DEPARTMENT OF ELECTRICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Minutes of the meeting of the Departmental faculty members held on 02-07-2014, at 2:00p.m. in the departmental committee room of Electrical Engineering.

Following members attended the meeting:

1. Prof. Aijaz Ahmad
   Professor & Head — Chairman
   Department of Electrical Engineering
2. Prof. M. D. Mufti
   Professor — Member
   Department of Electrical Engineering
3. Prof. S. A. Lone
   Professor — Member
   Department of Electrical Engineering
4. Dr. Abdul Hamid Bhat
   Associate Professor — Member
   Department of Electrical Engineering
5. Dr. Sheikh Javed Iqbal
   Associate Professor — Member
   Department of Electrical Engineering

Following agenda was discussed:

1. Curriculum of the department of Electrical Engineering was discussedconsidering the various inputs received from all the stake holders. Changes to be incorporated in the syllabus were highlighted & discussed in the meeting. The Course Instructors were asked to submit the detailed syllabus, identifying Course Outcomes (COs)and map the COs with Program Outcomes (POs) and Program Specific Outcomes (PSOs) with proper justifications. This is to be submitted to the Chairman BOS by the end of this month.
2. Process for identification of PSOs and COs were discussed in the meeting.
3. It was discussed that the COs formed should meet the following guidelines:
   a. The COs should follow Bloom's taxonomy.
   b. The COs should reflect the contents of whole syllabus.
   c. The COs should highlight the key topicsin the syllabus.
   d. It was decided that the no. of COs per course shall be limited to a maximum of 6.
4. Different methods / processes were discussedfor monitoring the extent of compliance of the curriculum with POs & PSOs.

Head
Department of Electrical Engineering

Copy to

1. **Office File**

For Batch 2015 + onwards

DEPARTMENT OF ELECTRICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Minutes of the Board of Studies Meeting held on 27-08-2014 at 10.00 a.m in the Departmental Committee Room of Electrical Engineering.

Following members attended the meeting:-

1.	Dr. Aijaz Ahmad, Professor & Head Department of Electrical Engineering.	Chairman
2.	Prof. Majid Jameel, Prof. & Head, Department of Electrical Engineering, JamiaMilliaIslamia, New Delhi	External Member
3.	Dr. M. D. Mufti, Professor, Department of Electrical Engineering.	Member
4.	Dr. Ab. Hamid Bhat, Associate Professor Department of Electrical Engg.	Member
5.	Dr. Sheikh Javed Iqbal Associate Professor, Electrical Engineering Department	Member
6.	Dr. S. A Lone Professor Department of Electrical Engg.	Special Invitee

Credit = 200.

Dr. Mohammad Abid Bazaz did not attend the meeting due to his preoccupations.

Following agenda was discussed and decision taken:

A **Revision of B. Tech. Scheme:**

It was suggested to modify the present B. Tech (Electrical) curriculum to conform to the present requirements and objectives. It was resolved to make the following changes in the scheme:

1. **3rd semester:**

   i) The course "Principles of Electrical Engineering" shall be renamed as "Basic Electrical Engineering", similarly "Principles of Electrical Engineering Lab." be renamed as "Basic Electrical Engineering Lab."

   ii) The course "Mechanical Engineering" taught by Mechanical Engineering Department of the Institute was suggested to be renamed as Engineering Thermodynamics/Thermal Engg. The BOS confirmed the proposal subject to the confirmation by Mechanical Engineering Department.

HEAD
Dept. of El...
...culty ...
...ia Mil... Islamia
... Delhi-110025

2. **4th Semester.**

The course No: ELE-404 i.e Non-conventional Energy Sources was decided to be dropped and introduce it as an elective at higher semester level with modified syllabus. Accordingly the revised credit structure of following courses was revised as follows:

•	Control System-I	3	1	0	4
•	Electric Measurements & Measuring Instruments	3	1	0	4
•	Electronics-II	3	1	0	4

3. **5th semester:**

Power System Lab.-I which was earlier dropped from 5th semester will be re-introduced. Accordingly the revised credit structure of Power System-I will be 2 1 0 (3 credits) & for Power System Lab. will be 0 0 2 (1 credit)

4. **6th semester:**

The course No: ELE-603 was decided to be renamed as "Electric Machine Design instead of Computer Aided Design of Electric Machines and course No: ELE-603P (Computer Aided Design Lab.) was dropped. Furthermore the syllabus of course No: ELE-602 i.e Power Electronics was modified as proposed by the concerned course in charge. Also the credit / LTP structure of course ELE-606 i.e Microprocessor was revised to 3 1 0 4 (4 credits)

5. **7th semester:**

The courses: General Management & Economics (HSS-701) and one of the Electives will be shifted to 8th semester and instead Power System-III and Power Station Practice will be included in 7th semester. This was done to meet the demand of students to have maximum coverage of GATE syllabus at 7th semester level. The syllabus of Advanced Power Electronics was revised as proposed by course in charge.

6. **8th semester:**

Due to the decision at (5) the courses Power System-III and Power Station Practice are shifted to 7th semester and accordingly courses "General Management & Economics and one Elective will be shifted to 8th semester. Further the course "Non-conventional Energy Courses" dropped at 4th semesters level will be included here as an elective with modification of syllabus with new title, "Renewable Sources of Electrical Energy."

It was further decided that Elective-IV i.e High Voltage Engineering will be treated as core course instead of elective.

Electives:

It was decided to have a common list of electives to be floated at 7th & 8th semester level to have more flexibility. Further the electives i) Restructuring of Power System ii) Power System Optimization iii) Flexible AC Transmission iv) Fuzzy Logic & Neural Network (renamed as Soft Computing) and v) Stand Alone Power System will be dropped from the list as these have now been introduced at M. Tech. Level.

HEAD
Deptt. of Electrical Engineering
Faculty of Engineering & Technology
Jamia Millia Islamia
New Delhi-110025

It was also resolved to explore the possibility of coverage of maximum GATE syllabus in the curriculum. Accordingly the subject experts were requested to do the needful wherever feasible. It was further suggested that syllabus of each course shall be put in the form of appropriate number of units / sections.

B. Revision of M. Tech. Scheme

The scheme of courses offered in M. Tech. was proposed to be revised. Following modifications in the scheme was proposed.

i) Revision of syllabi in following courses: The BOS approved the modification of syllabi of following subjects to cater the present needs of Electrical Engineering. subject to the confirmation by all subject experts.

a) Advanced Power System Analysis
b) Power Quality Problems & Solutions
c) Control of Electrical Energy Systems
d) Advanced Mathematics
e) Power System Dynamics &Control
f) Power System Optimization
g) HVDC System
h) Stand Alone Energy System

Further it was decided to rename the Advanced Mathematics course as "Optimization Techniques". Also an alternative title was proposed to be sought for the course "Stand Alone Energy System".

ii) The power System Lab.-II course at II Semester was renamed as Power System Simulation Lab.-II. It was also resolved to have only two theory courses (both Electives) in III semester in addition to seminar and Minor project. As such the core course "Power System Restructuring & Deregulation" is dropped and included as an elective. Accordingly the seminar shall be of 2 credits and minor project of 5 credits so that the overall credits for III semester remain 13 as before.

iii) Electives: It was further decided to float common list of electives to be taught from first to third semester.

iv) Evaluation: The relative weightage of evaluation was revised so that it is in line with other B. Tech / M. Tech course of the Institute. The revised weightage of evaluation will be as follows:

1) Class Assessment	10%
2) Mid Term Evaluation (minor 1 & 2)	40%
3) Final Term Evaluation (Major)	50%

(Sheikh Javed Iqbal) (Ab. Hamid Bhat) (S. A Lone)

(M. D. Mufti) (Majid Jameel) (Aijaz Ahmad)

HEAD
Deptt. of Electrical Engineering
Faculty of Engineering & Technology
Jamia Millia Islamia
New Delhi-110025

Minutes of the meeting of 18th Senate of National Institute of Technology Srinagar, Hazratbal, Kashmir held on March 09, 2015 at 3.00 p.m. in the Hi-tech Room of the Institute.

The following were present:

1	Prof. Rajat Gupta, Director, National Institute of Technology, Srinagar, Hazratbal-190006. (J&K),	Chairman
2	Prof. Abdul Wahid, Former Vice-Chancellor, Central University of Kashmir, Srinagar (J&K)	Member
3	Prof. Veena Chowdhary, Centre for Polymer Science, Indian Institute of Technology, Hauz Khas, New Delhi.	Member
4	Mr. Rajesh Uppal, Executive Director IT & CIO, Information Technology Division, Maruti Suzuki India Ltd., Palam Gurgaon Road,Gurgaon-122015 (Haryana)	Member
5	Prof. A. R. Dar, Head, Civil Engg. Department	Member
6	Prof. Aijaz Hussain Mir, Dean Research & Consultancy / Professor, Department of ECE	Member
7	Prof. M. A. Lone, Dean Planning & Development / Professor, Department of Civil Engineering	Member
8	Prof. M. D. Mufti, Dean Academic Affairs / Professor, Department of Electrical Engg.	Member
9	Prof. R. Ambardar, Professor & Head (I/C), Mett. & Materials Engg.	Member
10	Prof. H. K. Pandita, Dean Faculty Affairs / Professor, Department of Mechanical Engg.	Member
11	Prof. Mohammad Farooq Wani, Department of Mechanical Engg. / I/C HOD Physics Department	Member

Resolution No 06/18	Approved However, in case of B.Tech. 8th semester, the Senate did not agree to omit one credit in the Industrial Training and resolved that the Industrial Training shall continue to have one credit to maintain uniformity across the departments. Accordingly necessary modifications to be made in the proposal by the department.
Senate-18/07	**To consider the minutes of the meeting of BOS of Electrical Engineering Department held on 27-08-2014.**
Resolution No. 07/18	Approved. However, uniformity in the course structure especially with respect to dissertation be maintained with other M.Tech. programmes. The Senate felt that there has to be uniformity in M.Tech. course structure among various departments and for this purpose a Committee may be constituted by the Director to review all the M.Tech. programme course structure and submit it report to the Senate.
Senate-18/08	**To consider the report of the committee constituted by the Senate regarding implementation of Plagiarism Software in the Institute.**
Resolution No. 08/18	Approved. The Plagiarism certificate in case of Ph.D. candidates shall be given by the Doctoral Committee and for M.Tech./ M.Phil. students by the concerned supervisor/s.
Senate-18/09	**To consider the recommendations made in the meeting of Deans / HODs dated 05-03-2015.**
Resolution No. 09/18	The Senate approved the recommendations with the following modifications: • Henceforth, the regular research scholars of the Institute shall be designated as JRF or SRF as applicable. • <u>Revision of Ph.D. scholarship</u>: Regarding (a) and (b), the Institute may seek clarifications from MHRD. (c) is recommended for approval of FC / BOG for providing revised scholarship to all the existing Ph.D. scholars in the Institute irrespective of NET / GATE qualifications. (d) approved. (e) and (f) recommended for approval of FC / BOG. • <u>Ph.D. regulations:</u> Senate approved the modifications suggested by the committee. However, the research proposal shall be included in the oral comprehensive examination of the Ph.D. scholar which shall

Resolution No. 13/18	The proposal was discussed at length. It was pointed out by the Director that the proposal was not vetted by the Infrastructural Committee for computer facilities of the Institute. Hence, views of the members of the Infrastructural Committee for computer facilities in the Institute were also sought. The Infrastructural Committee members including the Chairman vetted the proposal of the DPC of Computer Services Centre estimated at a cost of Rs. 22.05 lacs. The procurement shall be done by the CPU as per Institute Purchase Rules. The execution of the work shall be carried out by the Computer Service Centre under the supervision of Prof. Roohie Naaz, Chairperson of CSC. The Senate, thus resolved to recommend the proposal for approval of FC / BOG.
Senate-18/14	**To record report on the extesnsion in the winter vacation on account of swine flu in the valley.**
Resolution No. 14/18	Record reported. The following changes in the Academic Calendar 2015were approved for spring semester: 1. Normal registration from March 16 to 20, 2015. 2. Classes to begin for all the students from March 18, 2015. 3. Loss of time due to extension in winter vacations shall be compensated by engaging classes on Saturdays. 4. Rest of the schedule for spring session 2015 shall remain unchanged.
Senate-18/15	**To consider the report of the Committee for fixing of the honorarium to Adjunct Faculty.**
Resolution No. 15/18	The proposal of the constituted committee is recommended for approval of the FC / BOG excluding the recommendation of Committee at (d).

The meeting ended with a vote of thanks to the Chair.

10/3/15

(Prof. F. A. Mir)
Secretary

(Prof. M . D. Mufti)
Dean Academic Affairs

Approved
Gupta 10/3/15

(Prof. Rajat Gupta)
Chairman

MAPPING of Course Outcomes (COs) with Program Outcomes (POs)

2015 Batch onwards

Semester 1

Course Name: PHYSICS - 1

Course Code: PHY 101

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	1	1	-	-	-	-	-	-	-	-	-
CO3	3	3	3	1	1	1	-	-	-	-	-	-	-	-	-
CO4	3	3	3	1	1	1	-	-	-	-	-	-	-	-	-

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	3	Strongly correlated to application of Quantum Mechanics Fundamentals in various branches of Engineering
	PO2	3	Moderately correlated to the theoretical knowledge of Quantum Mechanics for data interpretation
	PO3	2	Moderately correlated to knowledge of Quantum Mechanics Fundamentals in advanced engineering
	PO4	1	Satisfactory helps to achieve the skills through regular class discussion /seminar /poster presentation
	PO5	1	Low correlated to achieve the skills through learning various simulation tools
	PO6	1	Low correlated
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO2	PO1	3	Strongly correlated to basics of Laser fundamentals in engineering knowledge
	PO2	3	Strongly correlated to the theoretical knowledge of laser in designing and conducting Experiments
	PO3	3	Strongly correlated to the Knowledge of laser fundamentals for designing materials

	PO4	2	Moderately correlated to conduct investigation, analysis and interpretation of data based on Laser problems through regular class discussion /seminar /poster presentation
	PO5	1	Less correlated to Application of laser in Advanced Engineering Fields
	PO6	1	Less correlated
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO3	PO1	3	Strongly correlated
	PO2	3	Strongly correlated to various requirements to fabricate optical fibers
	PO3	3	Strongly correlated
	PO4	1	Less correlated
	PO5	1	Less correlated
	PO6	1	Less correlated
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO4	PO1	3	Strongly correlated to science by studying nuclear science and fission and fusion reaction takes place in physical science
	PO2	3	Strongly correlated to first principles of mathematics, natural sciences, and engineering sciences.
	PO3	3	Strongly correlated
	PO4	1	Minimal
	PO5	1	Minimal
	PO6	1	Minimal
	PO7	0	

	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	

Course Name: Mathematics-I

Course Code: MTH-101

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**2**	**2**	**1**	**2**	**2**	**1**							2	2	1
CO2	**2**	**2**	**2**	**3**	**2**	**2**							2	3	1
CO3	**2**	**2**	**2**	**2**	**2**	**1**							2	3	1
CO4	**1**	**2**	**2**	**2**	**1**	**1**							2	1	1
CO5	**1**	**2**	**2**	**1**	**2**										

Course Name: Communication Skills and Oral Presentation

Course Code: HSS-101

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									2	3	2	
CO2									2	2	2	
CO3									2	3	3	
CO4									3	2	2	

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated**: Effective reading and writing skills help students function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly Correlated**: Effective reading and writing skills help communicate effectively on engineering activities, write effective reports, and design documentation.
	PO11	2	**Moderately correlated**: Effective reading and writing skills enable students to demonstrate knowledge and understanding of the engineering and management principles.
	PO12	0	Not correlated
CO2	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated**: Correct usage of grammar enables effective communication which helps students function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	2	**Moderately correlated**: Correct usage of English grammar helps communicate effectively on engineering activities, write effective reports, and design documentation.

