network analyzers, Logic analyzers; Instrument usage - Grounding and shielding of

instruments, Signal conditioning, Data acquisition circuits, Quantifying instrumentation environments

EN 02002 Industrial Electronics (2 Credits)

Learning Outcome: 1. Identify sensors and actuators used in industrial applications, 2. Identify controllers used in industrial application, 3. Use sensors and actuators in automation applications, 4. Use industrial controllers in automation applications, 5. Identify electronics in machinery used in industrial applications

Course Contents: Industrial Sensors and Actuators– Pressure/temperature/ humidity/viscosity/flow sensors, load cells etc, Electric/pneumatic/hydraulic actuators; Industrial Controllers - Programmable controllers, Fuzzy logic controllers and fuzzy neural controllers; Industrial Automation - CNC machines, industrial robots, moulding machines, EDM machines, welding machines, heat treatment machines, Printing machines, packaging machines, conveyors; Lightning Protection.

EN 02001 Digital System Design (2 Credits)

Learning Outcome: 1. Demonstrate the required skills in Hardware Description Language that facilitates rapid prototyping of digital systems, 2. Design sequential systems using RTL based approach, 3. Describe different approaches available for processor design, 4. Identify the key stages in designing a processor, 5. Analyze the requirements of a system to decide whether a custom-made processor is required, 6. Design a custom-made processor, 7. Describe the requirements to use asynchronous sequential based approaches.

Course Contents: Hardware Description Languages, RTL based System Design, RISC Architecture, Processor Design, Memory Design, Asynchronous Sequential System Design.

6.4 Modules offered by Department of Interdisciplinary Studies.

ID 11001 - English-I (1 Credit)

Learning Outcome: 1. Use a stock of technical vocabularies in different contexts and be able to involve in organized academic writing. 2. Read a variety of texts and comprehend its meaning. 3. Listen to technical lectures, comprehend and take down notes. 4. Help learners develop listening skills for academic and professional purposes. 5. Speak effectively in English in real life situations. 6. Use different study skills, including library and Internet reference skills

Course Contents: Talking about oneself, Tourism in Sri Lanka, Talk about likes and dislikes, Talk about how often you do things - Focus - Speaking & Writing, Space elevators: preparing for take-off, Talk about special occasions, Discuss the use of technology, Unit Examination 1, Emphasizing technical advantages, What can computers do?, Environment, Discussion – Computer applications, What is inside a PC system, What is leadership, Ozone layer

ID 22001 - Engineer in Society (2 Credits)

Learning Outcome: 1. To develop ability to function as an engineer using his skills and knowledge for the betterment of society by solving problems is an environmentally and socially sustainable manner. 2. To developed his consciousness to integrate his speciality into many facets in life so that the ultimate beneficiary will be the society at large. 3. Develop the ability to work as a team-member. 4. Develop innovative and creative skills not limited by pecuniary gains.

Course Contents: Engineering and Technology development, Engineers' attributes, Professional attributes, Accreditation requirements, Service learning in engineering, Innovation and creativity based on flexibility, Research identification, Interdisciplinary approach, Sharing and dissemination of knowledge, Openness and transparency, Scientific integrity and grounded-approach

ID 21002 - English-II (1 Credit)

Learning Outcome: 1. Read and write academic texts. 2. Write effective and concise letters and memos. 3. Use e-mail effectively and efficiently. 4. Write practical reports and present them. 5. Make effective presentations using electronic presentation tools

Course Contents: Shapes and features, Describing health and safety precautions, Cross cultural management, Choosing a best computer, Eco homes, Career criminals, Electronic communications, Describing figures, Unit Test 1, Writing business letters: Block style and semi block style, Business letters continued, Unit Test 2, Emails, Practicing emails, Presentation Skills, Using passive, Writing mini reports/ practical recordings, Talking About final project, Project Presentations

ID 23003 - Mathematics-II (3 Credits)

Learning Outcome: 1. Apply the theoretical and practical aspects of the use of numerical methods. 2. Demonstrate knowledge and understand of numerical methods to solve

systems of linear equations and ordinary differential equations. 3. Apply the knowledge of differential equations to solve engineering problems. 4. Apply statistical concepts and use probability distributions in engineering problems

Course Contents: Numerical Methods, Ordinary Differential Equations, Linear Algebra

ID 21004 - Introduction to Sinhala Language (1 Credit)

Learning Outcome: 1. Identify the Alphabet and read and write in Sinhala 2. Construct sentences by using nouns and verbs in correct sentence pattern 3. Understand the basic Sinhala Grammar

Course Contents: Introduction to Sinhala Alphabet, Word Formation, Tenses, Honorifics, Gender, Number and Person, Sentences, Basic Sinhala Grammar, Reading and Writing Exercises

ID 21005 - Introduction to Tamil Language (1 Credit)

Learning Outcome: 1. Identify the Alphabet to read and write in Tamil 2. Construct small sentences by using the nouns, verbs and tenses 3. Understand the basic Tamil Grammar

Course Contents: Introduction to Tamil Alphabet, Word Formation, Tenses, Honor, Gender, Number and Person, Sentences, Basic Tamil Grammar, Reading and Writing Exercises

ID 32001 Calculus (2 Credits)

Learning Outcome: 1. Acquire sound understanding of linear, surface and volume integrals 2. Interpret and use the basic concepts of complex number, analytic functions, Taylor and Laurent series, residue and conformal mapping. 3. Use Taylor and Laurent series for a complex functions, compute residues and apply the residue theorem to evaluate integrals

Course Contents: Vector Calculus, Complex Variables,

ID 32002 - Differential Equations (2 Credits)

Learning Outcome: 1. Demonstrate the fundamental concepts of partial differential equations and their role in modern mathematics and applied contexts 2. Apply the Fourier and Laplace transform as part of solving a boundary value problem. 3. Use Fourier series techniques to solve problems applied to diverse situations in engineering contexts

Course Contents: Partial Differential Equations, Fourier Series Approximations, Fourier Transform and Applications, Laplace Transform and Applications

ID 32003- Engineering Economics (2 Credits)

Learning Outcome: 1. apply the basic principles of micro-economics and macro economics for decision making in marketing, production and investment. 2. analyze, evaluate and make choices of alternative projects.

Course Contents: Introduction, Theory of Production, Production in the Long-run, Derivation of Supply and Demand, Determination of Market Price in Perfect Competition, Determination of Output, Revenue and Profit, Imperfect Competition, Macro Economics: The Business Cycle and National Income, Money, Taxation, Public or Welfare Economics, Inflation, Project Appraisals. Decision making on Cost-benefit analysis

ID 31004 -Presentation Skills (1 Credit)

Learning Outcome: 1. Communicate most effectively and efficiently both verbally and in written form 2. Write business letters that are grammatically correct and in appropriate business style 3. Deliver effective presentations 4. Use effective interpersonal communication skills

Course Contents: Planning for business writing, Language needed for business writing, Memos, Notice/ invitations –response, Layout of business letters, Writing E-Mails, Informal letters and notes, Learning the Three Ps of Oral Presentations, Powerful Presentation Skills, Presenting for Success, Professional Telephone Etiquette, Formal presentation sessions

ID 42001 Accounting for Engineers (2 Credits)

Learning Outcome: 1. Interpret and analyse financial reports and communicate with the Accounting Personnel in an engineering venture regarding cost and management accounting aspects. 2. Apply cost and management principles in decision making in planning, design and implementation and day-to day running of engineering related ventures.