	PO11	2	**Moderately correlated**: Correctly using grammatical elements facilitates effective demonstration of knowledge and understanding of the engineering and management principles.
	PO12	0	Not correlated
CO3	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated:** The ability to write project reports with efficient technical writing skills enables students to function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly correlated:** Exhibiting effective technical writing skills helps write effective project reports and communicate effectively with the engineering community and with society at large.
	PO11	3	**Highly correlated:**The ability to write project reports with efficient technical writing skills facilitates better demonstration of knowledge and understanding of the engineering and management principles, efficient management of projects, and better application of the same to one's work as an individual, as a member, and as a leader in a team and multidisciplinary environments.
	PO12	0	Not correlated
CO4	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	3	**Highly correlated:** Effective oral presentation skills enable students to function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	2	**Moderately correlated:** Learning effective oral presentation skills in English helps give presentations in engineering discipline along with giving and receiving clear instructions.
	PO11	2	**Moderately correlated:** Effective oral communication skills help students demonstrate the knowledge and understanding of the engineering and management principles and apply these to one's work.
	PO12	0	Not correlated

Course Name: Chemistry-I

Course Code: CHM-101

CO-PO Mapping

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1							2		2	**2**	**1**	**2**
2	2	2	1							2		2	**1**	**1**	**2**
3	3	2	2							2		3	**2**	**1**	**2**
4	3	3	2							1		2	**2**	**1**	**3**

CO-PO Mapping Justification

CO1	**PO1**	**3**	The CO is more correlated to application of the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
	PO2	**2**	It is less correlated in any way for identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
	PO3	**1**	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
	PO4		No relevance found
	PO5		No relevance found
	PO6		No relevance found
	PO7		No relevance found
	PO8		No relevance found
	PO9		No relevance found
	PO10	**2**	It is less correlated to 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.
	PO11		No relevance found
	PO12	**2**	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
	PSO1	2	Moderately correlated to make students be competent, creative and imaginative in the field of research, safety , quality and technical services.

	PSO2	1	Less correlated to have progress through the participation in electrical engineering programs
	PSO3	2	Moderately correlated for the benefit of society at large
CO2	**PO1**	**2**	The CO is less correlated to application of the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
	PO2	**2**	It is less correlated in any way for identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
	PO3	**1**	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
	PO4		No relevance found
	PO5		No relevance found
	PO6		No relevance found
	PO7		No relevance found
	PO8		No relevance found
	PO9		No relevance found
	PO10	**2**	It is less correlated to 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.
	PO11		No relevance found
	PO12	**2**	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
	PSO1	2	Moderately correlated to make students be competent, creative and imaginative in the field of research, safety , quality and technical services.
	PSO2	1	Less correlated to have progress through the participation in electrical engineering programs
	PSO3	2	Moderately correlated for the benefit of society at large
	PO1	**3**	The CO is more correlated to application of the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
	PO2	**2**	It is less correlated in any way for identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
	PO3	**2**	It is less correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public

			health and safety, and the cultural, societal, and environmental considerations.
	PO4		No relevance found
	PO5		No relevance found
	PO6		No relevance found
CO3	**PO7**		No relevance found
	PO8		No relevance found
	PO9		No relevance found
	PO10	**2**	It is less correlated to 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.
	PO11		No relevance found upon this Criteria, so mapped to level 0.
	PO12	**2**	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
	PSO1	2	Moderately correlated to make students be competent, creative and imaginative in the field of research, safety , quality and technical services.
	PSO2	1	Less correlated to have progress through the participation in electrical engineering programs
	PSO3	2	Moderately correlated for the benefit of society at large
	PO1	**3**	The CO is more correlated to application of the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
	PO2	**3**	It is more correlated in any way for identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
	PO3	**2**	It is less correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
	PO4		No relevance found
	PO5		No relevance found
	PO6		No relevance found
CO4	**PO7**		No relevance found
	PO8		No relevance found
	PO9		No relevance found

PO10	**1**	It is partially correlated to 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.
PO11		No relevance found upon this Criteria, so mapped to level 0.
PO12	**2**	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated to make students be competent, creative and imaginative in the field of research, safety , quality and technical services.
PSO2	1	Less correlated to have progress through the participation in electrical engineering programs
PSO3	3	Highly correlated for the benefit of society at large

Course Name: Chemistry Laboratory-I

Course Code: CHM-101P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2			3	2	1			1		2	3	2	1
CO2	3	1			2	2	3			1	2	1	2	3	2
CO3	3	1			2	2	3			2		1	3	3	2
CO4	2	2			3	2	2				2	1	2	2	1

CO-PO Mapping Justification

COs	PO/ PSO	Mapping	Justification
1	PO1	2	Moderately correlated
	PO2	2	Moderately correlated
	PO3		
	PO4		
	PO5	3	Strongly correlated
	PO6	2	Moderately correlated
	PO7	1	Minimal
	PO8		
	PO9		
	PO10	1	Minimal
	PO11		
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlated
	PSO3	1	Minimal
2	PO1	3	Strongly correlated
	PO2	1	Minimal
	PO3		
	PO4		
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated
	PO7	3	Strongly correlated
	PO8		
	PO9		
	PO10	1	Minimal
	PO11	2	Moderately correlated
	PO12	1	Minimal
	PSO1	2	Moderately correlated

	PSO2	3	Strongly correlated
	PSO3	2	Moderately correlated
3	**PO1**	3	Strongly correlated
	PO2	1	Minimal
	PO3		
	PO4		
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated
	PO7	3	Strongly correlated
	PO8		
	PO9		
	PO10	2	Moderately correlated
	PO11		
	PO12	1	Minimal
	PSO1	3	Strongly correlated
	PSO2	3	Strongly correlated
	PSO3	2	Moderately correlated
4	**PO1**	2	Moderately correlated
	PO2	2	Moderately correlated
	PO3		
	PO4		
	PO5	3	Strongly correlated
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10		
	PO11	2	Moderately correlated
	PO12	1	Minimal
	PSO1	2	Moderately correlated
	PSO2	2	Moderately correlated
	PSO3	1	Minimal

Course Name: Computer Fundamentals and Problem-solving Techniques

Course Code: IT-101

CO-PO Mapping

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
CO1	3				2							2	3	1	1
CO2	3											2	3	2	1
CO3	2	3	1									2	2	2	1
CO4	2	3	1		2							2	3	3	3

CO-PO Mapping Justification

CO1(232.1) : To help the students understand basic operations of computer system, system software and hardware, identify the various components and parts of computer system

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO5	2	It is less correlated to Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
Po2,Po3,Po4,PO6,PO7,PO8,PO9, PO10, PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Highly correlated.
PSO2	1	Partially correlated.
PSO3	1	Partially correlated

CO2 (232.2) To understand the basic organization of the computer system, understand the basics of an operating systems, and identify the input/output devices, processor and memory organization..

PO/PSO	Mapping	justification
PO1	3	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
Po2,Po3,Po4,Po5,PO6,PO7,PO8,PO9, PO10, PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Highly correlated
PSO2	2	less correlated
PSO3	`1	Partially correlated

CO3(232.3): Problem identification, flowchart and algorithm writing and solutions of simple problems through it. Introducing student to logic and computer language.

PO/PSO	Mapping	justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
Po4,Po5,PO6,PO7,PO8,PO9, PO10, PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated.
PSO2	2	Partially correlated.

PSO3	1	Partially correlated

CO4(232.4) : Introducing the programming for basic operations and numerical analysis (basic techniques) by using a programming language.

PO/PSO	Mapping	justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO5	2	It is less correlated to Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
Po4,PO6,PO7,PO8,PO9, PO10, PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Highly correlated
PSO2	3	Partially correlated
PSO3	3	Partially correlated

Course Name: Computer Fundamentals & Problem Solving Lab

Course Code: IT 102 P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2							2	1		1
CO2	2		1		3							2	1		1
CO3	2	1	1		2							2	1		1
CO4	2	2	2		2							2	1		1
CO5	2	2	2		2							2	1		1

CO-PO Mapping Justification

CO1(232.1): Trouble shooting and maintenance of computer systems..

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	It is less correlated to the identification, formulation and analysis of engineering problems in reaching substantial conclusions using analytical tools.
PO3	2	It is less correlated to designing solutions for complex engineering problems to meet desired needs within realistic constraints related to economic, environmental, social, political, ethical, health and safety, verifiability and sustainability concerns.
PO5	2	It is less correlated to usage of technical skills including applications to broadly defined engineering activities.
PO4,PO6, PO7, PO8,PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10, PO11	-	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	It is less correlated to recognizing the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	1	partially correlated for solving the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2		

PSO3	1	partially correlated to ability to design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques

CO2(232.2): Introducing word-processing, spreadsheet, presentation and data representation software

PO/PSO	Mapping	Justification
PO1	2	It is less correlated to application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	0	No relevance
PO3	1	It is partially correlated to designing solutions for complex engineering problems to meet desired needs within realistic constraints related to economic, environmental, social, political, ethical, health and safety, verifiability and sustainability concerns.
PO4	-	No relevance found upon this Criteria, so mapped to level 0.
PO5	3	It is highly correlated to usage of technical skills including applications to broadly defined engineering activities.
PO6, PO7, PO8	-	No relevance found upon this Criteria, so mapped to level 0.
PO9,PO10, PO11	-	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	It is less correlated to recognizing the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1		
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in chemical and allied disciplines in the societal contexts.
PSO3	1	partially correlated to ability to design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques

CO3(232.3): Introducing operating systems including Microsoft Windows, UNIX and LINUX.

PO/PSO	Mapping	Justification

PO1	2	It is less correlated to application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	1	It is partially correlated to the identification, formulation and analysis of engineering problems in reaching substantial conclusions using analytical tools.
PO3	1	It is highly correlated to designing solutions for complex engineering problems to meet desired needs within realistic constraints related to economic, environmental, social, political, ethical, health and safety, verifiability and sustainability concerns.
		experiments to provide valid conclusions.
PO5	2	It is less correlated to the usage of technical skills including applications to broadly defined engineering activities.
PO6, PO7, PO8, PO9, PO10, PO11	-	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	It is less correlated to recognizing the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	1	partially correlated for solving the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2		
PSO3	1	partially correlated to ability to design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques

CO4(232.4): Basic programming in python(script based) solving computational problems.

PO/PSO	Mapping	Justification
PO1	2	It is less correlated to application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	It is less correlated to the identification, formulation and analysis of engineering problems in reaching substantial conclusions using analytical tools.

PO3	2	It is less correlated to designing solutions for complex engineering problems to meet desired needs within realistic constraints related to economic, environmental, social, political, ethical, health and safety, verifiability and sustainability concerns.

		experiments to provide valid conclusions.
PO5	2	It is less correlated to the usage of technical skills including applications to broadly defined engineering activities.
PO4,PO6, PO7, PO8, PO9, PO10, PO11	-	No relevance found upon this Criteria, so mapped to level 0.
PO12	2	It is less correlated to recognizing the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	1	partially correlated for solving the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2		
PSO3	1	partially correlated to ability to design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques

CO5(232.5): Introducing MATLAB/SciLab programs for analyzing simple problems.

PO/PSO	Mapping	Justification
PO1	2	It is less correlated to application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	It is less correlated to the identification, formulation and analysis of engineering problems in reaching substantial conclusions using analytical tools.
PO3	2	It is less correlated to designing solutions for complex engineering problems to meet desired needs within realistic constraints related to economic, environmental, social, political, ethical, health and safety, verifiability and sustainability concerns.

Semester 2

Course Name: Introduction to Social Sciences

Course Code: HU 201

CO-PO Mapping

CO-PO Mapping: Introduction to Social Sciences															
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1			2			2	2	2	2			2			
CO2						2	2				1				
CO3						1		1	3	2					
CO4						2	1	2	1						
CO5							1	1			2				

CO-PO Mapping Justification

COs	**POs**		**Justification**
CO1	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	2	Moderately correlated: Examining the relevance of Social Sciences and Sociology to engineering studies helps to design solutions for complex engineering problems with appropriate consideration for the public health and safety, and cultural, societal, and environment.
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	2	Moderately correlated: Study of social sciences and sociology helps attain contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	2	Moderately correlated: Knowledge of relevance of social sciences and sociology in engineering studies helps understand the impact of the professional engineering solutions in societal and environmental contexts. Thereby, the students are able to demonstrate the knowledge of and need for sustainable development.
	PO8	2	Moderately correlated: Understanding the structure and function of society and the impact of engineering solutions in societal contexts help students apply ethical principles and commit to professional ethics, responsibilities, and norms of engineering practice.
	PO9	2	Moderately correlated: Knowledge of diverse social institutions and communities help students function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
	PO10	0	Not correlated

	PO11	0	Not correlated
	PO12	2	Moderately correlated: An overview of social sciences and sociology help students recognize the need to engage in independent and life-long learning in the broadest context of technological change.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO2	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	2	Moderately correlated: Understanding consumer behaviour and the role of various factors of production help in assessing societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	2	Moderately correlated: Understanding the role of various factors of production and consumption help formulate professional engineering solutions in societal and environmental contexts, and in acquiring knowledge of the need for sustainable development.
	PO8	0	Not correlated
	PO9	0	Not correlated
	PO10	0	Not correlated
	PO11	1	Low correlation: Understanding the scope and importance of Economics and the mechanism of production helps to manage projects in multidisciplinary environments.
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO3	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	1	Low correlation: Students will be able to apply reasoning informed by the knowledge of personality, motivation, learning, and their influence on human behaviour to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	0	Not correlated

	PO8	1	Low correlation: Understanding human psychology and human behaviour enhances effective application of ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
	PO9	3	Highly correlated: Evaluating the role of motivation, personality, learning, and human behaviour helps to function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
	PO10	2	Moderately correlated: Understanding the role of motivation and learning help communicate complex engineering activities with the engineering community and with society at large, and aides in delivering effective presentations, and giving and receiving clear instructions.
	PO11	0	Not correlated
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO4	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	2	Moderately correlated: Knowledge of the elements and functions of state, various forms of government, human rights and duties of citizens help give contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	1	Low correlation: Knowledge of the elements and functions of state, various forms of government, human rights and duties of citizens help understand the impact of the professional engineering solutions in societal and environmental contexts.
	PO8	2	Moderately correlated: Knowledge of human rights helps to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
	PO9	1	Low correlation: Knowledge of the human rights and duties help students to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
	PO10	0	Not correlated
	PO11	0	Not correlated

	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO5	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	1	Low correlation: Understanding the essentials for successful entrepreneurship and the procedures and facilities for setting up industrial units helps understand the impact of professional engineering solutions in societal and environmental contexts and the need for sustainable
	PO8	1	Low correlation: Understanding the essentials for successful entrepreneurship and the procedures and facilities for setting up industrial units helps applying ethical principles in engineering practice.
	PO9	0	Not correlated
	PO10	0	Not correlated
	PO11	2	Moderately correlated: Understanding the essentials for successful entrepreneurship facilitates the understanding of engineering and management principles and in managing projects in multidisciplinary environments.
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated

Course Name: PHYSICS - II

Course Code: PHY 201

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1		-	-	1	-	-	-	-	-	-
CO2	3	3	3	2	1		-	-	1	-	-	-	-	-	-
CO3	3	3	3	1	1		-	-	1	-	-	-	-	-	-
CO4	3	3	3	1	1		-	-	1	-	-	-	-	-	-

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	3	Strongly correlated to application of Quantum Mechanics Fundamentals in various branches of Engineering
	PO2	3	Moderately correlated to the theoretical knowledge of Quantum Mechanics for data interpretation
	PO3	2	Moderately correlated to knowledge of Quantum Mechanics Fundamentals in advanced engineering
	PO4	1	Satisfactory helps to achieve the skills through regular class discussion /seminar /poster presentation
	PO5	1	Low correlated to achieve the skills through learning various simulation tools
	PO6	0	
	PO7	0	
	PO8	0	
	PO9	1	Low correlated
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	

CO2	PO1	3	Strongly correlated to basics of Laser fundamentals in engineering knowledge
	PO2	3	Strongly correlated to the theoretical knowledge of laser in designing and conducting Experiments
	PO3	3	Strongly correlated to the Knowledge of laser fundamentals for designing materials
	PO4	2	Moderately correlated to conduct investigation, analysis and interpretation of data based on Laser problems through regular class discussion /seminar /poster presentation
	PO5	1	Less correlated to Application of laser in Advanced Engineering Fields
	PO6	1	
	PO7	0	
	PO8	0	
	PO9	1	Less correlated
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO3	PO1	3	Strongly correlated
	PO2	3	Strongly correlated to various requirements to fabricate optical fibers
	PO3	3	Strongly correlated
	PO4	1	Less correlated
	PO5	1	Less correlated
	PO6	1	
	PO7	0	
	PO8	0	
	PO9	1	Less correlated
	PO10	0	
	PO11	0	

	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO4	PO1	3	Strongly correlated to science by studying nuclear science and fission and fusion reaction takes place in physical science
	PO2	3	Strongly correlated to first principles of mathematics, natural sciences, and engineering sciences.
	PO3	3	Strongly correlated
	PO4	1	Minimal
	PO5	1	Minimal
	PO6	1	
	PO7	0	
	PO8	0	
	PO9	1	Minimal
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	

Course Name: Chemistry Laboratory-II

Course Code: 201P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2			2	2			2	1	1	2	2	3
CO2	2	2	3			2	3			1		2	2	3	1
CO3	2	2	1			2	2				2	1	3	2	2
CO4	3	2	1			1	1				1	1	2	3	2

CO-PO Mapping Justification

COs	PO/ PSO	Mapping	Justification
1	PO1	3	Strongly correlated
	PO2	2	Moderately correlated
	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10	2	Moderately correlated
	PO11	1	Minimal
	PO12	1	Minimal
	PSO1	2	Moderately correlated
	PSO2	2	Moderately correlated
	PSO3	3	Strongly correlated
2	PO1	2	Moderately correlated
	PO2	2	Moderately correlated

	PO3	3	Strongly correlated
	PO4		
	PO5		
	PO6	2	Moderately correlated
	PO7	3	Strongly correlated
	PO8		
	PO9		
	PO10	1	Minimal
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	1	Minimal
3	**PO1**	2	Moderately correlated
	PO2	2	Moderately correlated
	PO3	1	Minimal
	PO4		
	PO5		
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10		
	PO11	2	Moderately correlated
	PO12	1	Minimal
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlated
	PSO3	2	Moderately correlated
4	**PO1**	3	Strongly correlated

	PO2	2	Moderately correlated
	PO3	1	Minimal
	PO4		
	PO5		
	PO6	1	Minimal
	PO7	1	Minimal
	PO8		
	PO9		
	PO10		
	PO11	1	Minimal
	PO12	1	Minimal
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	2	Moderately correlated

Course Name: Mathematics-II

Course Code: MTH-201

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3								2	2	1
CO2	3	3	3	3	3								2	3	1
CO3	3	2	3	2	2								2	3	1
CO4	3	3	3	2	3								2	1	1
CO5	3	2	2	2	2								1	1	1

Course Name: Chemistry-II

Course Code: CHM-201

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	2			1	1					2	2	2	2
2	3	2	2	1	1		3	1	1			2	2	3	1
3	2	3	3	1		1	3	1	1	2		2	2	3	1
4	2	1	1		2	1						1	2	1	1

CO-PO Mapping Justification

COs	PO/ PSO	Mapping	Justification
1	PO1	2	Moderately correlated
	PO2	1	Minimal
	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	1	Minimal
	PO7	1	Minimal
	PO8		
	PO9		
	PO10		
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	2	Moderately correlated
	PSO3	2	Moderately correlated
2	PO1	3	Strongly correlated
	PO2	2	Moderately correlated
	PO3	2	Moderately correlated

	PO4	1	Minimal
	PO5	1	Minimal
	PO6		
	PO7	3	Strongly correlated
	PO8	1	Minimal
	PO9	1	Minimal
	PO10		
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	1	Minimal
3	**PO1**	2	Moderately correlated
	PO2	3	Strongly correlated
	PO3	3	Strongly correlated
	PO4	1	Minimal
	PO5		
	PO6	1	Minimal
	PO7	3	Strongly correlated
	PO8	1	Minimal
	PO9	1	Minimal
	PO10	2	Moderately correlated
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	1	Minimal
4	**PO1**	2	Moderately correlated
	PO2	1	Minimal

	PO3	1	Minimal
	PO4		
	PO5	2	Moderately correlated
	PO6	1	Minimal
	PO7		
	PO8		
	PO9		
	PO10		
	PO11		
	PO12	1	Minimal
	PSO1	2	Moderately correlated
	PSO2	1	Minimal
	PSO3	1	Minimal

Course Name: Engineering Mechanics

Course Code: CIV-201

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	2	1	-	-	-	-	-	2	-	1
CO2	3	3	2	2	-	2	1	-	-	-	-	-	2	1	2
CO3	3	3	2	2	-	2	1	-	-	-	-	-	2	1	2
CO4	3	3	2	2	-	2	1	-	-	-	-	-	2	1	2
CO5	3	3	2	2	-	2	1	-	-	-	-	-	2	1	2

Semester 3

Course Name: BASIC ELECTRICAL ENGINEERING

Course Code: ELE 301

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	1	-	-	-	-	-	2	1	1	1	2
CO2	2	2	2	3	2	-	-	-	-	-	2	2	3	-	2
CO3	3	1	2	2	-	-	-	-	-	-	-	1	1	-	-
CO4	3	1	2	3	1	-	-	-	-	-	-	2	-	1	2
CO5	3	2	2	1	2	-	-	-	-	-	3	1	1	2	2

CO-PO Mapping Justification

CO1: Analyse the behaviour of different electric circuit parameters and have a thorough understanding of different types of energy sources.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	3	Very Highly related to the design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO3	1	Loosely related to creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO4	2	Highly related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO5	1	Loosely related to effective communication 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.
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering

		and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	1	Loosely related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	1	Loosely influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO2: Analyse the different configurations of DC circuits using basic circuit laws like KVL, KCL and tools like mesh analysis and nodal analysis.

PS/PSO	**Mapping**	**Justification**
PO1	2	Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	Highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	2	Highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering

		and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	Highly related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO3: Apply network analysis theorems like Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum Power Transfer theorem to DC circuits and networks.

PS/PSO	**Mapping**	**Justification**
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	Very highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.

CO4: Use phasor representation for steady state analysis of sinusoidally excited AC circuits and apply different network techniques for their analysis.

PS/PSO	Mapping	Justification
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	1	Loosely related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	Highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	Loosely related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO12	2	Highly related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS02	1	Loosely influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO5: Understand the concept of active, reactive power and power factor correction in AC circuits. Analyse various configurations of 3-phase AC circuits.

PS/PSO	Mapping	Justification
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	Highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	1	Loosely related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	2	Very highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO11	3	Very Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	1	Loosely related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	2	Highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

Course Name: Basic Electrical Engineering Laboratory

Course Code: ELE-301P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2		1		3	1				2		2	2	1
CO2	3	3		2		3	2				3		2	3	1
CO3	2	3		3		3	3				3		2	3	1
CO4	3	1		1		1	2				1		2	1	1

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO 1	PO1	2	The study of basic circuit components involves the application of a number of mathematical tools in solving engineering problems.
	PO2	2	This lab course forms the building block for formulating and analyzing complex research problems in higher education.
	PO3	0	No co-relation
	PO4	1	The Lab course is an introductory course on experimentation and not a research level course but it does serve as a building block for higher level studies
	PO5	0	No co-relation
	PO6	3	High co-relation is terms of understanding the impact of power conservation, demand, and role of consumers in the grid.
	PO7	1	Slight co-relation with the impact of power generation on the environment.
	PO8	0	No co-relation
	PO9	0	No co-relation

	PO10	0	No co-relation
	PO11	2	Students understand the components of power circuits and get insights into financial implications of power circuit design.
	PO12	0	No co-relation
	PSO 1	2	Basics of electrical engineering are crucial in design, research, manufacturing principles
	PSO 2	2	Higher studies in other disciplines of electrical engineering requires some knowledge of basic principles
	PSO 3	1	Slight co-relation with understanding the impact and role of electricity on the society.
CO 2	PO1	3	The study of basic circuit components involves the application of a number of mathematical tools in solving engineering problems.
	PO2	3	KVL/KCL and circuit transformations form the building block for formulating and analyzing complex research problems in higher education.
	PO3	0	No co-relation
	PO4	2	KVL/KCL and circuit transformations serve as a building block for higher level studies
	PO5	0	No co-relation
	PO6	3	High co-relation is terms of understanding the impact of power generation, demand, and role of consumers in the grid.
	PO7	2	Decent co-relation with the impact of power generation on the environment.
	PO8	0	No co-relation
	PO9	0	No co-relation
	PO10	0	No co-relation
	PO11	3	Students understand the components of power circuits and get insights into financial implications of power circuit design.
	PO12	0	No co-relation

	PSO 1	2	Basics of electrical engineering are crucial in design, research, manufacturing principles
	PSO 2	3	Higher studies in other disciplines of electrical engineering requires some knowledge of basic principles
	PSO 3	1	Slight co-relation with understanding the impact and role of electricity on the society.
CO 3	PO1	2	The study of basic circuit theorems involves the application of a number of mathematical tools in solving engineering problems.
	PO2	3	This lab course forms the building block for formulating and analyzing complex research problems in higher education.
	PO3	0	No co-relation
	PO4	3	Circuit theorems are instrumental in all higher level studies in electrical engineering.
	PO5	0	No co-relation
	PO6	3	High co-relation is terms of understanding the impact of power conservation, demand, and role of consumers in the grid.
	PO7	3	High co-relation with the impact of power generation on the environment.
	PO8	0	No co-relation
	PO9	0	No co-relation
	PO10	0	No co-relation
	PO11	3	Students understand the components of power circuits and get insights into financial implications of power circuit design.
	PO12	0	No co-relation
	PSO 1	2	Basics of electrical engineering are important in design, research, manufacturing principles
	PSO 2	3	Higher studies in other disciplines of electrical engineering requires some knowledge of basic principles
	PSO 3	1	Slight co-relation with understanding the impact and role of electricity on the society.

CO 4	PO1	3	Power analysis involves the application of a number of mathematical tools in solving engineering problems.
	PO2	1	Analysis of AC power, reactive power and power factor has some importance in formulating and analyzing complex research problems in higher education.
	PO3	0	No co-relation
	PO4	1	The Lab course is an introductory course on experimentation and not a research level course but it does serve as a building block for higher level studies
	PO5	0	No co-relation
	PO6	1	Slight co-relation is terms of understanding the impact of power conservation, demand, and role of consumers in the grid.
	PO7	2	Decent co-relation of power flow studies in understanding the impact of power generation on the environment.
	PO8	0	No co-relation
	PO9	0	No co-relation
	PO10	0	No co-relation
	PO11	1	Students understand the components of power circuits and get insights into financial implications of power circuit design.
	PO12	0	No co-relation
	PSO 1	2	Basics of electrical engineering are crucial in design, research, manufacturing principles
	PSO 2	1	Higher studies in other disciplines of electrical engineering requires some knowledge of basic principles
	PSO 3	1	Slight co-relation with understanding the impact and role of electricity on the society.

Course Name: Electrical Engineering Materials

Course Code: MET-302 (Elective)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1			2									1	1	
CO2	2	2	2	2		1	1	1				1	2	1	1
CO3	3	2	2	2		1	1	1				1	2	1	2
CO4	3	2	2	2		1	1	1				1	2	1	2
CO5	3	2	2	2		1	1	1				1	2	1	2

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	1	Basic knowledge is connected
	PO2		No correlation
	PO3		No correlation
	PO4	2	Solve problems related to crystal structure
	PO5		No correlation
	PO6		No correlation
	PO7		No correlation
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12		No correlation
	PSO1	1	Slight understanding of electrical engineering related to crystal structure
	PSO2	1	Higher studies in Electrical materials
	PSO3		No correlation

CO2	**PO1**	**2**	Apply basic science and engineering knowledge to understand electrical conduction.
	PO2	**2**	Engineering problems related to electrical conduction
	PO3	**2**	Correlate public safety and electrical conduction systems
	PO4	**2**	Investigation of problems related to conduction
	PO5		No correlation
	PO6	**1**	Impart knowledge for safe electrical conduction
	PO7	**1**	Environmental impact of electrical systems
	PO8	**1**	Ethical norms pertaining to electrical conductors
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12	**1**	Basic understanding for long-term requirement
	PSO1	**2**	Slight understanding of electrical engineering related to electrical conduction
	PSO2	**1**	Higher studies in Electrical conduction materials
	PSO3	**1**	Entrepreneurial activity in electrical transmission systems
CO3	**PO1**	**3**	Basic science and engineering knowledge for Semiconductors
	PO2	**2**	Problem identification and analysis of semiconductor materials
	PO3	**2**	Solutions based on semiconductormaterials
	PO4	**2**	Solve problems related to semiconductor materials
	PO5		No correlation
	PO6	**1**	Impart knowledge for safe semiconductor devices
	PO7	**1**	Environmental impact of semiconductor devices
	PO8	**1**	Slight understanding of ethical norms
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12	**1**	Basic understanding for long-term requirement

	PSO1	**2**	Slight understanding of electrical engineering related to semiconductors
	PSO2	**1**	Higher studies in semiconductor materials
	PSO3	**2**	Technological development for semiconductors
CO4	**PO1**	**3**	Basic science and engineering knowledge for Superconductors
	PO2	**2**	Engineering problems related to magnets and superconductors are analyzed
	PO3	**2**	Knowledge of magnetic and superconductor solutions is imparted
	PO4	**2**	Solve problems related to magnetic materials
	PO5		No correlation
	PO6	**1**	Impart knowledge for safe superconductors
	PO7	**1**	Environmental aspects of magnetic devices
	PO8	**1**	Slight understanding of ethical norms
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12	**1**	Basic understanding for long-term requirement
	PSO1	**2**	Slight understanding of electrical engineering related to magnetic devices
	PSO2	**1**	Higher studies in superconductor materials
	PSO3	**2**	Technological development for magnetic materials
CO5	**PO1**	**3**	Basic science and engineering knowledge for optical materials
	PO2	**2**	Engineering problems related to optical materials are analyzed
	PO3	**2**	Knowledge of optical material solutions is imparted
	PO4	**2**	Solve problems related to optical materials
	PO5		No correlation
	PO6	**1**	Impart knowledge for safe optical solutions
	PO7	**1**	Environmental aspects of optical devices
	PO8	**1**	Slight understanding of ethical norms
	PO9		No correlation

	PO10		No correlation
	PO11		No correlation
	PO12	**1**	Basic understanding for long-term requirement
	PSO1	**2**	Slight understanding of electrical engineering related to optical devices
	PSO2	**1**	Higher studies in optical materials
	PSO3	**2**	Technological development for optical materials

Course Name: Electro Magnetic Fields & Wave

Course Code: PHY- 303

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	2										
CO2	3	3	2	2	3										
CO3	3	2	2	2	3										
CO4	3	2	2	1	3										

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	3	Strongly correlated to application of electrostatic in various branches of Engineering
	PO2	3	Moderately correlated to the theoretical knowledge of electrostatic for data interpretation and problem solving
	PO3	2	Moderately correlated to knowledge of electrostatic Fundamentals in advanced engineering
	PO4	1	Satisfactory helps to achieve the skills through regular class discussion /seminar /poster presentation
	PO5	2	Moderately correlated to achieve the skills through learning various simulation tools
	PO6	0	
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO2	PO1	3	Strongly correlated to basics of potential calculations in engineering knowledge especially in electrical engineering

	PO2	3	Strongly correlated to the theoretical knowledge of potential calculations by using different techniques in designing and conducting experiments
	PO3	2	Moderately correlated to the Knowledge of Laplace's equation in one, two and three Dimensions and boundary conditions for calculating potential.
	PO4	2	Moderately correlated to conduct investigation, analysis and interpretation of data based on potential problems through regular class discussion /seminar /poster presentation
	PO5	3	Strongly correlated to application of potential in Advanced Electrical Engineering Fields
	PO6	0	
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO3	PO1	3	Strongly correlated to magneto static field in engineering knowledge
	PO2	2	Moderately correlated to various requirements of using magneto static in electrical engineering for solving problems.
	PO3	2	Moderately correlated to design solutions related to various problems of magneto static
	PO4	2	Moderately correlated conduct investigations of complex problems of magneto static in electrical engineering
	PO5	3	Strongly correlated to use modern tool to create, select and apply relevant techniques for the calculation of magneto static related problems.
	PO6	0	
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	

	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO4	PO1	3	Strongly correlated to electrical engineering by studying electromagnetic waves.
	PO2	2	Partially correlated to problems of electromagnetic waves in electrical engineering.
	PO3	2	Moderately correlated design and development of solutions for complex problems of electromagnetic waves in electrical engineering.
	PO4	1	Minimal correlated to investigations of complex problems
	PO5	3	Strongly correlated to modern tool usages in electromagnetic waves.
	PO6	0	
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	

Course Name: Electronics-I

Course Code: ECE-302

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	-	-	1	-	-	-	1	3	3	3	2
CO2	3	2	3	3	-	-	2	-	-	-	2	3	3	3	2
CO3	3	3	3	3	-	3	2	-	-	-	-	3	3	3	3
CO4	2	2	2	2	-	2	2	-	-	-	-	3	3	3	2

CO-PO Mapping Justification

CO 302.1: Familiarization with basic semiconductors

PO'S	Mapping	Justification
PO1	3	This course outcome strongly correlates with program outcome 1 as the graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.