Course Contents: Fundamentals of Accounting, Financial Statements, Introduction to Cost and Management Accounting, Cost concepts and cost terms, Accounting for Material, Accounting for Labour, Accounting for Overhead, Various Types of Costing, Cost volume and profit analysis (CVP analysis), Decision making using CVP and relevant cost concepts, Budgets and forecasted financial statements, Capital investment decisions, Management of working capital, Managing current assets

ID 42003 - Linear Algebra (2 Credits)

Learning Outcome: 1. Demonstrate the concept and basic structure of vector spaces 2. Solve systems of linear equations, manipulate matrix algebra and determinants. 3. Evaluate the matrix representations of a linear transformation; 4. Evaluate eigenvalues and eigenvectors.

Course Contents: Definition of a Vector Space, Linear Transformations, Systems of Linear Equations, Eigen Values and Eigen Vectors

ID 42004 Probability & Statistics (2 Credits)

Learning Outcome: 1. Compute probabilities by modelling sample spaces and applying rules of permutations, combinations, additive and multiplicative laws and conditional probability 2. Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance 3. Compute

probabilities based on practical situations using the different probability distributions 4. Use the student's t and normal distribution to test statistical hypotheses and to compute confidence intervals 5. Describe the relationship between two variables using statistical tools.

Course Contents: Introduction to Probability, Conditional probability and independence, Random variables, Probability and Cumulative Distribution Functions, Statistical Inferences, Simple Linear Regression

ID 41005 Report Writing (1 Credit)

Learning Outcome: 1. Prepare CVs and write job applications 2. Write short reports and summaries 3. Express themselves confidently

Course Contents: Developing listening competencies, Introduction to Cover Letters and CVs, Writing CV, Completing the job application, Cover letter, Preparing for interview, Unit Test, meetings, Summary writing, Writing Short Reports,

ID 52001 - Industrial Management (2 Credits)

Learning Outcome: 1. Describe basic concepts and principles of organizational management and apply them to manage modern organizations. 2. Identify and apply the principles and practices of the primary areas of human resource management and industrial relations in organizations. 3. Describe basic marketing concepts, theories and their applications. 4. Explain basic concepts and theories of management of technology and identify their usage in modern organizations and economy.

Course Contents: Organizational Management, Human Resource Management and Industrial Relations, Marketing, Technology Management.

ID 52002 Numerical Methods (2 Credits)

Learning Outcome: 1. Recognize when numerical methods can be employed to solve problems in mathematics 2. Apply numerical methods in solving linear and nonlinear equations 3. Apply numerical methods in solving differential and partial differential equations

Course Contents: Numerical Solutions of System of Linear Equations, Numerical Solutions of System of Non-Linear Equations, Numerical Solutions of Ordinary Differential Equations, Numerical Solutions of Partial Differential Equations

ID 52003 Operational Research (2 Credits)

Learning Outcome: 1.Identify and develop operational research models from the description of the real system. 2. Demonstrate the mathematical tools that are needed to solve optimization problems. 3. Apply different steps of decision making processes 4. Apply a number of basic techniques in Operations Research

Course Contents: 1. Linear Programming 2. Duality Theory 3. Revised Simplex Method 4. Sensitivity Analysis 5. Parametric Programming 6. Integer Programming 7. Transportation Model 8. Assignment Model

ID 63001- Production & Operations Management (3 Credits)

Learning Outcome: 1. Identify issues in organisations in relation to production and operations management 2. Plan facilities for production systems 3. Analyse and solve basic engineering problems associated with production systems to improve productivity

Course Contents: Introduction to production and operations management, Production and sales forecasting, Facilities planning, Production planning, Material requirement planning, Inventory control, Production scheduling, Quality management, Work study, Maintenance and reliability,

ID 73002 - Introduction to Mathematical Modelling (3 Credits)

Learning Outcome: 1. Ability to apply laws of nature to develop mathematical models for dynamical systems and to analyze and simulate them and predict the behavior. 2. Ability to conduct appropriate identification experiments and to estimate the linear and nonlinear models for systems using system identification methodologies and optimization

Course Contents: Introduction, Model Development using laws of nature, Linear Systems and Models, Simulation, Non-linear systems, Signal models and Noise models, Discrete time systems, Frequency domain analysis of dynamical system, Introduction to Optimization, Systems Identification, Advance non-linear models for systems and phenomena

ID 72001 - Industrial Law (2 Credits)

Learning Outcome: 1. Demonstrate the knowledge of legal systems, Court system and the jurisdiction of Courts 2. Demonstrate the knowledge of law of contracts and analyse a given factual situation 3. Explain the factories ordinance and its importance 4. Demonstrate the knowledge of basics of labour law practised in Sri Lanka

Course Contents: Introduction to legal systems and Court system of Sri Lanka, Nature and types of contracts, Contract of employment, Factories Ordinance, Settlement of industrial disputes, Termination of employment, Trade unions, Legislation on terms and conditions of employment

ID 82001 Entrepreneurship & Intellectual Property (2 Credits)

Learning Outcome: 1. commence their own enterprise with confidence after few years of industry experience 2. Apply the basic aspects related to entrepreneurship for establishment of an enterprise including protection of IPR 3. Work within the scope of product (or service) cycles including accessing technology and collaboration 4. Application of IPR and related laws and conventions on Patents, Industrial Designs, Trademarks etc.

Course Contents: Engineer as a Job Seeker or a Job Provider, Establishing an Enterprise, Economic Viability, Financial feasibility, Operational Procedures, Competitiveness and market share, Introduction to Intellectual Property, Need and use of Inventions and Innovations for an Enterprise, Patents – Understanding, Drafting, Obtaining Patent rights

ID 03001 – Industrial Training & ID 03002 – Industrial Training.

The main objective of Industrial Training is for undergraduates to develop practical and professional skills thorough exposures to real life situations in industrial organizations. This training is oriented towards developing the skills, knowledge and desirable attitudes needed to make an effective start as a member of the engineering profession when they graduate from the university. During the industrial training period, undergraduates are expected to get exposure in engineering procedural work, technical report preparation, management skills, sustainable development concepts, work ethics, safety management, and interpersonal skills.

6.5 Modules offered by Department of Mechanical Engineering:

ME 13001 - Applied Mechanics (3 Credits)

Learning Outcome: 1. Apply the laws of physics to mechanics using mathematical methods and analytical skills for the purpose of quantitatively analyzing and solving engineering problems. 2. Apply principles in statics and dynamics establishing the necessary background for studying the core engineering subjects

Course Contents: Introduction, Forces, Moments, Couples and Torques, Force analysis of Plane Frames and Machines, Centroids of Plane Areas and Curves, Kinematics of Particles, Kinematics of Plane motion of a rigid body, Centroids and mass moments & Products of inertia of rigid bodies, Work Energy methods for particles and rigid bodies, Impulse Momentum for particles and rigid bodies, Rectilinear motion of a body with resisting or drag forces, Introduction to Dynamic unbalance and Gyroscopic moments, Bio-mechanics

ME 12002 - Engineering Drawing (2 Credits)

Learning Outcome: 1. Visualize and sketch an object. 2. Produce Engineering Drawings of acceptable standard. 3. Prepare Drawings / Sketches to express or communicate design ideas and concepts. 4. Produce Orthographic Projections of 3-Dimensional objects. 5. Generate Assembly Drawings of complex engineering assemblies. 6. Interpret Civil and Electrical Engineering drawings for building services and other requirements.