PO2	2	The course outcome moderately correlates with this PO as the student has the ability ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	2	This shows moderate correlation with this program outcome since it deals with design, conduction of experiments, analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	1	Weakly correlated as the student utilises research-based knowledge and research methods for the synthesis of

		the information in order to provide valid conclusions.
PO5	-	-
PO6	-	-
PO7	1	-
PO8	-	-
PO9	-	-
PO10	-	-

PO11	1	-
PO12	3	Strongly correlated since it recognizes the need for preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	The outcome has a strong correlation because it makes the students competent, creative and imaginative electrical engineers employable in fields ofdesign,research,manufacturing,safety,quality,technical services.
PSO2	3	Strong correlation as it helps the students to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	2	Moderate correlation as it deals with lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO 302.2: Understanding the behavior of different types of diodes at circuit level

PO'S	Mapping	Justification

PO1	3	The specified course outcome strongly correlates with this program outcome as the graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	2	The course outcome moderately correlates with this PO as the student has the ability ability to identify and analyze the problem in
		order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	3	This shows strong correlation with this program outcome since it deals with design, conduction of experiments, analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	3	Strongly correlated as the student utilises research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5	-	-

PO6	-	-
PO7	2	The course outcome is moderately correlated as the engineer needs to understand the impact of the professional engineering solutions in societal and environmental contexts and apply the knowledge for sustainable environmental development.
PO8	-	-
PO9	-	-
PO10	-	-
PO11	2	Moderately correlated as it involves effectively planning and dealing with engineering projects.
PO12	3	Strongly correlated since it recognizes the need for preparation and ability to engage in independent and life-long learning in the broadest context of technological change
PSO1	3	The outcome has a strong correlation because it makes the students competent, creative &imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality, technical services
PSO2	3	Moderate correlation as it enables the students should to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields

PSO3	2	Moderate correlation as it deals with the students to take lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.

CO 302.3: Analyze and study the behavior of different types of transistors such as bipolar junction transistors, JFET'S, MOSFET'S and amplifiers

PO'S	Mapping	Justification
PO1	3	This course outcome strongly correlates with program outcome 1 as the graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	3	The course outcome moderately correlates with this PO as the student has the ability ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	3	This shows strong correlation with this program outcome since it deals with design, conduction of experiments, analysis and interpretation of data to arrive at the correct solutions of various technical problems.

PO4	3	Strongly correlated as the student utilises research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5	-	-
PO6	3	Strongly correlated because there is application of reasoning
		and the contextual knowledge to assess societal health, safety, legal and cultural issues and the consequent fulfillment of the responsibilities relevant to the professional engineering practice
PO7	2	Moderate correlation as engineers need to understand the impact of the professional engineering solutions in societal and environmental contexts and apply the knowledge for sustainable environmental development.
PO8	-	-
PO9	-	-
PO10	-	-
PO11	-	-
PO12	3	Strongly correlated since it recognizes the need for preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1	3	The outcome has a strong correlation because it enables the students to be competent creative and imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality,technical services.
PSO2	3	Strong correlation as it enhances students to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	3	Strong correlation as it deals with the Students to take lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.

C0 302.4: Study of Cathode Ray Oscilloscope

PO'S	Map ping	Justification
PO1	2	This course outcome moderately correlates with program outcome 1 as the graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.

PO2	2	The course outcome moderately correlates with this PO as the student has the ability ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic
PO3	2	This shows moderate correlation with this program outcome since it deals with design, conduction of experiments, analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	2	Moderately correlated as the student utilises research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5	-	-
PO6	2	Moderate correlation because there is application of reasoning and the contextual knowledge to assess societal health, safety, legal and cultural issues and the consequent fulfillment of the responsibilities relevant to the professional engineering practice
PO7	2	Moderate correlation as it helps to understand the impact of the professional engineering solutions.
PO8	-	-
PO9	-	-

PO10	-	-
PO11	-	-
PO12	3	Strongly correlated since it recognizes the need for preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	The outcome has a strong correlation as it enables the students to be competent, creative and imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality, technical services.
PSO2	3	Strong correlation as it helps the students to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	2	Moderate correlation as it deals the students to take lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.

Course Name: Mathematics-III

Course Code: MTH-305

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3						1		1	2	3	1
CO2	2	2	2	2						1			1	3	1
CO3	3	3	2	2						1		1	2	3	1
CO4	2	3	3	2						1			2	1	1

CO-PO Mapping Justification

CO1 (304.1) : Apply various methods for evaluation Laplace and inverse Laplace transforms of various functions.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	3	Highly correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The CO is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO2 (304.2) Apply Laplace transform for solving ordinary differential equations.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4,	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9		No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	1	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3(304.3): Evaluate Fourier transforms of various functions and using Fourier transforms for solving partial differential equations.

PO/PSO	Mapping	Justification
PO1	3	It is Highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first

		principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The CO is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO4(304.4) : Develop the concept of Z-transforms , evaluate z-transforms of various functions and apply these concepts for solving difference equations

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	1	Less correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.

PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

Course Name: Network Analysis and Synthesis

Course Code: ECE-301

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	1	-	-	-	-	3	-	3	3	3	3
CO2	3	3	3	3	3	1	3	2	3	2	3	3	3	3	3
CO3	3	3	3	2	3	1	2	-	-	-	-	3	3	3	3
CO4	3	3	3	3	3	-	3	-	-	-	-	3	3	3	3

CO-PO Mapping Justification

	POs(PO1, PO2,…...) and PSOs (PSO1, SO2,PSO3)	**Degree of Correlation**
COs (CO1, CO2, ……..)	**Mapping Level (3)**	Excellent (highly correlated
	Mapping Level (2)	Good (moderate);
	Mapping Level (1)	Satisfied (Low);
	Mapping Level ( )	Blank: Not correlated

Course Name: THERMAL ENGINEERING
Course Code: MECH- ELE

CO-PO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2		2	1	2	2				2	3	2	3
2	3	2	2		2	2	2	2				2	3	2	3
3	3	2	2		2	2	2	2				2	3	2	3
4	3	3	3			3	1	2			3	2	3	1	3

CO-PO Mapping Justification

Cos	Pos		Justification
CO1	PO1	3	Strongly correlated to science and engineering fundamentals in such a way that to know the source of energy and combustion and chemical reaction takes place in fuels
	PO2	2	Moderately correlated to complex engineering analysis
	PO3	2	Moderately correlated to design solutions for complex engineering problems
	PO4	0	Minimal.
	PO5	2	Moderately correlated
	PO6	1	Minimal.
	PO7	2	Moderately correlated
	PO8	2	Moderately correlated
	PO9	0	Minimal, No literature survey or there is no complex designs involvement
	PO10	0	Minimal
	PO11	0	Strongly correlated by knowing investors profit depreciation
	PO12	2	Moderately correlated to lifelong learning because science and engineering are continuous learning process
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlated
	PSO3	3	Strongly correlated
CO2	PO1	3	Strongly correlated to Engineering
	PO2	2	Moderately correlated to first principles of mathematics for load calculation

	PO3	2	Moderately correlated
	PO4	0	Minimal.
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated to Environmental safety
	PO7	2	Moderately correlated
	PO8	2	Moderately correlated
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal.
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlated
	PSO3	3	Strongly correlated.
CO3	PO1	3	Strongly correlated to Engineering by studying mechanical works
	PO2	2	Moderately correlated to first principles of mathematics for load calculation
	PO3	2	Moderately correlated
	PO4	0	Minimal.
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated to Environmental safety
	PO7	2	Moderately correlated
	PO8	2	Moderately correlated
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal.
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlated
	PSO3	3	Strongly correlated
CO4	PO1	3	Strongly correlated to science
	PO2	3	Strongly correlated to first principles of mathematics, natural sciences, and engineering sciences.

	PO3	3	Strongly correlated
	PO4	0	Minimal.
	PO5	3	Strongly correlated
	PO6	3	Strongly correlated as the nuclear reaction safety and health issues
	PO7	1	Strongly correlated as the environmental context
	PO8	2	Moderately correlated
	PO9	0	Moderately correlated as the solution for pollution control and usage of renewable energy sources
	PO10	0	Minimal.
	PO11	3	Strongly correlated
	PO12	2	Moderately correlated as the invention is continuously takes place in enhancing the renewable energy sources
	PSO1	3	Minimal.
	PSO2	1	Less Moderately correlated advanced materials used in nuclear reactors
	PSO3	3	Strongly correlated

Semester 4

Course Name: Control System-I
Course Code: ELE- 402

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	1	3	1	3	2	2	3	2	2	1
CO2	3	3	3	2	3	2	3		2	2	2	3	2	3	1
CO3	3	3	3	3	1		2	2	3	2	1	3	2	3	1
CO4	3	2	3	3	3	2	3	2	3		3	3	2	1	1
CO5	3	3	3	1	3	2	3	2	1	3		3	2	1	1

3: Excellent (highly correlated) 2: Good (moderate); 1: Satisfied (Low); Blank: Not correlated

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	3	Basic knowledge of control systems will help he engineering graduates in solving complex engineering problems
	PO2	3	Research literature can be reviewed and sort of things
	PO3	3	Basic understanding about design / development of solutions can be attributed
	PO4	3	Basic investigation and research knowledge of control systems will be imparted
	PO5	3	Modelling of complex engineering problems related to control systems
	PO6	1	Correlate the societal activities/responsibilities with control systems
	PO7	3	Strongly connect the environmental aspects with control systems
	PO8	1	Understand professional ethics and responsibilities relating to control systems
	PO9	3	Basic team-effort skills
	PO10	2	Effective communication related to the basics of control systems
	PO11	2	Slight understanding of technical and financial relation to control
	PO12	3	Life long understanding of the control system basics
	PSO1	2	Understanding of electrical engineering relating to Control Systems
	PSO2	2	Higher studies in Control related areas in Electrical Engineering
	PSO3	1	Basic understanding of the need of society with inclusion of control systems
CO2	PO1	3	Apply basic science, mathematical and engineering knowledge to understand, model and analyze various control systems
	PO2	3	Problem identification and mathematical analysis of control systems
	PO3	3	Design and development of solutions using basic knowledge of control
	PO4	2	Knowledge of control system modelling is used to solve complex control problems
	PO5	3	Usage of the advanced tools.
	PO6	2	Acceptable results to the society with the knowledge of control systems

	PO7	**3**	Environmental and societal impact of control systems
	PO8		No correlation
	PO9	**2**	Basic team-effort skills
	PO10	**2**	Effective communication related to the modelling of control systems
	PO11	**2**	Understanding of mathematical models of management
	PO12	**3**	Basic understanding of control system modelling for long-term requirement
	PSO1	**2**	Creative knowledge is inculcated for design and modelling in relation to electrical and mechanical systems
	PSO2	**3**	Higher studies and professional requirement in relation mathematical modelling and analysis of control systems is instilled
	PSO3	**1**	Technological development for better opportunity is infused
CO3	**PO1**	**3**	Basic engineering knowledge for analysis of first and second order ssytems
	PO2	**3**	Problem identification and analysis is carried out
	PO3	**3**	Design and development of solutions using basic knowledge and mathematical modelling of control systems
	PO4	**3**	Knowledge of time response analysis is used to solve complex control problems
	PO5	**1**	Slight usage of the advanced tools.
	PO6		No correlation
	PO7	**2**	Environmental and societal impact of control systems is taught
	PO8	**2**	Slight understanding of ethical norms
	PO9	**3**	Basic team-effort skills
	PO10	**2**	Effective communication related to the time response analysis of various systems
	PO11	**1**	Slight understanding of technical and financial relation to control
	PO12	**3**	Understanding of control system response analysis for long-term requirement
	PSO1	**2**	Creative knowledge is inculcated for design and research
	PSO2	**3**	Higher studies and professional requirement is brought into highlight
	PSO3	**1**	Technological development for better opportunity is imparted
CO4	**PO1**	**3**	Basic knowledge of stability of control systems is connected
	PO2	**2**	Research analysis can be carried out
	PO3	**3**	Slight knowledge of design / development of solutions is imparted
	PO4	**3**	Future options are highlighted
	PO5	**3**	Modelling of complex engineering problems related to control systems
	PO6	**2**	Correlate the societal activities/responsibilities with Control systems
	PO7	**3**	Environmental aspects for future energy sources
	PO8	**2**	Understand professional ethics and responsibilities relating to control systems
	PO9	**3**	Basic team-effort skills
	PO10		No correlation
	PO11	**3**	Probable engineering and management principles pertaining to the future of control systems
	PO12	**3**	Basic understanding of control system stability for long-term requirement
	PSO1	**2**	Creative knowledge is inculcated for stability analysis in relation to

			different control systems
	PSO2	**1**	Higher studies and professional requirement in relation to the stability of control systems is instilled
	PSO3	**1**	Technological development for better opportunity is infused
CO5	**PO1**	**3**	Apply basic science, mathematical and engineering knowledge to understand, model and design various controllers
	PO2	**3**	Problem identification and mathematical analysis of controllers
	PO3	**3**	Design and development of solutions using basic knowledge of controller designs
	PO4	**1**	Knowledge of controller design is used to solve complex control problems
	PO5	**3**	Usage of the advanced tools.
	PO6	**2**	Acceptable results to the society with the knowledge of controllers
	PO7	**3**	Environmental and societal impact of control systems
	PO8	**2**	Understand professional ethics and responsibilities relating to control systems
	PO9	**1**	Basic team-effort skills
	PO10	**3**	Effective communication related to the modelling controllers
	PO11		Understanding of mathematical models of management
	PO12	**3**	Basic understanding of control system modelling for long-term requirement
	PSO1	**2**	Creative knowledge is inculcated for design of controllers for electrical and mechanical systems
	PSO2	**1**	Higher studies and professional requirement in relation to modelling and analysis of controllers is instilled
	PSO3	**1**	Technological development for better opportunity is infused

Course Name: Electrical Machines-I

Course Code: ELE-401

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2		1		3	1				2		2	2	1
CO2	3	3		2		3	2				3		2	3	1
CO3	2	3		3		3	3				3		2	3	1
CO4	3	1		1		1	2				1		2	1	1

CO-PO Mapping Justification

CO1: Apply the basic principles of electromechanical energy conversion to Electrical Machines

CO	PO/PSO	Mapping	Justification
CO1	PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO4	1	It is less correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	PO5		No correlation
	PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	1	Less correlated to 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
	PO8		No correlation
	P		No correlation

	O 9		
	P O 1 0		No correlation
	P O 1 1	**2**	It is Moderately correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	P O 1 2		No correlation
	P S O 1	**2**	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	P S O 2	**2**	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	P S O 3	**1**	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO2: Analyze operating characteristics of various types of DC Generators.