Course Contents: Introduction to Drawings, Simple Geometrical Constructions, Orthographic Projections, Isometric Projections, Other Geometrical Constructions, Assembly Drawings, Civil and Electrical Engineering Conventions

ME23001- Engineering Materials and Processes (3 Credits)

Learning Outcome: 1. Outline the structure of a wide range of engineering materials, including metals and alloys, polymers, ceramics and composites. 2. Explain the characteristic properties, applications and limitations of engineering materials in practical use. 3. Describe various metal removal and metal forming processes and their applications. 4. Select correct tools, equipment and machinery to perform various manufacturing process. 5. Describe various metal casting processes and their applications. 6. Explain fabrication processes and their applications. 7. Use principles of metrology for quality assurance

Course Contents: Basic Structures of Engineering Materials, Mechanical Properties of Engineering Materials, Phase Equilibrium in Metal Alloy Systems, Polymeric materials, Ceramics, Composite Materials, Forms of metallic materials, Cutting and hand tools, Machining process, Metal casting, Fabrication, Metal forming

ME22002- Presentation of Engineering Information (2 Credits)

Learning Outcome: 1. Use and appreciate the computer software available for presentation and communication of engineering information. 2. Process and present engineering information using analytical and simulation software. 3. Use Computer

Aided Drafting Software to generate standard drawings to process, interpret and present engineering concepts and ideas. 4. Produce Engineering Drawings of acceptable professional standard

Course Contents: Introduction to CAD and Working with the Windows Environment, Viewing and Plotting a Drawing, Basic CAD Drawing, Creating Basic Geometry Basic Editing Skills, Dimensioning a Drawing, Using Symbols and Attributes, Introduction to analytical and simulation software, Introduction to the basic theory in numerical computation, Fundamental concepts in programming, Data Presentation

ME 23003 - Thermo Fluids (3 Credits)

Learning Outcome: 1. Apply the basic principles of thermodynamics to analyze simple thermodynamic systems including cycles. 2. Analyze and solve basic engineering problems involving thermodynamic phenomena. 3. Apply the basic principles governing fluid flow to analyze simple fluid flow systems. 4. Analyze and solve basic engineering problems associated with fluid at rest and in motion

Course Contents: Introduction to Thermodynamics, Properties of Pure substances and Ideal Gases, Second Law of Thermodynamics, Power Cycles and Refrigeration Cycle, Entropy Balance, Description of Fluids, Fluid Flow, Introduction to Fluid Machineries, Bio fluid flow

ME 33001- Fluid Mechanics (3 Credits)

Learning Outcome: 1. Apply the concepts in Fluid Statics to solve problems in engineering practice 2. Apply Continuity, Momentum and Steady Flow Energy Equations to solve problems in engineering practice 3. Assess the effects of Boundary Layer on the flow over solid surfaces 4. Use the concept of Ideal Fluid Flow to simulate real fluid flow conditions 5. Determine the flow rates and/or required diameter and power transmission in pipe flow 6. Use the techniques of Dimensional Analysis and Similarity to formulate solutions to problems in engineering practice

Course Contents: Applications of Fluid Statics in Engineering Practice , Applications of Continuity, Momentum and Steady Flow Energy Equations in Engineering Practice , Flow Over Solid Surfaces: Boundary Layer Theory, Ideal Fluid Flow, Pipe Flow, Pipe Networks, Dimensional Analysis and Similarity

ME 33002- Mechanics of Machines (3 Credits)

Learning Outcome: 1. Demonstrate a sound knowledge and understanding of the important principles in Mechanics of Machines 2. Analyze and solve simple but realistic problems in Engineering Mechanics 3. Recognize the relevance of the principles of Mechanics of Machines in the Design of Machine Elements.

Course Contents: Planar Linkages, Gear Drives, Balancing, Turning Moment Diagram and Flywheel, Vibrations

ME 33003- Mechanics of Materials (3 Credits)

Learning Outcome: 1. Evaluate the stresses and strains in a continuum subject to external forces 2. Solve problems in linear elasticity in rectangular and polar coordinates 3. Analyze steady compressible fluid flow and related applications 4. Analyze the basic combustion processes within the context of laws of Thermodynamics

Course Contents: Analysis of Stress , Analysis of Strain, Constitutive Relationships, Two dimensional Problems in Rectangular Coordinates, Two Dimensional problems in Polar Coordinates, Three Dimensional States of Stress and Strain, Experimental Stress Analysis, Failure Analysis, Fatigue and Creep Failure, Mechanics of Fracture.

ME 43001- Applied Thermodynamics (3 Credits)

Learning Outcome: 1. Analyze the performance of standard Vapour & Gas power cycles 2. Analyze the performance of compressing & expanding work transfer devices 3. Analyze steady compressible fluid flow and related applications 4. Analyze the basic combustion processes within the context of laws of Thermodynamics

Course Contents: Overview of Laws of Thermodynamics, Vapour Power Cycles, Gas Power Cycles, Expanders, Compressors, Compressible Fluid Flow, Combustion

ME 43002- Basic Controls & Instrumentation (3 Credits)

Learning Outcome: 1. Realize the purpose and objectives of engineering control systems and instrumentation. 2. Able to mathematically model a physical system and analyse the performance and stability of the system. 3. Know the application of different transducers, calculation of errors in measurement, 4. Experimental determination of transfer functions of the sensors or systems. 5. Be conversant with application of different controllers and their applications to suitable processes.

Course Contents: Introduction, Feedback Theory, Time Response Analysis, Concepts of Stability, Classification of instruments transducers, Design techniques for sensor signal conditioning, High impedance sensors, Positioning, motion and temperature sensors, Micro-sensors and smart sensors and Programmable logic controller

ME 42003 - Design of Machine Elements (2 Credits)

Learning Outcome: 1. Recognize the purpose and function of each member of a mechanical device. 2. Visualize and develop appropriate structural elements for different devices. 3. Select suitable materials for fabrication of various machine elements. 4. Estimate the required load bearing capacities and the limitations of stress and strain in the design of machine elements. 5. Design and develop a range of elemental machine components and modules for the assembly of a functional device or machines

Course Contents: Introduction to Engineering Design, Selection of Materials Required for Machine Elements, Stresses in Simple Machine Elements, Limits and Fits, Design of Machine Elements Subjected to Variable Stresses, Design of Shafts for Power Transmission, Design of Levers, Design of Screws, Fly Wheel Design, Springs, Methods of Fastening, Keys, Splines and Couplings

ME 43004 - Manufacturing Engineering (3 Credits)

Learning Outcome: 1. Describe major manufacturing processes including cutting, deformation, joining and their associated machines, implements and tools 2. Explain the manufacturing support systems 3. Design a Simple Manufacturing System for a Given Product/Volume Specification 4. Explain the Operation and Control of a Manufacturing Systems 5. Describe the functions of a Manufacturing Engineer

Course Contents: Introduction to Manufacturing Engineering, Manufacturing Systems, Design for Manufacture, Assembly and Quality, Lean Production and Agile Manufacturing, Process Planning, Metal Forming, Removal Processes, Joining Processes, Metal Casting Processes, Powder Metallurgy and Rapid Prototyping, Forming and Shaping of Plastics and Composite materials, Elements of Machine Tool design, Assembly, Micro-Fabrication and Nano-Fabrication Technologies

ME 53001 Design of Machines (3 Credits)

Learning Outcome: 1. Develop innovative solutions to real problems 2. Carry out a comprehensive design task with confidence 3. Communicate design information through technical reports, engineering drawings, computer representations, real communication, etc. 4. Demonstrate the ability to work as a team to manage a comprehensive design project

Course Contents: Design methodology, Design optimization, Conceptual design Concept generation techniques, Concept selection, Selection of materials, Detailed design calculation , Load and stress analysis, Electric motors and selection, Geometric modelling, Production drawings ,Project: Design of a practical industrial machine or equipment

ME 53002 Fluid Machinery (3 Credits)

Learning Outcome: 1. Describe the basic types of fluid machinery being used, their principles of operation and applications, 2. Apply the basic principles governing fluid flow to analyse simple fluid machinery, 3. Apply the controls of fluid power machinery and energy systems 4. Estimate the energy potential in a water source

Course Contents: Introduction to Fluid Power Machinery and their classifications, Positive displacement Pumps, their characteristics and applications, Rotodynamic Pumps, Agricultural and miscellaneous pumping devices , Types of Hydro Turbines, Impulse Turbines, Reaction Turbines, Cross Flow Turbines, Operation of Pumps as Turbines (PAT), Estimation and Measurement of Potential of a hydro site.