C O	**P O / P S O**	**Ma ppi ng**	**Justification**
C O 2	**P O 1**	**3**	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	P O 2	**3**	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	P O 3		No correlation
	P O 4	**2**	It is Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	P		No correlation

	O 5		
	P O 6	**3**	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	P O 7	**2**	It is Moderately correlated to 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
	P O 8		No correlation
	P O 9		No correlation
	P O 1 0		No correlation
	P O 1 1	**3**	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principle and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	P O 1 2		No correlation
	P S O 1	**2**	It is Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	P S O 2	**3**	It is highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	P S O 3	**1**	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO3: Identify various speed control methods of DC Motor and evaluate this performance.

C O	**P O / P S O**	**Ma ppi ng**	**Justification**

CO3	PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO4	3	It is highly correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	PO5		No correlation
	PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	3	It is highly correlated to 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
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	PO12		No correlation
	PSO1	2	It is Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	PSO2	3	It is highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	P	1	It is Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of

	SO3		professional and moral ethics and prove themselves beneficial to society at large.

CO4: Analyze the performance of Transformers and selecting it for particular application.

CO	**PO/PSO**	**Mapping**	**Justification**
CO4	**PO1**	**3**	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	**1**	It is Less correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO4	**1**	It is Less correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	PO5		No correlation
	PO6	**1**	It is Less correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	**2**	It is Moderately correlated to 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
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11	**1**	It is Less correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

	PO12		No correlation
	PSO1	**2**	It is Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	PSO2	**1**	It is Partially correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	PSO3	**1**	It is Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

Course Name: Electrical Measurements and Measuring Instruments
Course Code: ELE-403

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1				2	2	2	2	1
CO2	3	3	3	2	1	3	3				3	2	2	3	1
CO3	2	3	3	3	1	3	3				3	2	2	3	1
CO4	3	3	3	2	1	3	3				3	2	2	3	1

CO-PO Mapping Justification

CO1(232.1) : : **Develop the basic concept of basic terms used in measurements**

PO/PSO	Mapping	Justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.

PO12	3	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO2 (232.2) Develop the understanding of effects utilized in measuring instruments

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is partially correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.

PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3(232.3): Develop the knowledge of Measurement of Power, Energy and Power Factor

PO/PSO	Mapping	justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO4(232.4) : Develop an understanding of Measurement of Resistance

PO/PSO	Mapping	justification
PO1	3	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	1	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The COs is partially correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	1	Partially correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.

PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

Course Name: Electrical Measurement & Instrumentation Lab
Course Code: ELE-403P

CO-PO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	1	1	1	1	3	2	2	2	2	2	1
2	3	3	3	2	2		1	1	3	3	3	2	3	3	1
3	3	3	3	1	2		1		3	3	3	3	3	3	1

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	3	Strong corelation between concepts and applications
	PO2	3	Strong corelation between concepts and applications
	PO3	2	Basic understanding about design / development of solutions can be attributed
	PO4	1	Correlates the mathematical analysis with basic concepts
	PO5	1	Addresses fundamental concepts
	PO6	1	Correlate the concepts with basics
	PO7	1	Strong corelation between concepts and applications
	PO8	1	Correlation between basic aims
	PO9	3	Correlates the concepts with basics
	PO10	2	Moderate corelation between concepts and applications
	PO11	2	Develops technical skills
	PO12	2	Moderately relates the concepts and applications
	PSO1	2	Understanding of electrical engineering problems relating to measurements.
	PSO2	2	Higher studies in instrumentation.

	PSO3	**1**	Basic understanding of instrumentation.
CO2	**PO1**	**3**	Apply basic science and engineering knowledge to understand and analyze major problems
	PO2	**3**	Problem identification and analysis
	PO3	**3**	Design and development of solutions
	PO4	**2**	Final stage / end user requirement fulfillment
	PO5	**2**	Final stage / end user requirement fulfillment
	PO6		No correlation
	PO7	**1**	Basic knowledge applied
	PO8	**1**	Basic concepts corelated
	PO9	**3**	Application of important concepts
	PO10	**3**	Application of important concepts
	PO11	**3**	Strong corelation between concepts and applications
	PO12	**2**	Basic understanding for long-term requirement
	PSO1	**3**	Creative knowledge is inculcated for design and research in relation to electrical measurements.
	PSO2	**3**	Higher studies and professional requirement in relation to control engineering
	PSO3	**1**	Advanced technological development for better opportunity is infused
CO3	**PO1**	**3**	Basic science and engineering knowledge for Measurement of Power, Energy and Power Factor
	PO2	**3**	Problem identification and analysis carried out
	PO3	**3**	Problem identification and analysis carried out
	PO4	**1**	Useful to extension of knowledge
	PO5	**2**	Slight usage of the advanced tools.
	PO6		No Correlation
	PO7	**1**	Connection between concepts and applications
	PO8		No correlation
	PO9	**3**	Strong correlation between ideas and applicaitons

	PO10	**3**	Strong correlation between concepts and applications
	PO11	**3**	Strong correlation between concepts and applications
	PO12	**3**	Development of practical experience with handling instruments.
	PSO1	**3**	Creative knowledge is inculcated for design and research
	PSO2	**3**	Higher studies and professional requirement is brought into highlight
	PSO3	**1**	Technological development for better opportunity is imparted

Course Name: Electronics II
Course Code: ECE -402

CO-PO Mapping

Course outcomes	Program outcomes												Program specific Outcomes		
	PO - 1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO - 3
C402.1	2	1	1	0	0	0	0	0	0	1	0	2	2	2	1
C402.2	3	3	2	0	0	0	0	0	0	1	0	3	1	3	1
C402.3	2	3	2	0	0	0	0	0	0	2	0	3	2	3	1
C402.4	3	3	3	1	0	0	0	0	0	2	0	1	2	2	1

CO-PO Mapping Justification

CO1(402.1): **Develop the concept of feedback and analysis of different feedback topologies.**

PO/PSO	Mapping	Justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	1	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,P05,PO6,PO7,PO8,PO9	0	No relevance found upon this Criteria, so mapped to level 0.

PO10	1	Partially correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electronic & Comm. engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to develop the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems /processes for a variety of applications.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove them beneficial to society at large.

CO2 (402.2) Analysis and design of sinusoidal oscillators and multivibrators.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to the application of the knowledge of mathematics, science and engineering fundamentals.
PO2	3	It is highly correlated in identifying and analysing the problems in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.

PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components as well as analyse and interpret the data to arrive at the correct solutions of various technical problems.
PO4,PO5,PO6,PO7,PO8,PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	1	Partially correlated to develop the ability to associate the learning to real world problems and arrive at their solutions.
PSO2	3	Highly correlated to develop the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems /processes for a variety of applications.
PSO3	1	Partially correlated to design Electrical, Electronics and Communication systems containing Electrical/ Electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering.

CO3(402.3): Understanding of basic concepts of power amplifiers and IC regulated power supplies.

PO/PSO	Mapping	Justification

PO1	2	It is moderately correlated to the application of the knowledge of mathematics, science and engineering fundamentals.
PO2	3	It is highly correlated in identifying and analysing the problems in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4,PO5,PO6,PO7,PO8,PO9	0	No relevance found upon these Criteria, so mapped to level 0.
PO10	2	Less correlated to the selection and application of appropriate techniques and modern engineering tools like MATLAB, CADENCE etc. for prediction and modelling of complex engineering problems with an understanding of the practical limitations.
PO11	0	No relevance found upon these Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated to develop the ability to associate the learning to real world problems and arrive at their solutions.
PSO2	3	Highly correlated to develop the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems /processes for a variety of applications.

PSO3	1	Moderately correlated to design Electrical, Electronics and Communication systems containing Electrical/ Electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering.

CO4(402.4) :Understanding basics of an OPAMP, its linear & non-linear applications and understanding circuit design of basic gates using various logic families.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to the application of the knowledge of mathematics, science and engineering fundamentals.
PO2	3	It is highly correlated in identifying and analysing the problems in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	1	It is partially correlated to the investigation of complex problems by using research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5,PO6,PO7,PO8,PO9	0	No relevance found upon these Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon these Criteria, so mapped to level 0.
PO12	1	The COs is partially correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1	2	Less correlated for proficient Electronics & Comm. engineers employable to serve in the industry, government and allied services.
PSO2	2	Less correlated to ability to advance in academic and research pursuits in Electronics & Comm. and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove them beneficial to society at large.

Course Name: ELECTRONIC CIRCUITS-II LAB
Course Code:

CO-PO Mapping

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	3	3	-	-	-	-	-	-	3	3	3	-
2	3	3	3	3	3	-	-	-	-	-	-	3	3	3	-
3	3	3	3	3	3	-	-	-	-	-	-	3	3	3	-
4	3	3	3	3	3	-	-	-	-	-	-	3	3	3	-

Course Name: Mathematics-IV
Course Code MTH-402

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3	-	-	-	-	-	1	-	1	2	3	1
CO2	2	2	2	2	-	-	-	-	-	1	-	-	1	3	1
CO3	3	3	2	2	-	-	-	-	-	1	-	1	2	3	1
CO4	2	3	3	2	-	-	-	-	-	1	-	-	2	1	1
CO5	2	3	3	2	-	-	-	-	-	1	-	-	2	1	1

CO-PO Mapping Justification

CO1: Determination of Analytic functions their Harmonic conjugates and Laplace equation

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	3	Highly correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.

PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO2 : Differentiate and Integrate complex functions

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.

PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	1	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3: Calculate singularities of a complex function and their classification and Expand complex valued functions in terms of Taylor, Laurent series

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The CO is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO4: Evaluation of Integrals over contours.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis

		of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	2	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	1	Less correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO5: Understand Wavelet transform as a two parameter transform and its properties.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	2	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	1	Less correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

Course Name: Electric Machines – I Lab
Course Code: ELE- 401P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2		1		3	1				2		2	2	1
CO2	3	3		2		3	2				3		2	3	1
CO3	2	3		3		3	3				3		2	3	1
CO4	3	1		1		1	2				1		2	1	1

CO-PO Mapping Justification

CO1	To understand the performance of single Phase Transformer on different load conditions

CO	PO/PSO	Mapping	Justification
CO1	PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO4	1	It is less correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	PO5		No correlation
	PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	1	Less correlated to 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
	PO8		No correlation
	PO		No correlation

	9		
	PO10		No correlation
	PO11	**2**	It is Moderately correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	PO12		No correlation
	PSO1	**2**	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	PSO2	**2**	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	PSO3	**1**	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO2	To understand the performance of Three Phase Transformer on different load conditions

CO	**PO/PSO**	**Mapping**	**Justification**
CO2	**PO1**	**3**	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	**3**	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO	**2**	It is Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

	4		
	PO5		No correlation
	PO6	**3**	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	**2**	It is Moderately correlated to 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
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11	**3**	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principle and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	PO12		No correlation
	PSO1	**2**	It is Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	PSO2	**3**	It is highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	PSO3	**1**	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO3	To determine the internal and external characteristics of the different types of dc generator by conducting load test

CO	**PO**	**Mappi**	**Justification**

	/ PSO	**ng**	
CO3	**PO1**	**2**	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	**3**	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO4	**3**	It is highly correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	PO5		No correlation
	PO6	**3**	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	**3**	It is highly correlated to 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
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11	**3**	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	PO12		No correlation
	PSO1	**2**	It is Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	P	**3**	It is highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines

	SO2		
	PSO3	1	It is Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO	PO/PSO	Mapping	Justification
CO4	To determine the magnetization characteristics of the given dc shunt generator and to determine its critical field resistance and critical speed		
CO4	PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems
	PO2	1	It is Less correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
	PO3		No correlation
	PO4	1	It is Less correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
	PO5		No correlation
	PO6	1	It is Less correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	2	It is Moderately correlated to 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
	PO8		No correlation

	PO9		No correlation
	PO10		No correlation
	PO11	**1**	It is Less correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
	PO12		No correlation
	PSO1	**2**	It is Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services
	PSO2	**1**	It is Partially correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines
	PSO3	**1**	It is Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

Semester 5

Course Name: Mathematics-V
Course Code: MTH-503

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3	-	-	-	-	-	1	-	1	2	3	1
CO2	2	2	2	2	-	-	-	-	-	1	-	-	1	3	1
CO3	3	3	2	2	-	-	-	-	-	1	-	1	2	3	1
CO4	2	3	3	2	-	-	-	-	-	1	-	-	2	1	1
CO5	2	3	3	2	-	-	-	-	-	1	-	-	2	1	1

CO-PO Mapping Justification

CO1: Understand and apply Newton difference formulae

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	3	Highly correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The COs is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO2 : Solve algebraic and transcendental equations using numerical techniques

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4,	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	1	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3: Solve integrals by using numerical techniques

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first

		principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is moderately correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4,	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The CO is less correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO4: Solve ordinary differential equations by numerical techniques

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	2	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	1	Less correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.
PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove

		themselves beneficial to society at large.

CO5: To understand Law of Total Probability , Baye's Theorem, Random Variables and apply Law of expectations

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	Moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5,PO6,PO7,PO8, PO9	0	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	0	No relevance found upon this Criteria, so mapped to level 0.
PSO1	2	Less correlated for proficient Electrical engineers employable to serve in the industry, government and allied services.
PSO2	1	Less correlated to ability to advance in academic and research pursuits in Electrical engineers and allied disciplines.