ME 53003 Heating Ventilation Air Conditioning and Refrigeration (3 Credits)

Learning Outcome: 1. Describe the basic heating systems used in industrial applications 2. Explain the basic heat pump cycle, describe properties of refrigerants used and their environmental impact 3. Describe commonly used refrigeration and air-conditioning systems and their layouts 4. Carryout preliminary sizing of sub-systems of commonly used refrigeration & air-conditioning systems 5. Describe the aspects of human thermal Comfort and Indoor Air Quality (IAQ) in buildings

Course Contents: Basic Heating Systems, Vapour Compression Cycles, Psychrometry, Human Thermal Comfort and IAQ, Cooling Load Estimation, Building Air-conditioning.

ME 53004 Machine Dynamics & Controls (3 Credits)

Learning Outcome: 1. Describe the important principles of three dimensional kinematics and kinetics of rigid bodies and solve related problems. 2. Model and analyse vibrations of multi degree of freedom systems and continuous systems. 3. Apply mathematical modelling to dynamic systems and analyse their responses.

Course Contents: Three Dimensional Kinematics of Rigid Bodies, Three Dimensional Kinetics of Rigid Bodies, Vibrations of Multi Degree of Freedom Systems, Mathematical modeling and analysis of dynamic systems

ME 63001 Automobile Engineering (3 Credits)

Learning Outcome: 1. Describe the construction and operating principles of systems, sub systems and main components of an automobile 2.Use analytical techniques to solve automotive engineering problems 3.Critically evaluate and appreciate the application of new technologies and changes in automobile engineering practice

Course Contents: Introduction, Automotive Engines, Fuels and Fuel Systems for Automobile Engines, Automotive Power Train, Electric and Hybrid Power Trains, Automotive Steering and Suspension Systems, Alternative Fuels for Automobiles, Advanced Automotive Systems

ME 63002 Computational Fluid Dynamics (CFD)(3 Credits) /E

Learning Outcome: 1. Demonstrate knowledge and basic understanding of CFD techniques and applications 2. Explain the physical principles that underpin CFD codes 3. Explain the basic structure of a CFD code 4.Formulate, analyze, and verify a selected range of problems in Thermo-Fluid Systems using a commercial CFD software package

Course Contents: Introduction to computational fluid dynamics, Conservation laws of fluid motion and boundary conditions, Turbulence modelling, Overview of CFD techniques, Finite volume method for diffusion problems, Finite volume method for diffusion-convection problems, Finite volume discretisation, multi-dimensional grids, solution algorithms, Finite volume method for unsteady flows, Boundary conditions in the discretised equations of the FVM, Advanced applications of CFD – an overview

ME 63003 Computer Integrated Manufacturing (3 Credits) /E

Learning Outcome: 1. Select and use digital/analog sensors and actuators for different manufacturing and assembly tasks in conjunction with real-time control computers 2. Develop program codes for real-time control/monitoring applications in manufacturing 3. Design and implement simple Stepping or DC-motor based motion control systems 4. Write a simple program for machining a part on a CNC machine and a program for articulated robotic devices 5. Use computer vision systems for manufacturing applications 6.program and implement sequential logic control tasks using PLCs 7. Perform system integration to solve complex assembly tasks

Course Contents: Introduction to Computer Integrated Manufacturing, Computers for automation - Interfacing to external devices, Sensors and actuators - Analog and digital devices, Motion Control - Introduction to computer control, Sequential Control - Programmable Logic Controllers (PLCs), Robot programming, Fundamentals of machine vision, Automated Manufacturing, Automated assembly.

ME 62004 Energy Sources (2 Credits) /E

Learning Outcome: 1. Describe the types of energy sources in the present global context 2. Characterize the resource/reserve base of each energy source type and their future trends 3. Describe the supply-demand scenario of energy with reference to the local context 4. Describe the general impact on the environment in using energy sources

Course Contents: Overview of the Energy Scenario, Earth Energy Cycle, Reserves and Resources, Formation of Fossil and Mineral Sources, Conversion Technologies related to Fossil and Mineral Sources, Description of Renewable and Alternative Energy Sources, Environmental Impact, Emission Reduction Mechanisms

ME 63005 Introduction to Agricultural Engineering (3 Credits) /E

Learning Outcome: 1.Apply the basic principles of soil-water-plant relationship to assess farming conditions. 2. Analyse and solve basic water management problems under rain-fed and irrigated agriculture 3. Apply the basic principles of structural engineering to plan retaining structures for farm use and water retention 4. Analyse and solve basic engineering problems associated with waste management in agriculture

Course Contents: Properties of soils, Hydrology, Soil-water-plant relationship, Soil erosion, Farm structures, Agricultural wastes and by-product utilization,

ME 63006 Mechatronics (3 Credits) /E

Learning Outcome: 1. Analyze the effects of component interconnection and the overall behaviour of mechatronics systems. 2. Apply the basics of theory, operation, design and application of sensors and actuators 3.Use computer tools for system analysis and data acquisition, and to program microcontrollers. 4. Apply recent research results in mechatronics and measurement systems. 5. Ascribe the fundamentals and applications of Micro/Nano Electro Mechanical Systems (MEMS/NEMS).

Course Contents: Introduction to mechatronic systems, Sensors and sensing technologies, Actuators, principles, applications, Signal conditioning and Data Acquisition systems, Digital Electronics, Microprocessors, Microcontrollers and Programmable Logics Controllers (PLC), Virtual instrumentation, Micro-Mechatronic Systems

ME 73001 Agricultural Plant & Machinery (3 Credits) /E

Learning Outcome: 1. Explain the types of machines used for different agricultural operations 2. Estimate work rates, tractor power and number of ploughs in tillage operations 3. Demonstrate the understanding of different parts of an agricultural tractor and methods of attaching implements 4. describe soil parameters that are of importance to field operations 5. Demonstrate the understanding of soil failure criteria,

factors affecting the soil strength, slip-thrust relationship of tractor tyres and methods of enhancing traction

Course Contents: Introduction to Agricultural Machines, Engine power for agriculture, Traction, Agricultural Tractor

ME 72002 Energy Conservation (2 Credits) /E

Learning Outcome: 1. Describe the role, current and future global trends of energy conservation 2. Describe various aspects and best practices of energy conservation commonly used in thermal and electrical systems. 3. Conduct and energy audit for a simple system within the perspective of an overall energy management program. 4. Evaluate the effectiveness and energy conservation of a project 5. Explain the standards and labels related to energy conservation

Course Contents: Introduction to Energy Conservation, Energy Conservation in Thermal Systems, Energy Conservation in Electrical Systems, Energy conservation in Fluid machinery, Energy Conservation in Buildings, Energy Audit, Energy Management, Economic Analysis

ME 73003 Heat & Mass Transfer (3 Credits) /E

Learning Outcome: 1. Describe basic principles and mechanisms of heat and mass transfer processes 2. Estimate heat exchanging quantities in simple systems 3. Apply both analytical and numerical methods in solving heat and mass transfer problems

Course Contents: Introduction to Heat Transfer, Conduction Analysis, Convection Analysis, Radiation Analysis, Boiling and Condensation, Heat Exchangers, Introduction to Mass Transfer

ME 72004 Human Factors Engineering (2 Credits)

Learning Outcome: 1. Identify issues in organisations in relation to human factors engineering 2. Match user abilities, skills, and attitudes with work 3. Use the concepts learned in class in design of products and processes

Course Contents: Introduction to human factors engineering, Presentation and comprehension of information, Workplace design, Human output and control, Environmental conditions, Applications of human factors

ME 73005 Renewable Energy Technologies (3 Credits) /E

Learning Outcome: 1. Describe the types of Renewable Energy sources in the present global context 2. Describe in detail the types of Renewable Energy resource potential and their applicability in the local context 3. Analyse the applicability of Renewable Energy technologies in the local context including basic economics

Course Contents: Overview of Renewable Energy Sources, Solar Energy Technologies, Wind Energy Technologies, Biomass Energy Technologies, Small Hydro Energy Technologies, Miscellaneous Renewable Energy Technologies

ME 74099 Research Project _ Part 1 (4 Credits) and ME 84099 Research Project _ Part 2 (4 Credits):

Learning Outcome: 1. Describe the process of scientific research, techniques, and rationalisation 2. Plan and organise a research project incorporating key components and reasonable timelines 3. Carry out a research project by intelligently analysing a practical or conceptual problem and conclude in a scientific and logical manner

Course Contents: Problem Identification and Project Formulation, Research Methods, Research Project Planning, Conduct of Research Project, Research Report Preparation and Defence

ME 83001 Building Services Engineering (3 Credits) /E

Learning Outcome;1. Describe general attributes of building services engineering 2. Explain the interdisciplinary nature and the goals in building services engineering 3. Define basic terms in building lighting systems, select suitable light sources for the application 4. Identify the layout and carry out a preliminary system selection of a HVAC system 5. Describe the aspects of Indoor Air Quality and measures of addressing related issues 6. Describe practices of plumbing and of efficient water resource utilization related to buildings 7. Describe practices of electricity distribution and of ancillary services related to buildings 8. Explain the basics of building related acoustics, controls and automation systems 9. Explain the practices of building waste management, on-site renewable energy generation and Green Buildings

Course Contents: Introduction to BSE, Lighting System, HVAC and IAQ, Plumbing and Water Efficiency, Electricity Distribution and Ancillary Services, Building Acoustics, Building Controls and Automation, On site Renewable Energy Generation Waste Disposal and Management

ME 82002 Environment & Sustainability (2 Credits) /E

Learning Outcome: 1. Use the basic principles of environmental science to assess technology 2. Evaluate the impact of modern human development on the environment 3. Determine social and environmental concerns in development planning

Course Contents: Basic principles of environmental science, Impact of human development on the environment, Social and environmental considerations in Sustainability, Practices and Conventions on environment and development.

ME 83003 Fluid Power Systems (3 Credits) /E

Learning Outcome: 1. Describe the application of fluid mechanics principles in various fluid power system components 2. Interpret ISO/ANSI symbols for fluid power components and recognize the type and function of different components of fluid power circuit diagrams 3. Describe the actuation and operation principles of individual components of fluid power systems as well as overall system operation 4. develop mathematical models of individual fluid power components to aid in the analysis, selection and optimization of hydraulic circuits 5. Describe various fundamental fluid

power circuits 6. Design fluid power circuits to perform given functions representing simple practical applications 7. Appraise various practical fluid power circuits

Course Contents: Introduction to Fluid Power Transmission Systems, Hydraulic Fluids, Ancillary Hydraulic Devices, Hydraulic Pumps, Hydraulic Actuators, Hydraulic Valves, Theoretical Modelling of Flow Control Systems, Fundamental Hydraulic Circuits, Practical Fluid Power Systems

ME 82004 Maintenance Management (2 Credits)

Learning Outcome: 1. Describe the concepts of effective maintenance of plant and equipment 2. Ensure cost-effective utilisation of assets. 3. Plan and design an effective maintenance programme 4. Acquire best plant and equipment whenever replacement / enhancement of capacity is required

Course Contents: Introduction, Objectives of Maintenance and Maintenance Costs , Availability, Performance and Productivity, Availability Performance in different Production Systems, Maintenance Definitions, Maintenance Procedures, How to get Unplanned Repair Jobs Planned, Failure Development , Maintenance Procedures and Life Cycle Cost, Total Productive Maintenance, Maintenance Management Systems, Contents in a Maintenance Management System, Inspection Systems in Maintenance Management, System Implementation

ME 83005 Postharvest Technology (3 Credits)

Learning Outcome: 1. Apply the basic principles of postharvest technology to analyse simple postharvest systems including minimal processing 2. Analyze and solve problems involving storage of fresh produce 3. Apply the basic principles governing fresh produce to analyse systems to extend shelf-life 4. Analyze and solve basic drying and cold storage/freezing problems associated with fresh produce

Course Contents: Introduction to Postharvest Technology, Food Chemistry and physiology, Principles of food processing, Food quality and evaluation, Food microbiology, Equipment for processing.

7 EVALUATION CRITERIA

7.1 Evaluation

7.1.1. Performance of student in each module will be evaluated by Continuous Assessment (CA) and End of Semester Examination (ESE).

7.1.2. Senate on the recommendation of the Faculty will approve the Examiner (1st Examiner) and assign a Moderating Examiner (2nd Examiner) for each module conducted in a semester.

7.1.3. CA component in a module normally carries a weightage of not less than 20% and not more than 50% of the total marks, except in training, camps, research projects and other similar modules, where ESE may be replaced by another form of end of module evaluation and for which prior approval must be obtained from the Faculty.

7.1.4. CA of a student may be based on a specified combination of assignments including laboratory work, tutorials, quizzes, presentations and participation in the module activities as appropriate.

7.1.5. Weightage of each of the component used in the determination of the final grade for each module will be conveyed to the student by the Examiner at the commencement of each module along with the outline of the module. For repeat candidates, the current weightage of each component of the module should be used in determining the final grade.

7.1.6. The eligibility of the candidates to sit for ESE is based on the satisfactory participation in the module. To be considered to have satisfactorily followed a module, a student in general toshould have 80% attendance based on the total number of equivalent lecture hours of the module. At the end of semester, the list of eligible students for each module in that semester will be sent to the Examination Division by the Coordinator of the module through the Head of the Department for Specialization Programme or Academic Advisors for the Common Core Programme.

7.1.7. To pass a module, a candidate shall obtain at least 35% from each of CA and ESE components.

7.1.8. If only one of the components is passed, the student has to complete only the remaining component as a repeat candidate in the next attempt in order to complete the module. The marks obtained for the passed component will be kept on records and taken to determine the grade at the repeat attempt.

7.1.9. The students failing both CA and ESE receive an F grade, and should re-do both components in order to upgrade the result.

7.1.10. The highest grade obtainable at a repeat attempt is the grade C except when an academic concession has been granted to sit written examinations as a first attempt candidate.

7.1.11. Board of Examiners comprising Vice Chancellor, Dean, Heads of Departments, Examiners of all the modules relevant to a particular semester of the programme will meet at the end of each semester to decide on the performance and the academic standing of each student registered for that semester of the programme.

7.2 Grading System

7.2.1. Grades are generally awarded on a relative basis within the minimum and maximum grades of F and A for all modules excluding Industrial Training which is considered on a **Pass/Fail** basis. The numerical equivalence of the grades (Grade Points) and corresponding Indicative Benchmark Percentages are presented in Table 7.1.

Table 7.1 – Grading System

Indicative Benchmark Percentages (refer Section 7.2.2)	**Grade***	**Grade Points***	**Description**
85 and above	A^+	4.00	
80 – 84	A	4.00	Excellent
75 – 79	A^-	3.70	
70 – 74	B^+	3.30	
65 – 69	B	3.00	Good
60 – 64	B^-	2.70	
55 – 59	C^+	2.30	
50 – 54	C	2.00	
45 – 49	C^-	1.70	Pass
40 – 44	D^+	1.30	Weak Pass
35 – 39	D	1.00	Conditional Pass
Both ESE and CA components 34 and below	F	0	Fail
**In accordance with UGC Circular No: 901*			

7.2.2. Indicative benchmark percentages are given for reference and may be changed upwards or downwards by the moderator in consultation with the examiner in accordance with Faculty guidelines.