PSO3	1	Less correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

Course Name: Control System &VI Lab
Course Code: ELE- 503P

CO-PO Mapping

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	2	1	1	1	1	1	3	2	2	2	2	2	1
2	3	3	3	2	2		1	1	3	3	3	2	3	3	1
3	3	3	3	1	2		1		3	3	3	3	3	3	1

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	3	Strong corelation between concepts and applications
	PO2	3	Strong corelation between concepts and applications
	PO3	2	Basic understanding about design / development of solutions can be attributed
	PO4	1	Correlates the mathematical analysis with basic concepts
	PO5	1	Addresses fundamental concepts
	PO6	1	Correlate the concepts with basics
	PO7	1	Strong corelation between concepts and applications
	PO8	1	Correlation between basic aims
	PO9	3	Correlates the concepts with basics
	PO10	2	Moderate corelation between concepts and applications
	PO11	2	Develops technical skills
	PO12	2	Moderately relates the concepts and applications
	PSO1	2	Understanding of electrical engineering problems relating to control
	PSO2	2	Higher studies in control design
	PSO3	1	Basic understanding of control applications
CO2	PO1	3	Apply basic science and engineering knowledge to understand and analyze major problems
	PO2	3	Problem identification and analysis
	PO3	3	Design and development of solutions
	PO4	2	Final stage / end user requirement fulfillment
	PO5	2	Final stage / end user requirement fulfillment
	PO6		No correlation
	PO7	1	Basic knowledge applied
	PO8	1	Basic concepts corelated

	PO9	**3**	Application of important concepts
	PO10	**3**	Application of important concepts
	PO11	**3**	Strong corelation between concepts and applications
	PO12	**2**	Basic understanding for long-term requirement
	PSO1	**3**	Creative knowledge is inculcated for design and research in relation to control engineering
	PSO2	**3**	Higher studies and professional requirement in relation to control engineering
	PSO3	**1**	Advanced technological development for better opportunity is infused
CO3	**PO1**	**3**	Basic science and engineering knowledge for control theory
	PO2	**3**	Problem identification and analysis carried out
	PO3	**3**	Problem identification and analysis carried out
	PO4	**1**	Useful to extension of knowledge
	PO5	**2**	Slight usage of the advanced tools.
	PO6		No Correlation
	PO7	**1**	Connection between concepts and applications
	PO8		No correlation
	PO9	**3**	Strong correlation between ideas and applicaitons
	PO10	**3**	Strong correlation between concepts and applications
	PO11	**3**	Strong correlation between concepts and applications
	PO12	**3**	Development of practical experience with handling control equipment
	PSO1	**3**	Creative knowledge is inculcated for design and research
	PSO2	**3**	Higher studies and professional requirement is brought into highlight
	PSO3	**1**	Technological development for better opportunity is imparted

Course Name: Digital Electronics and Logic Design Lab
Course Code: **ECE 509P**

CO-PO Mapping

Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab												Digital Electronics and Logic Design Lab		
	Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	2	2				2	2		1		2	3	2
Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	2	2				2	2		1		2	3	2
Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	3	3				2	2		1		2	3	2
Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	Digital Electronics and Logic Design Lab	3	3				2	2		2		2	3	2

Course Name: Digital Electronics & Logical Design

Course Code: **ECE 509**

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C403.1	3	2	1		1						1	3	1		1
C403.2	3	3	3		3						3	3	3	2	3
C403.3	2	3	3		2						1	3	2	2	3
C403.4	3	3	3	2	3						3	3	3	3	3

CO-PO Mapping Justification

C403.1: To represent numbers in different number systems, binary codes and to perform their conversions and arithmetic operations.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	2	It is partially correlated to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	1	It is less correlated to design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO5	1	It is less correlated to select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO11	1	It is less correlated to effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects.
PO12	3	It is highly correlated to recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	1	It is less correlated to associate the learning from the courses related to Electronics and Communication to arrive at solutions to real world problems.
PSO3	1	It is less correlated to design Electrical, Electronics and Communication systems containing Electrical/ Electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication

C403.2: To understand the Boolean algebra/theorems, K-Map and Q-M method and minimization of logic function using them, design and analysis of various combinational circuits.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	3	It is highly correlated to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	3	It is highly correlated to design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO5	3	It is highly correlated to select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO11	3	It is highly correlated to effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects.
PO12	3	It is highly correlated to recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	It is highly correlated to associate the learning from the courses related to Electronics and Communication to arrive at solutions to real world problems.
PSO2	2	It is partially correlated to comprehend the technological advancements in the usage of modern design tools to analyze and design.
PSO3	3	It is highly correlated to design Electrical, Electronics and Communication systems containing Electrical/ Electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering.

C403.3: To understand lathes and flip flops and designing various sequential circuits using various flip flops.

PO/PSO	Mapping	Justification
PO1	2	It is partially correlated to fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	3	It is highly correlated to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	3	It is highly correlated to design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO5	2	It is partially correlated to select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO11	1	It is less correlated to effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects.
PO12	3	It is highly correlated to recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	It is partially correlated to associate the learning from the courses related to Electronics and Communication to arrive at solutions to real world problems.
PSO2	2	It is partially correlated to comprehend the technological advancements in the usage of modern design tools to analyze and design.
PSO3	3	It is highly correlated to design Electrical, Electronics and Communication systems containing Electrical/ Electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering.

C403.4: To understand basic concept of semiconductor memories, PLA, PAL, ADC, DAC and VHDL programming

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	3	It is highly correlated to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	3	It is highly correlated to design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	2	It is partially correlated to use of research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5	3	It is highly correlated to select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO11	1	It is less correlated to effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects.
PO12	2	It is partially correlated to to recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Highly correlated to associate the learning from the courses related to Electronics and Communication to arrive at solutions to real world problems.
PSO2	3	Highly correlated to comprehend the technological advancements in the usage of modern design tools to analyze and design.
PSO3	3	Highly correlated to design Electrical, Electronics and Communication systems containing Electrical/ Electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering.

Course Name: Communication Systems

Course Code: ***ECE -508***

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	3	1	1	1	1	2	1	2	2	3	1
CO2	3	3	3	2	3	2	2	1	1	1	1	2	3	3	3
CO3	2	1	3	1	2	1	1	0	1	0	1	1	3	2	3
CO4	3	3	2	3	3	0	1	0	1	0	1	3	3	3	3

CO-PO Mapping

CO-PO Mapping Justification

CO-1: Understanding of basic principles of communication system and Fourier analysis of different signals	
PO1	CO1 is strongly related to the PO that a graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	CO1 is strongly related to the PO that a student should have the ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	CO1 is weakly related to the PO that Design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	CO1 is moderately related to the PO that use of research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.

PO5	CO1 is strongly related to the PO that Select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc. for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO6	CO1 is weakly related to the PO that Apply reasoning and the contextual knowledge to assess societal health, safety, legal and cultural issues and the consequent fulfillment of the responsibilities relevant to the professional engineering practice.
PO7	CO1 is weakly related to the PO that understand the impact of the professional engineering solutions in societal and environmental contexts and apply the knowledge for sustainable environmental development.
PO8	CO1 is weakly related to the PO that Ability to think both creatively as well as analytically with an understanding of professional and ethical responsibility.
PO9	CO1 is weakly related to the PO that Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10	CO1 is moderately related to the PO that Communicate effectively on 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
PO11	CO1 is weakly related to the PO that Effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects
PO12	CO1 is moderately related to the PO that Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	CO1 is moderately related to the PSO that Students should be competent, creative and imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality, technical services
PSO2	CO1 is strongly related to the PSO that Students should be able to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	CO1 is weakly related to the PSO that **S**tudents should take lead in innovation and

	entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.
CO-2: To understand and analyze various analog modulation and demodulation schemes (AM, FM, PM)	
PO1	CO2 is strongly related to the PO that a graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	CO2 is strongly related to the PO that a student should have the ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	CO2is strongly related to the PO that Design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	CO2is moderately related to the PO that use of research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5	CO2 is strongly related to the PO that Select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc. for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO6	CO2 is moderately related to the PO that apply reasoning and the contextual knowledge to assess societal health, safety, legal and cultural issues and the consequent fulfillment of the responsibilities relevant to the professional engineering practice.
PO7	CO2 is moderately related to the PO that understand the impact of the professional engineering solutions in societal and environmental contexts and apply the knowledge for sustainable environmental development.
PO8	CO2 is weakly related to the PO that Ability to think both creatively as well as analytically with an understanding of professional and ethical responsibility.
PO9	CO2 is weakly related to the PO that Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10	CO2 is weakly related to the PO that Communicate effectively on 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.
PO11	CO2 is weakly related to the PO that Effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects.
PO12	CO2 is moderately related to the PO that Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	CO2 is strongly related to the PSO that Students should be competent, creative and imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality, technical services
PSO2	CO2 is strongly related to the PSO that Students should be able to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	CO2 is strongly related to the PSO that **S**tudents should take lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.
CO-3: To understand various reception techniques and the performance analysis of different radio receivers.	
PO1	CO3 is moderately related to the PO that a graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	CO3 is weakly related to the PO that a student should have the ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	CO3 is strongly related to the PO that Design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	CO3 is weakly related to the PO that use of research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.

PO5	CO3 is moderately related to the PO that Select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO6	CO3 is weakly related to applying reasoning and the contextual knowledge to assess societal health, safety, legal and cultural issues and the consequent fulfillment of the responsibilities relevant to the professional engineering practice
PO7	CO3 is weakly related to understanding the impact of the professional engineering solutions in societal and environmental contexts and apply the knowledge for sustainable environmental development
PO8	Not correlated
PO9	CO3 is weakly related to the PO that Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10	Not correlated
PO11	CO3 is weakly related to the PO that Effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects
PO12	CO3 is weakly related to the PO that Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	CO3 is strongly related to the PSO that Students should be competent, creative and imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality, technical services
PSO2	CO3 is moderately related to the PSO that Students should be able to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	CO3 is strongly related to the PSO that **S**tudents should take lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.

CO-4: To understand and analyze Analog to conversion and various digital modulation techniques.	
PO1	CO4 is strongly related to the PO that a graduate should have a sound working knowledge of the fundamental principles of mathematics, science, and engineering that forms the basis of Electronics and Communication Engineering.
PO2	CO4 is strongly related to the PO that a student should have the ability to identify and analyze the problem in order to solve the complex engineering problems by reinforcing a systematic approach to problem solving.
PO3	CO4is moderately related to the PO that Design, conduct of experiments, as well as analysis and interpretation of data to arrive at the correct solutions of various technical problems.
PO4	CO4 is strongly related to the PO that use of research-based knowledge and research methods for the synthesis of the information in order to provide valid conclusions.
PO5	CO4 is strongly related to the PO that Select and apply appropriate techniques and modern engineering tools like MATLAB, CADENCE etc. for prediction and modeling of complex engineering problems with an understanding of the practical limitations.
PO6	Not correlated
PO7	CO4 is weakly related to the PO that understand the impact of the professional engineering solutions in societal and environmental contexts and apply the knowledge for sustainable environmental development.
PO8	Not correlated
PO9	CO4 is weakly related to the PO that function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10	Not correlated
PO11	CO4 is weakly related to the PO that effectively plan, organize, schedule, execute, and lead engineering management-related projects and manage relevant financial aspects.
PO12	CO4 is strongly related to the PO that Recognize the need for and have the preparation and

	ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	CO4is strongly related to the PSO that Students should be competent, creative and imaginative electrical engineers employable in fields of design, research, manufacturing, safety, quality, technical services
PSO2	CO4 is strongly related to the PSO that Students should be able to progress through an advanced degree, certificate programs or participate in continuing education in electrical engineering, business, and other professionally related fields.
PSO3	CO4 is strongly related to the PSO that **S**tudents should take lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large.

Course Name: Control System-II
Course Code: ELE- 503

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	1			1	1		2	2	2	1
CO2	3	3	3	3	2	2			2	2	1	3	2	3	1
CO3	3	3	3	3	3	2	2	1	2	1	1	2	2	3	1
CO4	3	2	3	3	3	3	2	1	2		1	3	2	1	1

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO 1	PO1	3	State variable modeling knowledge will greatly help students in solution of complex engineering problems.
	PO2	2	Research literature can be reviewed and sort of things
	PO3	1	Basic understanding about design / development of solutions can be attributed
	PO4	1	Basic investigation and research knowledge will be imparted.
	PO5	2	Modeling of complex engineering problems.
	PO6	1	Correlate the societal activities/responsibilities with basic knowledge of control.
	PO7		No correlation
	PO8		No correlation
	PO9	1	Basic team-effort skills.
	PO10	1	Basic communication and presentation skills.
	PO11		No correlation
	PO12	2	Life-Long learning of modeling complex dynamical systems is learned
	PSO1	2	Understanding of electrical engineering problems.
	PSO2	2	Higher studies in control and automation or robotics courses.

	PSO 3	**1**	Basic societal ethics.
CO 2	**PO1**	**3**	Strongly correlated to engineering knowledge.
	PO2	**3**	Strongly correlated to problem identification and analysis.
	PO3	**3**	Strongly correlated to Design and development of solutions using state-variable modeling techniques.
	PO4	**3**	Analysis and research-based knowledge.
	PO5	**2**	Sight usage of the advanced tools.
	PO6	**2**	Acceptable results to the society and professional engineering practice.
	PO7		No correlation
	PO8		No correlation
	PO9	**2**	Moderate team-work and leadership skills.
	PO10	**2**	Moderate communicational skills.
	PO11	**1**	Basic project management skills.
	PO12	**3**	Physical and artificial nonlinear systems .
	PSO 1	**2**	Creative knowledge is inculcated for design and research in relation to design of electrical and mechanical systems.
	PSO 2	**3**	Higher studies and professional requirement in relation to robotics.
	PSO 3	**1**	Basic technological development for better opportunity is infused.
CO 3	**PO1**	**3**	Strong correlation in terms of engineering knowledge.
	PO2	**3**	Problem identification and analysis can be carried out in digital domain.
	PO3	**3**	Solution of engineering problems via digital control.
	PO4	**3**	Research-based knowledge is inculcated through controlling practical systems.
	PO5	**3**	Modern tool such as microcontrollers, FPGA’s are used.
	PO6	**2**	Correlate the societal activities/responsibilities with basic knowledge of control.

	PO7	**2**	Environmental and societal impact is taught.
	PO8	**1**	Slight understanding of ethical norms.
	PO9	**2**	Team-work and leadership skills are imparted.
	PO10	**1**	Complex engineering activities related to computers and programming.
	PO11	**1**	Basic multi-disciplinary projects are involved.
	PO12	**2**	Long-life learning in terms of programming.
	PSO1	**2**	Creative knowledge is inculcated for design and research.
	PSO2	**3**	Higher studies and professional requirement is brought into highlight.
	PSO3	**1**	Technological development for better opportunity is imparted.
CO4	**PO1**	**3**	Strongly correlated to engineering knowledge.
	PO2	**2**	Research analysis can be carried out.
	PO3	**3**	Knowledge of design / development of solutions is imparted
	PO4	**3**	Complex nonlinear systems are solved.
	PO5	**3**	Modern GPU and CPU are required.
	PO6	**3**	Correlate the societal activities/responsibilities with basic knowledge of control.
	PO7	**2**	Environmental aspects for studying and controlling nonlinear phenomena.
	PO8	**1**	Slight responsibilities and norms are inculcated.
	PO9	**2**	Team-work responsibilities are taught.
	PO10		No correlation
	PO11	**1**	Probable engineering and management principles pertaining to real-life systems.
	PO12	**3**	Technological change in terms of designing and controlling real-life systems.
	PSO1	**2**	Creative knowledge is inculcated for design and research.