7.2.3. Grades will satisfy the following criteria.

i. The grade **D** or above is required to earn credit for a module.

ii. A student failing either CA or ESE receives an incomplete grade **I-CA** or **I-ESE** respectively**,** and is required to repeat only the failed component.

iii. A student failing both CA and ESE receives an **F** grade, and must repeat both components. The maximum grade awarded for repeating a module will be a **C** and it will be used for calculating SGPA.

iv. Grade **N** signifies Academic Concession granted with the approval of the Faculty, in the event a student is unable to sit for the ESE due to illness or other compelling reason accepted by the Senate. In such instances the student must make an appeal, with supporting documents, to the Dean for an Academic concession strictly following the procedures laid out by the Senate. CA component can be carried forward to the next available examination as the first attempt. The grade is not counted in the calculation of SGPA.

v. Grade **W** indicates a module withdrawn by the student with the approval of the Faculty and the Senate. The grade is not counted in the calculation of the SGPA. If a student later decides to register for a withdrawn module, he/she will be considered as a repeat candidate with an F grade for the module

vi. The grades **F, I, D, D$^+$** or **C$^-$** can be improved up to a **C** grade and considered for calculating SGPA. Students who wish to upgrade need to complete their examinations and obtain the upgraded grade before the relevant final board of Examiners.

7.2.4. The grade achieved for each module will be entered on the student's permanent record. Any subsequent upgrade to any grade will override the grade obtained at a previous attempt in the permanent record.

7.3 Non-GPA Modules

7.3.1. Of the total requirement for graduation, 6 credits should be earned through modules designated as Non-GPA modules (Industrial Training).

7.3.2. The grades earned for Non-GPA modules will not be taken for the purpose of calculating the SGPA, CGPA, and OGPA or in the award of Class Honours.

7.4 Unsatisfactory Standing

7.4.1. If the student's SGPA falls between 1.50 and 1.99 the student will be placed on Academic warning.

7.4.2. Any student with a SGPA less than 1.50 will be placed on Academic probation.

7.4.3. Academic Probation and/or Academic Warning may be withdrawn when the relevant SGPA is upgraded to 2.00 or more.

7.4.4. A student on Academic Warning or Academic Probation who falls into one of the following categories due to failure to upgrade the SGPA **will not be permitted to register for a new module until the SGPA improves as required**.

I. SGPA< 1.50 in any two semesters (02 Academic Probations)

II. SGPA< 1.50 in any semester (01 Academic Probation), and 1.50 ≤SGPA< 2.00 in any two semesters (02 Academic Warnings)

III. 1.50≤SGPA< 2.00 in any four semesters (04 Academic Warnings)

7.5 Award of Class Honours

7.5.1. Awarding of Class Honours is determined at the completion of all the graduation requirements **within four academic years**. OGPA obtained in **the Specialization Programme** (Semesters 3 to 8) will be used for awarding of classes, as indicated in the Table 7.2.

Table 7.2 – GPA for awarding Classes / Passes

OGPA in the Specialization Programme	**Academic Standing***
3.70-or Above	First Class
3.30-3.69	Second Class- Upper Division
3.00-3.29	Second Class- Lower Division
2.00-2.99	Pass
**In accordance with UGC Circular No: 901*	

7.5.2. For a student considered under Section 5.8 and or a student under exceptional circumstances, who has satisfied the OGPA requirements but has taken longer than four academic years to complete the course requirements, may be deemed to be eligible for the award of BSc Engineering with a class by the Senate on the recommendation of the Faculty.

7.6 Academic Concession

7.6.1. A student who has missed an ESE or any other course requirements because of illness or other compelling reason may appeal with supporting documents to the Dean for an Academic Concession for the approval of the Senate.

7.6.2. In case of a written examination, the student should submit an application with supporting documents within the time period specified under the Clause on Absence from Examination of By-Law. In instances where a student misses any other academic activity such as CA, the student should submit the application with supporting documents before the last date of academic activities of the relevant semester.

7.7 Dean's List

7.7.1. Undergraduate students who have achieved a OGPA of 3.80 or higher in **the Specialization Programme**, have completed at least the minimum number of credits on a letter graded basis during the semesters, have no Grade below C, and have no disciplinary action against them will be recommended by the Board of Examiners to be included in the Dean's List and such a placement will also be noted on the Student's Academic Transcript. Dean's List will be published annually.

8 GRADUATION REQUIREMENTS

8.1 Minimum Residence Requirement

8.1.1. A student enrolled for the BSc Engineering degree has to follow the program of study as a full time student for a period extending over a minimum of four academic years.

8.2 Credit and GPA Requirements

8.2.1. A candidate should satisfy the following requirements in order to be admitted to the BSc Engineering degree:

(a) Successful completion of the Common Core Programme.

(b) Securing a minimum of total of 150 Credits including minimum of 144 GPA Credits and 6 Non-GPA Credits from among the modules specified for the relevant field of specialization and the Common Core Programme. If a student secured more than 150 Credits with Optional / Elective modules, the relevant and best grades obtained up to 150 Credits will be used to calculate GPA. A minimum OGPA of 2.00 in **the Specialization Programme**, Grade in any of the modules is not below D, and the Cumulative Credit Deficit (CCD) does not exceed 15.

CCD = $\sum \mathbf{n_i}\ \mathbf{d_i}$ for all modules with grade of D, D^+ or C^- ;

where $\mathbf{n_i}$ is the number of credits of a module in which the student has secured a grade of D, D^+ or C^-, and $\mathbf{d_i}$ is the deficit weightage, defined as 1 for a D, 2/3 for a D^+ and 1/2 for a C^-.

(c) Credit requirements specified in the curriculum for the specialization as approved by the Senate, and

(d) Completion of any other mandatory requirements prescribed by the Senate.

8.3 Maximum Allowed Duration of Study

8.3.1. A candidate will not qualify for the award of the BSc Engineering degree if the approved graduation requirements are not satisfied **within eight academic years** from the date of first registration.

8.3.2. Under Medical Grounds the Senate may grant permission to extend the duration of study beyond the maximum allowed duration by an amount not exceeding the approved leave on medical grounds.

8.3.3. Under exceptional circumstances other than Medical Grounds, the Senate may grant permission to extend the maximum allowed duration of study by not more than one additional academic year on the recommendation of the Faculty.

8.4 Modules from Other Institutions

8.4.1. Normally students are expected to complete their programs through modules taken at the South Eastern University of Sri Lanka. Students who wish to take a module elsewhere should obtain written permission from the Faculty of Engineering before registering for the module, to ensure that it is acceptable for credit.

8.4.2. It is the responsibility of the student to ensure that an official transcript of grades is forwarded directly to the Senior Assistant Registrar (Academic / Examination) of the South Eastern University of Sri Lanka in order that the appropriate grade to be recorded. To receive credit, normally a minimum grade of C^- (equivalent to at least 45%) must be obtained for a module.

8.5 Effective Date of Award

8.5.1. The effective date of the award of the degree shall be reckoned as the first day of the month following the satisfactory completion of the graduation requirements, as confirmed by the Senate, and set out in Section 8.

9 EXAMINATIONS RULES AND PUNISHMENTS FOR EXAMINATION OFFENCES

9.1 By-Law No. 02 of 1996 - Conduct at Examinations

Prepared under section 135 of the Universities Act No. 16 of 1978 as amended by the Universities Amendment Act No. 07 of 1985 and approved by the University Council on 24.08.1996. This By-Law may be cited as By-Law No. 02 and shall come into force on 15th July, 1996:

Rules pertaining to the Conduct of Examinations:

9.1.1. Candidates shall be present at the Examination Hall at least 15 minutes before the commencement of each paper and shall enter the Hall only when they are requested to do so by the Supervisor.

9.1.2. On the admission to the Examination Hall, the candidates shall occupy the seats allocated to them.

9.1.3. No candidate shall have in his person or in his clothes or on the admission card, time table and record book or on any other object that is permitted to be brought to the examination hall any notes, signs, diagrams of formula or any other unauthorized materials. Books, notes, parcels, file covers, bags etc. which the candidate has brought with him should be kept at a place indicated by the Supervisor or invigilators.

9.1.4. No candidate shall be admitted to the examination hall after the expiry of half an hour from the commencement of the examination nor shall a candidate be allowed to leave the hall until half an hour has elapsed from the commencement of the examination or during the last 15 minutes of the paper.

9.1.5. A candidate shall bring into the examination hall his Student Record Book or his University Identity Card which should bear the candidate's photography and his signature duly certified by the Registrar or the Authorized officer. If there is a discrepancy between the names indicated in the Record book or the Identity Card and the name under which the candidate appears for the examination the candidate shall produce a certificate endorsed by the Registrar to the effect that both names refer to one and the same person. In the absence of the above proof of identity a candidate may produce his or her National Identity Card or a recently taken photography duly certified by an authorized person.

9.1.6. A candidate may be requested by the Supervisor to declare any items in his or her possession or person.

9.1.7. No candidate can either lend or borrow any material from any other candidate or attempt to communicate in any manner with another candidate or copy from the script of any other candidate. No candidate shall attempt to help another candidate or conduct him / her negligently so that another candidate has the opportunity of copying.

9.1.8. Candidates shall write only on the writing paper issued during the current paper on that particular date and session.

9.1.9. Examination stationary (i.e. writing paper, graph paper, drawing paper, ledger paper, precise paper etc.) will be supplied as and when necessary. No sheet of paper or answer book supplied to a candidate may be torn, crumpled, folded or otherwise mutilated. No papers other than those supplied to him / her by the Supervisor / invigilator shall be used by candidates. Log tables or any other material provided shall be used with care and left behind on the desk. All materials supplied, whether used or unused, shall be left behind on the desk and not removed from the examination halls.

9.1.10. Every candidate shall enter his / her Index Number on the answer book and every continuation sheet, before using such answer book or continuation sheet. No candidate shall write his/her name or any identifying mark on the answer script. Any candidate who inserts on his script an Index Number other than his / her own is liable to be regarded as having attempted to cheat.

9.1.11. All calculations and rough work shall be done only on paper supplied for the examination and shall be cancelled and attached to the answer script. Such work should not be done on admission cards, time table, question papers, record books or on any other paper. Any candidate who disregards these instructions runs the risk of being considered as having written notes or outline of answers with intention of copying.

9.1.12. Every candidate shall conduct himself/herself in the examination hall and its precincts so as not to cause disturbance or inconvenience to the Supervisor or his staff or to other candidates. In entering and leaving the hall, he/she shall conduct himself/herself as quietly as possible. A candidate is liable to be excluded from the examination hall for disorderly conduct.

9.1.13. No candidate shall submit a practical or field book dissertation or project study or answer script which has been done wholly or partly by anyone other than the candidate himself / herself.

9.1.14. Candidates shall bring their own pens, ink, mathematical instruments, drawing instruments, erasers, pencils and calculators. No candidate shall bring a programmable calculator into the examination.

9.1.15. No person shall impersonate a candidate at the examination nor shall any candidate allow himself / herself to be so impersonated by another person.

9.1.16. The supervisor/invigilator is empowered to require any candidate to make a statement in writing on any matter which may have arisen during the course of the examination and such statement shall be signed by the candidate. No candidate shall refuse to make such a statement or to sign it.

9.2 Procedure for inquiry and determination of punishment due to those found guilty of examination offences

Examination offences shall be reported by the supervisor of the examination to Senior Assistant Registrar / Examination Branch. This will be inquired by the Examination Offences Committee appointed by the Vice Chancellor. The findings of this Committee will be reported to the Senate. The Senate shall after consideration of the report, determine the punishments due to those found guilty of the examination offences.

9.3 Punishments for examination offences

Type of Offences	Recommended Punishments
1. Name written on Answer Scripts	Written warning
2. Possession of bag etc. on or near desk	Written warning
3. Possession of Unauthorized materials a)Use any information devices in the Examination hall	Students will not be allowed to bring any electronic devices that can save / possess information or be used to get/transfer information. Cancellation of that particular paper and any other punishments recommended by the Senate
b)Possession of relevant material on university stationary and/ or on/in the human body and/or any other display material	Whenever found while sitting for a particular paper, a. The admission card on which that particular exam paper falls will be cancelled. This implies that the particular paper and all the other exam paper/s mentioned in the given admission with this particular paper will be cancelled.
c)Relevant material to relevant Subject	

<table>
<tr><td>d)Notes found in bags or near desk relevant to examination paper</td><td rowspan="2">b. This candidate will not be eligible for class awarding.
c. These all cancelled exam papers will be considered as repeat papers in future.
d. And any other punishments recommended by the Senate

Eg. Let a student sit for Second year First Semester proper subject under an admission card A and few First year First semester repeat subjects under admission card B.

- If this student is found guilty while sitting for a Second year subjects, then all the exam papers come under admission card A will be cancelled.

- If this student is found guilty while sitting for a First year subjects, than all the exam papers come under admission card B will be cancelled.

Note: there may be cases a Second year student may write the First year subjects under two admission cards. (One for repeat subjects and other for the proper due to some reasons). Here also same rules said above be applied considering two different admission cards.</td></tr>
<tr><td>e)Possession of unauthorized formulae etc. which are relevant.</td></tr>
<tr><td>f. University lecture notes. Subjects based but not relevant to specific examination paper found on/ beside desk.</td><td rowspan="2">Written warning for first offence.

Cancellation of that particular paper and any other punishments recommended by the Senate</td></tr>
<tr><td>g. Possession of unauthorized formulae etc. which are not relevant</td></tr>
<tr><td>4. Copying at examination (Refer conducting examination in together)</td><td>Whenever found while sitting for a particular paper,
a. The admission card on which that particular paper falls will be cancelled. This implies that the particular paper and all the other paper/s mentioned in the given admission with this particular paper will be cancelled.
b. This candidate will not be eligible for class awarding.
c. These all cancelled papers will be considered as repeat papers in future.
d. And any other punishments recommended by the Senate</td></tr>
</table>

5. Disruption of examination (Misconduct)	Written warning. If the candidate repeated, any other punishments recommended by the Senate
6. Impersonation	Whenever found while sitting for a particular paper and if it is by a student a. Debarment for two years and to be referred to disciplinary action. If the student in final year, debarment period depends on duration on completion of degree program. b. The admission card on which that particular paper falls will be cancelled. This implies that the particular paper and all the other paper/s mentioned in the given admission with this particular paper will be cancelled. c. This candidate will not be eligible for class awarding. d. These all cancelled papers will be considered as repeat papers in future. e. And any other punishments recommended by the Senate - If by an outsider, prosecution to be initiated and any other punishments recommended by the Senate
7. Copying an assignment, project work	Assign zero marks and written warning. And any other punishments recommended by the Senate
8. Aiding and abetting	Whenever found while sitting for a particular paper, a. The admission card on which that particular paper falls will be cancelled. This implies that the particular paper and all the other paper/s mentioned in the given admission with this particular paper will be cancelled. b. This candidate will not be eligible for class awarding. c. These all cancelled papers will be considered as repeat papers in future. d. And any other punishments recommended by the Senate
9. Removal of University stationary and material	Warning by the supervisor. If the candidate persists or any other punishments recommended by the Senate

10. Attempt to obtain improper assistance	Cancellation of paper and any other punishments recommended by the Senate
11. Not carrying out the Instructions of the Supervisor at the examination hall	Verbal Warning by the supervisor. If the candidate persists written warning by the supervisor and any other punishments recommended by the Senate

10 GENERAL INFORMATION

Faculty Details

10.1 Faculty Colour

The official colour of the Faculty of Engineering is ***violet*** (R:G:B = 148,0,211).