	PSO 2	**1**	Motivated for higher/further learning in the nonlinear/robust control
	PSO 3	**1**	Better usage of future energy for benefitting society at large

Course Name: Computer Aided Simulation of Electrical Systems
Course Code: ELE- 504

CO-PO Mapping

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	2	1	1	1	1	1	3	2	2	2	2	2	1
2	2	3	3	2	2		1	1	2	3	3	2	3	3	1
3	3	3	3	1	2		1		3	2	3	3	2	3	1

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	3	Strong corelation between concepts and applications
	PO2	3	Strong corelation between concepts and applications
	PO3	2	Basic understanding about design / development of solutions can be attributed
	PO4	1	Correlates the mathematical analysis with basic concepts of MATLAB/SIMULINK
	PO5	1	Addresses fundamental concepts
	PO6	1	Correlate the concepts with basics
	PO7	1	Strong corelation between concepts and applications
	PO8	1	Correlation between basic aims
	PO9	3	Correlates the concepts with basics
	PO10	2	Moderate corelation between concepts and applications
	PO11	2	Develops technical skills
	PO12	2	Moderately relates the concepts and applications
	PSO1	2	Understanding of electrical engineering problems relating to control
	PSO2	2	Higher studies in control related to coding.
	PSO3	1	Basic understanding of control applications using MATLAB/SIMULINK
CO2	PO1	3	Apply basic science and engineering knowledge to understand and analyze major problems
	PO2	3	Problem identification and analysis
	PO3	3	Design and development of solutions
	PO4	2	Final stage / end user requirement fulfillment

	PO5	**2**	Final stage / end user requirement fulfillment
	PO6		No correlation
	PO7	**1**	Basic knowledge applied
	PO8	**1**	Basic concepts corelated
	PO9	**3**	Application of important concepts
	PO10	**3**	Application of important concepts
	PO11	**3**	Strong corelation between concepts and applications
	PO12	**2**	Basic understanding for long-term requirement
	PSO1	**3**	Creative knowledge is inculcated for design and research in relation to control engineering using MATLAB/SIMULINK
	PSO2	**3**	Higher studies and professional requirement in relation to control engineering
	PSO3	**1**	Advanced technological development for better opportunity is infused
CO3	**PO1**	**3**	Basic science and engineering knowledge for modelling of electrical systems using SIMULINK toolboxes
	PO2	**3**	Problem identification and analysis carried out
	PO3	**3**	Problem identification and analysis carried out
	PO4	**1**	Useful to extension of knowledge
	PO5	**2**	Slight usage of the advanced tools.
	PO6		No Correlation
	PO7	**1**	Connection between concepts and applications
	PO8		No correlation
	PO9	**3**	Strong correlation between ideas and applications
	PO10	**3**	Strong correlation between concepts and applications
	PO11	**3**	Strong correlation between concepts and applications
	PO12	**3**	Development of practical experience with handling control equipment
	PSO1	**3**	Creative knowledge is inculcated for design and research
	PSO2	**3**	Higher studies and professional requirement is brought into highlight
	PSO3	**1**	Technological development for better opportunity is imparted

Course Name: Power Systems - I
Course Code: ELE-501

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1			1	3					2	1	2	1
CO2	3	3	3	3	1	2	2					2	3	3	3
CO3	3	3	3	2	1						1	2	3	2	2
CO4	1	2	1									2	2	3	2
CO5	1	2	1									2	2	3	2

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	1	Basic knowledge of mathematics, science, engineering fundamentals is connected
	PO2	2	Power system problem can be identified and analyzed.
	PO3	1	Simple understanding of design / development of solutions.
	PO4		No correlation
	PO5		No correlation
	PO6	1	Correlate the societal activities/responsibilities for basic power system structure
	PO7	3	Knowledge of societal and environmental aspects of power system and its impact.
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12	2	Dealing with the futuristic need of the electrical power system.
	PSO1	1	Slight understanding of electrical power system design, safety and its quality services.
	PSO2	2	Higher studies or entrepreneurship in the field of power system.
	PSO3	1	Slight understanding of the need of the society and find innovative methods.
CO2	PO1	3	Apply basic science and engineering knowledge to understand and analyze the overhead line insulators.
	PO2	3	Problem identification and analysis of overhead line insulators parameters.
	PO3	3	Design and development of solutions for overhead line insulators.
	PO4	3	Final stage / end user requirement fulfillment
	PO5	1	Slight usage of the advanced tools.
	PO6	2	Apply reasoning to assess safety and legal issues.
	PO7	2	Correlate societal and environmental impact in demonstrating engineering solutions.
	PO8		No correlation
	PO9		No correlation

	PO10		No correlation
	PO11		No correlation
	PO12	**2**	Understanding of overhead line insulators for futuristic requirement.
	PSO1	**3**	Creative knowledge is inculcated for design and research in relation to overhead line insulators.
	PSO2	**3**	Higher studies and professional requirement in the field of overhead line insulator is instilled
	PSO3	**3**	Advanced technological development for better opportunity is infused
CO3	**PO1**	**3**	Apply basic science and engineering knowledge to understand and analyze the overhead transmission lines.
	PO2	**3**	Problem identification and analysis of overhead transmission lines.
	PO3	**3**	Design and development of solutions for overhead transmission lines.
	PO4	**2**	The knowledge to design, analysis and interpret data for overhead transmission lines is entrusted.
	PO5	**1**	Acquaintance to minor advanced tools is provided.
	PO6		No correlation
	PO7		No correlation
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11	**1**	Project preparation and its management are informed.
	PO12	**2**	Familiarization to recent updates in the field of overhead transmission lines for long-term requirement is done.
	PSO1	**3**	Creative knowledge is inculcated for design and research in relation to overhead transmission lines.
	PSO2	**2**	Higher studies and professional requirement in the field of overhead transmission lines is instilled
	PSO3	**2**	Advanced technological development for better opportunity is infused
CO4	**PO1**	**1**	Basic knowledge is connected
	PO2	**2**	Problems can be identified with the help of mathematics, engineering sciences.
	PO3	**1**	Trivial knowledge of design / development of solutions are imparted.
	PO4		No correlation
	PO5		No correlation
	PO6		No correlation
	PO7		No correlation
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12	**2**	Preparation to understand the upgraded underground cables for long-term requirement is imbibed.
	PSO1	**2**	Basic understanding is delivered to be employable in this field.
	PSO2	**3**	Motivated for higher/further learning in this field of study.
	PSO3	**2**	Better implementation for benefitting society at large.
CO5	**PO1**	**1**	Basic knowledge of mathematics, science, engineering fundamentals is connected with this particular CO.
	PO2	**2**	Practical problems in power system transmission lines can be identified.

	PO3	**1**	Small understandings to design and develop solutions are imparted.
	PO4		No correlation
	PO5		No correlation
	PO6		No correlation
	PO7		No correlation
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12	**2**	Independently able to incorporate the understanding of corona in preview of technological changes.
	PSO1	**2**	Knowledge of corona is delivered to be employable in this field.
	PSO2	**3**	Informed and motivated for higher studies in this field of study.
	PSO3	**2**	Innovation and entrepreneurship activities for benefitting society at large.

Course Name: Power Systems – I Laboratory
Course Code: ELE-501P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2				2	2						2	1	1
CO2	3	2				2	2						2	1	1
CO3	2	1				1	2						2	2	1
CO4	3	2	2	2	2		2					2	3	2	2

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO 1	PO1	3	Complete knowledge of mathematics, science, and engineering fundamentals are connected.
	PO2	2	Distribution system problem can be identified and analyzed.
	PO3		No correlation
	PO4		No correlation
	PO5		No correlation
	PO6	2	While designing/solving distribution system problem, the societal activities/responsibilities is kept in context.
	PO7	2	Knowledge of societal and environmental aspects of power system and its impact.
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12		No correlation
	PSO1	2	Understanding of electrical power system design, safety and its quality services.
	PSO2	1	Students will be able to participate in continuing education in power system, business and other professionally related fields.
	PSO3	1	Slight understanding of need of the society and find innovative methods.
CO 2	PO1	3	Complete knowledge of mathematics, science, and engineering fundamentals are connected.
	PO2	2	Transmission line system problem can be identified and analyzed.
	PO3		No correlation
	PO4		No correlation
	PO5		No correlation
	PO6	2	Apply reasoning to assess safety and legal issues.
	PO7	2	Correlate societal and environmental impact in demonstrating engineering solutions.
	PO8		No correlation

	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12		No correlation
	PSO1	**2**	Creative knowledge is inculcated for design and research in relation to overhead transmission lines.
	PSO2	**1**	Students will be able to participate in continuing education in power system, business and other professionally related fields.
	PSO3	**1**	Advanced technological development for better opportunity is infused.
CO3	**PO1**	**2**	Apply basic science and engineering knowledge to understand and analyze the overhead line insulators and transmission lines.
	PO2	**1**	Problem identification and analysis of overhead line insulators and transmission lines.
	PO3		No correlation
	PO4		No correlation
	PO5		No correlation
	PO6	**1**	Apply technical reasoning to assess safety and societal issues.
	PO7	**2**	Correlate societal and environmental impact in demonstrating engineering solutions.
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12		No correlation
	PSO1	**2**	Creative knowledge is inculcated for design and research in relation to overhead line insulators.
	PSO2	**2**	Higher studies and professional requirement in the field of overhead transmission lines is instilled
	PSO3	**1**	Technological development for better opportunity is infused.
CO4	**PO1**	**3**	Basic knowledge is completely connected.
	PO2	**2**	Problems can be identified with the help of mathematics, engineering sciences.
	PO3	**2**	Simple understanding of design / development of solutions are imparted.
	PO4	**2**	Complex problem in power system can be simulated for better understanding.
	PO5	**2**	Advanced tools or software is utilized for simulative environment.
	PO6		No correlation
	PO7	**2**	Correlate societal and environmental impact in demonstrating engineering solutions.
	PO8		No correlation
	PO9		No correlation

	PO10		No correlation
	PO11		No correlation
	PO12	**2**	Dealing with the futuristic need of the electrical power system for long-term requirement is imbibed.
	PSO1	**3**	Modelling of power system is exercised to imbibe creativeness and imaginative in the field of design, research, safety, and technical services.
	PSO2	**2**	Motivated for higher studies and further learning in this field of study.
	PSO3	**2**	Innovativeness is called upon for better implementation benefitting society at large.

Semester 6

Course Name: Electric Machine Design
Course Code: ELE- 603

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1				2	2	2	2	1
CO2	3	3	3	2	1	3	3				3	2	2	3	1
CO3	2	3	3	3	1	3	3				3	2	2	3	1
CO4	3	3	3	2	1	3	3				3	2	2	3	1

CO-PO Mapping Justification

CO 1: To study principles of electrical machine design, magnetic circuit calculations and armature winding design in AC and DC machines. .

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO 2 To study DC machines design.

PO/PSO	**Mapping**	**Justification**
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO 3 : To design of single phase and three phase transformers.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO 4: To study about induction and synchronous machines design.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities

		with high standards of professional and moral ethics and prove themselves eneficial to society at large.

Course Name: Power Electronics
Course Code: ELE-602

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1		1			2		2	2	2	1	3
CO2	2	3	2	1		1			2		3	1	1	2	2
CO3	2	2	3	2	1	2			3		3	2	3	2	1
CO4	2	2	3	2	1	2			3		3	2	3	1	2
CO5	2	2	3	2	1	2			3		3	2	3	3	3

CO-PO Mapping Justification

CO1	PO1	Knowledge of power electronics is directly related with Engineering knowledge.
	PO2	Problem analysis is not much needed in knowledge and application of power electronics.
	PO3	Detailed design/ development is not desired in knowledge and application of power electronics.
	PO4	Applying the knowledge of power electronics does not conduct the investigations of complex problems in details.
	PO5	No correlation.
	PO6	Sometimes the knowledge of power electronics helps the engineer and society.
	PO7	No correlation.
	PO8	No correlation.
	PO9	Application of power electronics somehow requires individual and team work.
	PO10	No correlation.
	PO11	Knowledge and application of power electronics somehow involves project management and finance.
	PO12	Basic knowledge is somehow required for long-term learning.
	PSO1	Knowledge and application of power electronics somehow makes the students competent in the field of engineering.
	PSO2	Knowledge of power electronics sometimes helps students in their future studies.
	PSO3	Knowledge and application of power electronics helps students to take lead in innovation and entrepreneurship activities.
CO2	PO1	Driving and control circuits somehow requires Engineering knowledge.
	PO2	Problem analysis is needed in designing driving and control circuits.
	PO3	Somehow design/ development is desired in analysis of driving and control circuits.
	PO4	Analysis of driving and control circuit does not conduct the investigation of complex problems in details.
	PO5	No correlation.
	PO6	The driving and control circuit of power electronics helps the engineer and society in some manner.
	PO7	No correlation.
	PO8	No correlation.
	PO9	The analysis of driving and control circuits somehow requires individual and team work.
	PO10	No correlation.
	PO11	The design of driving and control circuits involves project management and finance.
	PO12	Basic design of driving and control circuits is not sufficient for long-term learning.

	PSO1	Analysis of driving and control circuits little bit makes the students competent in the field of engineering.
	PSO2	Design and analysis of driving and control circuits somehow helps students in their future studies.
	PSO3	Design and analysis of driving and control circuits somehow helps students to take lead in innovation and entrepreneurship activities.
CO3	**PO1**	Analysis and design of rectifiers somehow requires Engineering knowledge.
	PO2	Problem analysis is somehow required in analysis and design of rectifiers.
	PO3	Design/ development is desired in analysis and design of rectifiers.
	PO4	Analysis and design of rectifiers somehow conduct the investigations of complex problems in details.
	PO5	Modern tool usage is little bit desired in analysis and design of rectifiers.
	PO6	Somehow the analysis and design of rectifiers helps the engineer and society.
	PO7	No correlation.
	PO8	No correlation.
	PO9	Analysis and design of rectifier circuits requires individual and team work.
	PO10	No correlation.
	PO11	Analysis and design of rectifiers involves project management and finance.
	PO12	Analysis and design of rectifier circuits is somehow required for long-term learning.
	PSO1	Analysis and design of rectifiers makes the students competent in the field of engineering.
	PSO2	Analysis and design of rectifiers somehow helps students in their future studies.
	PSO3	Basic knowledge regarding analysis and design of rectifiers does not helps students to take lead in innovation and entrepreneurship activities.
CO4	**PO1**	Analysis and design of choppers and inverters somehow requires Engineering knowledge.
	PO2	Problem analysis is somehow needed in analysis and design of choppers and inverters.
	PO3	Design/ development is desired in analysis and design of choppers and inverters.
	PO4	Analysis and design of choppers and inverters somehow conduct the investigations of complex problems in details.
	PO5	Modern tool usage is not much desired in analysis and design of choppers and inverters.
	PO6	Somehow the analysis and design of choppers and inverters helps the engineer and society.
	PO7	No correlation.
	PO8	No correlation.
	PO9	Analysis and design of choppers and inverters requires individual and team work.
	PO10	No correlation.
	PO11	Analysis and design of choppers and inverters involves project management and finance.
	PO12	Analysis and design of choppers and inverters is somehow required for long-term learning.
	PSO1	Analysis and design of choppers and inverters makes the students competent in the field of engineering.
	PSO2	Basic knowledge about analysis and design of choppers and inverters helps students in their future studies.
	PSO3	Analysis and design of choppers and inverters somehow helps students to take lead in innovation and entrepreneurship activities.
CO5	**PO1**	Analysis and design of ac controllers and converters requires Engineering knowledge.
	PO2	Problem analysis is somehow required in analysis and design of ac controllers and converters.
	PO3	Design/ development is desired in suggesting the design of ac controllers and converters.
	PO4	Analysis and design of ac controllers and converters conduct the investigations of complex problems.
	PO5	Modern tool usage is little bit desired in basic analysis and design of ac controllers and converters.
	PO6	Somehow the analysis and design of ac controllers and converters helps the society.

	PO7	No correlation.
	PO8	No correlation.
	PO9	Analysis and design of ac controllers and converters requires individual and team work.
	PO10	No correlation.
	PO11	Analysis and design of ac controllers and converters involves project management and finance.
	PO12	Analysis and design of ac controllers and converters is someway required for long-term learning.
	PSO1	Analysis and design of ac controllers and converters makes the students competent in the field of engineering.
	PSO2	Analysis and design of ac controllers and converters helps students in their future studies.
	PSO3	Analysis and design of ac controllers and converters helps students to take lead in innovation and entrepreneurship activities.

Course Name: MICROPROCESSORS
Course Code: ELE-606

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		2		1	1				1	2	2	2	2	2
CO2	3	2	3	3	3	1					1	2	3	3	3
CO3	3	2	3	3	3	2	1				2	1	3	3	3

CO-PO Mapping Justification

CO1: Have a clear understanding of the architecture and instruction set of 8085 and 8086.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO3	2	Highly related to the design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO5	1	Loosely related to creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	1	Loosely related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO10	1	Loosely related to effective comunication 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.
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	Highly related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of

		technological change.
PS01	2	Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	2	Highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large
PO2, PO4, PO7, PO8, PO9	-	Not related

CO2: Be able to interface peripherals and memories with 8085.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	Very highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	3	Very highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	1	Loosely related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO11	1	Loosely related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a

		member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	Highly related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	3	Highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	3	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large
PO7, PO8, PO9, PO10	-	Not related

CO3: Be able to understand the application of 8085 in waveform generators.