10.2 Industrial Training Unit

Industrial Training Unit (ITU) of Faculty of Engineering was established in 2014. ITU coordinates with the National Apprentice and Industrial Training Authority (NAITA) to organize, monitor and evaluate the industrial training placements for engineering undergraduates.

Industrial Training is an integral component of the undergraduate programme. All engineering students should undergo the training programme after the second and third years of study over a period of 12 weeks duration each. The Industrial Training provides the students opportunities to face real life situations in industrial organizations which help to make an effective start as a member of the engineering profession when they graduate from the university.

Industrial Training Coordinator:
Eng. A.M. Aslam Saja *BSc Eng (Hons) (PDN), MScEng (PDN)*

10.3 Engineering Workshop

The Engineering Workshop of the Faculty was established in 2014 and consists of Machine Shop, Fitting Shop, Welding Shop, and Carpentry Shop. The facilities are utilized to conduct workshop practical sessions in the common core programme, experiments and training sessions for mechanical engineering students in their 2nd and 3rd year of studies in the areas of workshop and production technology. The workshop resources are also used to fabricate hardware components, laboratory and field equipment for teaching and research. A team of craft demonstrators and technical staff is working at the workshop under guidance of the Workshop Engineer.

Workshop Engineer:
Eng. M.S.A. Sabry *HND (Eng), BEng, Dip in Industrial Quality Control (SLSI)*

General Details

10.4 Student Registration

All students who are admitted to the university are required to register themselves before commencing their course of studies each academic year. Students are requested to submit duly completed registration form together with all relevant documents to the Academic and Examination Division of the University on or before the specified date.

10.5 Issue of Student Record Book and Identity Card

On completion of registration, the University will issue every student a Student's Record Book and an Identity Card bearing his / her photograph duly embossed with the seal of the University. Every student must carry his / her record book or identity card whilst in the University premises, and is required produce such record book or identity card when called upon to do so by any member of the academic, administrative or security staff of the University.

10.6 Renewal of Registration

All Students who continue their course of studies during their second and subsequent years are required to renew registration at the commencement of each academic year on or before the date notified. Forms for renewal of registration are made available at Academic and Examination Division or the Office of the Dean. The form for renewal duly completed together with Paying in Voucher bearing the bank seal as proof for the payment of fees prescribed by the University should be submitted to the office of the Dean on or before the closing date.

10.7 Payment for Registration

Details of fees are given below and the payment should be credited to the South Eastern University of Sri Lanka, **Account No. 228- 100190001704**, People's Bank, Addalaichenai through any branch of the People's Bank. Such fees payable may vary subject to decisions of the University.

Existing Fees Payable for Initial Registration by all Students

- Registration Fees: 110/-
- Annual Medical Fees: 50/-
- Library Deposit: 100/-
- Handbook: 25/-

Those seeking Hostel Accommodation should pay an additional Fee

- Hostel Fees (per year): 900/-

Fee for Renewal of Registration for all Students

- Renewal fees: 110/-
- Medical fees: 50/-
- Identity card: 100/-
- Fees for repeat courses (per course):25/-
- Loss of Identity card: 300/-
- Loss of Record Book: 300/-

10.8 English Language Teaching Unit (ELTU)

For administrative purposes ELTU is attached to the Faculty of Arts and Culture. The unit offers English Language Courses to the entire university student population to enhance their proficiency in English Language. During the Intensive Programme English classes are conducted by the ELTU with the help of visiting instructors within or out of the University. In addition, the ELTU is conducting the English classes during the first and second semesters of the Common Core Programme.

10.9 University Library and Museum

South Eastern University Library was established in 1995, along with the establishment of the South Eastern University College. The University Main library located in the main campus at Oluvil serves the needs of the Faculty of Engineering, Faculty of Arts & Culture, Faculty of Islamic Studies & Arabic Language and Faculty of Management & Commerce. The Science Library is a branch of the main library located at the Faculty of Applied Science, Sammanthurai.

The University Main Library (http://www.seu.ac.lk/library/index.php) with state-of-the-art facilities has 51120 square feet floor area. It has seating capacity for about 400 persons and provides many facilities such as Digital Knowledge Centre, Research Centre, Centre for Special Needs, Cyber Centre, Leisure Reading, and 24 Hours Open Access Centre for Group Study in addition to the traditional library services. The Library has implemented Integrated RFID Technology Access Control System and fully automated Library Services to enable the users to receive world-class facilities and services.

The University Library delivers customer focused quality information products, services and programmes, creatively adjust to changing information needs and innovatively respond to new challenges at national and international level. The objective of the library is to effectively support the University in achieving standards of excellence in its academic programmes, research and other activities. More specifically, its goal is to provide access to scholarly information in support of the teaching, learning and research activities of the university, as they relate to the curricula.

At present the library possesses a total print collection of items about 114,000 including books, pamphlets, and audio visual materials and e-resources needed for learning, teaching and research. The University Library recently purchased a large number of textbooks which support the teaching and learning interest of faculties. Our patrons borrow these books for a longer period of time.

The Library subscribes to a number of Electronic Databases to provide access to scholarly Journal Collection. The University has also developed Digital Library (E-Repository / Institutional Repository). Institutional Repository is an online digital collection of scholarly output. It includes faculty publications, research materials, rare materials, images, audio and video outputs, theses and conference proceedings.

The Cultural Museum is an integral part of the South Eastern University Library. It is a "General Museum", depicting the heritage of Sri Lankan Societies. This cultural museum was established to strengthen and support the overall culture, tradition and norms of different communities of Sri Lanka. It promotes cross-cultural awareness and communications between Sri Lankan people of different communities.

10.10 Student Support Service and Welfare

The Student Support Service and Welfare (SSSW) is a central entity, which is located at the main campus to which the students and others could bring their grievances and issues and seek solutions and relief. Similarly, it oversees the coordination and cohesion among several service divisions and units to ensure smooth functioning of the system, to remedy shortcomings and deficiencies, and to extend assistance for the students in need.

SSSW encompasses six broader areas, namely Student services, Student accommodation and cafeteria services, Common amenities and services such as recreational and sports facilities, curative and preventive health care services and facilities for social, cultural, creative and aesthetic pursuits, Student welfare, grievance redress and counseling system that will coordinate with university authorities and faculty level student counseling system, Career Guidance Services, and Marshal and Security services.

Further, SSSW will entertain any complaints/problems/grievances from students as regard to food and lodging and financial, education and health matters etc., and provides assistance to needy students in liaison with relevant divisions / units.

10.11 Facilities and Services

The students have facilities in the campus such as Library, Computer unit, Health Centre, student's common room, Places of worship, Multi shop, Sporting facilities,

Canteen, Students' Unions, Societies, Hostels, Shroff's Office etc. Officers can be met by prior appointment.

10.12 Career Guidance Unit

As part of the Education Reform proposals Career Guidance had been identified as a priority and since 1998 practically every University had started some activities in this regard.

Career Guidance is an interpersonal process designed to assist individuals with Career Development problems. Throughout its history, career guidance has been known by a number of different names, including Vocational Guidance, Occupational Counseling, and Vocational Counseling etc. In general Career Guidance is the assistance given to students and job seekers in choosing and preparing for a suitable job.

Career Guidance Unit of the University conducts career related programmes in the following focal areas: Counseling and advising on careers, Employability skills enhancement, Career-related information provision, Networking with the industries, Availing work experience, Entrepreneurship skills development and Conducting seminars, conferences, workshops, exhibitions, festivals, industry days, career fairs, out bound training, etc.

Compiled and Edited
by
S.M. Junaideen

UNDERGRADUATE HANDBOOK 2016