PS/PSO	Mapping	Justification
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	Very highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	3	Very highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	2	Highly related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent

		responsibilities relevant to the professional engineering practice.
PO7	1	Loosely related to understanding the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	3	Highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	3	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large
PO8, PO9, PO10	-	Not related

Course Name: MICROPROCESSOR LAB
Course Code: ELE-606P

CO-PO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	1	2	3	1				1	2	1	3	3	2
2	3	1	1	2	3	1				1	2	1	3	3	3
3	3	3	3	3	3	1				1	2	1	3	3	3

CO-PO Mapping Justification

CO1: Have a clear understanding of the architecture and instruction set of 8085 and 8086.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	1	Loosely related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	Lossely related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	2	Highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	3	Highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6	1	Loosely related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO10	1	Loosely related to effective communication 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
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	3	Very highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO2: Be able to interface peripherals and memories with 8085.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	1	Loosely related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	Lossely related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public

		health and safety, and the cultural, societal, and environmental considerations
PO4	2	Highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	3	Highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	1	Loosely related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO10	1	Loosely related to effective communication 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
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	3	Very highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Very Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO3: Be able to understand the application of 8085 in waveform generators.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	3	Loosely related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	Lossely related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	3	Highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	1	Loosely related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO10	1	Loosely related to effective communication 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
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers

		employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	3	Very highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	3	Very Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

Course Name: DIGITAL SIGNAL PROCESSING
Course Code: ELE-605

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	1	1	-	-	-	-	2	1	1	1	2
CO2	2	2	2	3	3	1	-	-	-	-	2	2	3	3	2
CO3	3	1	2	2	1	2	-	-	-	-	2	1	1	3	3
CO4	3	1	2	3	1	2	-	-	-	-	2	2	3	1	2
CO5	3	2	1	3	3	1	-	-	-	-	3	1	2	2	2

CO-PO Mapping Justification

CO1: Compare and contrast various Signals & Systems.

PO/PSO	Mapping	Justification
PO1	3	Basic knowledge is connected
PO2	3	Research literature can be reviewed and sort of things
PO3	1	Basic understanding about design / development of solutions can be attributed
PO4	1	Investigation of complex problems
PO5	1	Apply appropriate approach for modern tools
PO6	1	Contextual knowledge for professional engineering practice
PO11	2	Probable engineering and management principles pertaining to future research development
PO12	1	Recognize the need of technology changes
PSO1	3	Get good research ability
PSO2	2	Useful for advanced degree in professional related fields
PSO3	3	Technological development for better opportunity is imparted

CO2: Mathematical analysis of Z-Transform and Fourier transform of Linear time invariant systems.

PO/PSO	Mapping	Justification
PO1	2	Creative knowledge is inculcated for design and research
PO2	2	Higher studies and professional requirement in relation electrical research
PO3	2	Advanced technological development for better opportunity is infused
PO4	3	Investigation of complex problems
PO5	3	Apply appropriate approach for modern tools
PO6	1	Contextual knowledge for professional engineering practice
PO11	2	Probable engineering and management principles pertaining to future research development
PO12	2	Recognize the need of technology changes
PSO1	3	Get good research ability
PSO2	3	Useful for advanced degree in professional related fields
PSO3	2	Technological development for better opportunity is imparted

CO3: Study and designing the structure of Discrete-time Systems

PO/PSO	Mapping	Justification
PO1	3	Basic science and engineering knowledge
PO2	1	Problem identification and analysis can be carried out
PO3	2	Plan and progress of engineering solutions
PO4	2	Can be able to fulfill the high-end requirement
PO5	1	Slight usage of the advanced tools.
PO6	2	Contextual knowledge for professional engineering practice
PO11	2	Probable engineering and management principles pertaining to future research development
PSO1	1	Creative knowledge is inculcated for design and research
PSO2	3	Higher studies and professional requirement is brought into highlight
PSO3	3	Technological development for better opportunity is imparted

CO4: Mathematical analysis and comparison of Filter Design Techniques.

PO/PSO	Mapping	Justification
PO1	3	Basic knowledge is connected
PO2	2	Research analysis can be carried out
PO3	1	Slight knowledge of design / development of solutions is imparted
PO4	1	Future options are highlighted
PO5	2	Slight usage of the advanced tools.
PO11	2	Probable engineering and management principles pertaining to future energy sources
PSO1	2	Get good research ability
PSO2	2	Motivated for higher/further learning in the upcoming fields
PSO3	2	Better usage for benefitting society at large

CO5: Mathematical analysis and comparison of Filter Design Techniques.

PO/PSO	Mapping	Justification
PO1	3	Basic knowledge is connected
PO2	2	Problem identification and analysis can be carried out
PO3	1	Slight knowledge of design / development of solutions is imparted
PO4	1	Can be able to fulfill the high-end requirement
PO5	2	Apply appropriate approach for modern tools
PO11	2	Probable engineering and management principles pertaining to future research
PSO1	2	Get good research ability
PSO2	2	Motivated for higher/further learning in the upcoming fields
PSO3	2	Technological development for better opportunity is imparted

Course Name: Power Electronics Laboratory
Course Code: ELE-602P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1		1			2		2	2	2	1
CO2	2	3	2	1		1			2		3	1	1	2
CO3	2	2	3	2	1	2			3		3	2	3	2
CO4	2	2	3	2	1	2			3		3	2	3	1

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	3	The study of SCR and UJT based circuits requires the application of a number of mathematical tools in solving engineering problems.
	PO2	1	There is little scope of formulating and analyzing complex research problems in this lab course
	PO3	1	There is slight correlation with development of solutions for complex engineering problems and design system components or processes that meet the specified needs
	PO4	1	The Lab course is an introductory course on power electronics experimentation and not a research level course but it does serve as a building block for higher level studies
	PO5		No co-relation
	PO6	1	Slight co-relation is terms of understanding the impact of power quality on the society and the role of power electronics in maintaining power quality.
	PO7		No co-relation
	PO8		No co-relation
	PO9	2	Students do experiments in small lab groups to promote team work
	PO10		No co-relation
	PO11	2	Students understand the components of power electronics circuits and get insights into management of projects as well as their financial implications
	PO12	2	SCR AND UJT studies are instrumental towards lifelong learning in power electronics
	PSO1	2	Basics of Power Electronics are crucial in design, research, manufacturing principles

	PSO2	1	Higher studies in Power Electronics requires some knowledge of basic principles
	PSO3	3	Understand the need of the society with use of power electronics in renewable integration of grids, electric vehicle technology and reducing carbon emissions.
CO2	PO1	2	The study of SCR firing circuits requires the application of a number of mathematical tools in solving engineering problems.
	PO2	3	There is good scope of formulating and analyzing complex problems through study of firing and gating techniques
	PO3	2	There is decent co-relation with development of solutions for complex engineering problems and design system components or processes that meet the specified needs
	PO4	1	The Lab course is an introductory course on power electronics experimentation and not a research level course but it does serve as a building block for higher level studies
	PO5		No co-relation
	PO6	1	Slight co-relation is terms of understanding the impact of power quality on the society and the role of power electronics in maintaining power quality.
	PO7		No co-relation
	PO8		No co-relation
	PO9	2	Students do experiments in small lab groups to promote team work
	PO10		No co-relation
	PO11	3	Students understand the components of power electronics circuits and get insights into management of projects as well as their financial implications
	PO12	1	Slight co-relation with lifelong learning
	PSO1	1	Basics of Power Electronics are crucial in design, research, manufacturing principles
	PSO2	2	Higher studies in Power Electronics requires decent knowledge of basic principles of firing and gating circuits
	PSO3	2	Understand the need of the society with use of power electronics in renewable integration of grids, electric vehicle technology and reducing carbon emissions.
CO3	PO1	2	The study of uncontrolled and controlled rectifier circuits requires the application of a number of mathematical tools in solving engineering problems.
	PO2	2	There is good scope of formulating and analyzing complex problems through study of front end converters for various applications

	PO3	3	There is high co-relation with development of solutions for complex engineering problems and design system components or processes that meet the specified needs especially in drive systems.
	PO4	2	Rectifier circuits serve as a building block for design of experiments, analysis and interpretation of data, related to Front end converters used in industries.
	PO5	1	Slight co-relation of modern engineering tools in the analysis of rectifier circuits.
	PO6	2	Decent co-relation is terms of understanding the impact of power quality on the society and the role of power electronics in maintaining power quality.
	PO7		No co-relation
	PO8		No co-relation
	PO9	3	Students do experiments in small lab groups to promote team work and individual understanding is also promoted
	PO10		No co-relation
	PO11	3	Students understand the components of power electronics circuits and get insights into management of projects as well as their financial implications
	PO12	2	Decent co-relation with lifelong learning
	PSO1	3	Basics of Power Electronics are crucial in design, research, manufacturing principles
	PSO2	2	Higher studies in Power Electronics requires decent knowledge of basic principles of rectifier and converter circuits
	PSO3	1	Slight co-relation in the use of DC-DC converters in renewable integration of grids, electric vehicle technology and reducing carbon emissions.
CO4	PO1	2	The study of controlled rectifier circuits and inverters requires the application of a number of mathematical tools in solving engineering problems.
	PO2	2	There is good scope of formulating and analyzing complex problems through study of front end converters as well as inverters for various applications.
	PO3	3	There is high co-relation with development of solutions for complex engineering problems and design system components or processes that meet the specified needs especially in drive systems.
	PO4	2	Controlled AC-DC and DC-AC circuits serve as a building block for design of experiments, analysis and interpretation of data, related to Front end converters used in industries.

	PO5	1	Slight co-relation of modern engineering tools in the analysis of converter topologies.
	PO6	2	Decent co-relation is terms of understanding the impact of power quality on the society and the role of power electronics in maintaining power quality.
	PO7		No co-relation
	PO8		No co-relation
	PO9	3	Students do experiments in small lab groups to promote team work and individual understanding is also promoted
	PO10		No co-relation
	PO11	3	Students understand the components of power electronics circuits and get insights into management of projects as well as their financial implications
	PO12	2	Decent co-relation with lifelong learning
	PSO1	3	Basics of Power Electronics are crucial in design, research, manufacturing principles.
	PSO2	1	Higher studies in Power Electronics requires decent knowledge of basic principles converter/inverter circuits
	PSO3	2	Decent co-relation in the use of DC-AC converters in renewable integration of grids, electric vehicle technology and reducing carbon emissions.

Course Name: POWER SYSTEMS-II Lab
Course Code: ELE-601P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	-	1	2	-	-	-	-	-	-	-	2	2	-
CO2	2	2	2	2	1	-	-	-	-	-	-	1	2	2	-
CO3	1	3	1	-	2	-	-	-	-	-	-	1	2	2	2
CO4	2	1	-	2	-	-	-	-	-	-	-	1	2	2	2

CO-PO Mapping Justification

COs	POs/PSOs	Co-relation
CO1	PO1	Per unit calculation essentially requires knowledge of mathematics and fundamental of engineering.
	PO2	Complex engineering problem is involved in PU calculation of large electrical power network.
	PO4	Analysis and synthesis of the information is needed for understanding of PU system
	PO5	Modern and classical tools are used for PU calculation
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
CO2	PO1	Balance and unbalance fault calculation essentially requires knowledge of mathematics, fundamental of science and engineering

	PO3	Complex engineering problem is involved in Balance and unbalance fault calculation of electrical power network.
	PO4	Investigation is needed for understanding of Balance and unbalance fault calculation
	PO5	Modern software and mathematical tools are used for Balance and unbalance fault calculation
	PO12	Power system engineering is used in entire career of electrical and power engineers
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
CO3	PO1	Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations essentially requires knowledge of mathematics, fundamental of science and engineering
	PO2	Complex engineering problem is involved in Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations of electrical power network.
	PO3	Investigation is needed for understanding of Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations
	PO5	Modern software, hardware and mathematical tools are used for Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations
	PO12	Power system engineering is used in entire career of electrical and power engineers
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.

	PSO2	Student can further extend his knowledge of course in their higher studies
	PSO3	Student can apply the practical knowledge acquire in under graduate course in the future studies
CO4	PO1	Power line communication calculations essentially requires knowledge of mathematics, fundamental of science and engineering
	PO2	Complex engineering problem is involved in Power line communication calculations of electrical power network.
	PO4	Investigation is needed for understanding of Power line communication calculations
	PO11	Modern software, hardware and mathematical tools are used for Power line communication calculations
	PO12	Power system engineering is used in entire career of electrical and power engineers
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
	PSO3	Student can apply the practical knowledge acquire in under graduate course in the future studies

Course Name: POWER SYSTEMS-II
Course Code: ELE-601

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	-	1	1	-	-	-	-	-	-	-	2	2	-
CO2	3	-	2	2	3	-	-	-	-	-	-	1	2	2	-
CO3	2	2	2	2	-	-	-	-	-	-	2	1	2	2	-
CO4	2	1	-	2	-	-	-	-	-	-	1	1	2	2	-
CO5	1	3	-	-	2	-	-	-	-	-	-	1	2	2	-

CO-PO Mapping Justification

COs	POs/PSOs	Co-relation
CO1	PO1	Per unit calculation essentially requires knowledge of mathematics and fundamental of engineering.
	PO2	Complex engineering problem is involved in PU calculation of large electrical power network.
	PO4	Analysis and synthesis of the information is needed for understanding of PU system
	PO5	Modern and classical tools are used for PU calculation
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
CO2	PO1	Balance and unbalance fault calculation essentially requires knowledge of mathematics, fundamental of science and engineering
	PO3	Complex engineering problem is involved in Balance and unbalance fault calculation of electrical power network.
	PO4	Investigation is needed for understanding of Balance and unbalance fault calculation
	PO5	Modern software and mathematical tools are used for Balance and unbalance fault calculation
	PO12	Power system engineering is used in entire career of electrical and power

		engineers
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
CO3	PO1	Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations essentially requires knowledge of mathematics, fundamental of science and engineering
	PO2	Complex engineering problem is involved in Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations of electrical power network.
	PO3	Investigation is needed for understanding of Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations
	PO4	Modern software, hardware and mathematical tools are used for Insulation coordination, over voltage, lighting surges, switching surges and switching operations calculations
	PO11	Insulation coordination and switching need lot of investment and therefore suitable financial management is required
	PO12	Power system engineering is used in entire career of electrical and power engineers
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
CO4	PO1	Power line communication calculations essentially requires knowledge of mathematics, fundamental of science and engineering
	PO2	Complex engineering problem is involved in Power line communication calculations of electrical power network.
	PO4	Investigation is needed for understanding of Power line communication calculations
	PO11	Modern software, hardware and mathematical tools are used for Power line communication calculations
	PO12	Power system engineering is used in entire career of electrical and power engineers

	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies
CO5	PO1	Power electronics, HVDC and FACTS calculations essentially requires knowledge of mathematics, fundamental of science and engineering
	PO2	Complex engineering problem is involved in Power electronics, HVDC and FACTS calculations of electrical power network.
	PO5	Modern software and mathematical tools are used for Power electronics, HVDC and FACTS calculations calculation
	PO12	Power system engineering is used in entire career of electrical and power engineers
	PSO1	After learning this course student will be able to design and manufacture electrical components and goods. Also, he can contribute toward research.
	PSO2	Student can further extend his knowledge of course in their higher studies

Course Name: TOUR & TRAINING
Course Code: ELE-604

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	2	-	-	-	-	-	2	2	2	2	-
CO2	3	2	2	-	3	-	-	-	1	2	2	2	2	2	-
CO3	3	2	-	2	2	-	2	-	-	1	-	1	2	2	-

CO-PO Mapping Justification

COs	POs/PSOs	Co-relation
CO1	PO1	Practical knowledge of power system requires fundamental knowledge of mathematics, science and engineering
	PO2	Literature review and analysis of complex problem are involved in practical knowledge of power system
	PO3	Design solution and complex engineering problem are involved in practical power system knowledge
	PO5	Modern tools usages in creation and selection of practical industrial equipment
	PO11	Finance and management are also play important role in practical industrial equipment
	PO12	Practical knowledge of power system and industrial equipment is life long learning process.
	PSO1	This course develops competent and creativity of electrical engineering in the field of research, manufacturing, safety and quality services.
	PSO2	This course also helps students in advance studies and certificate program
CO2	PO1	Knowledge of modern tools and its analysis involves knowledge of mathematics, science and engineering fundamentals.
	PO2	Knowledge of modern tools also requires review of research literature.

	PO3	Design solution of complex engineering problem is also involved in knowledge of modern tools
	PO5	Appropriate techniques, resources and modern engineering is involved in modelling of tools
	PO9	Individual and team work are also needed in design of modern tools
	PO10	Suitable communication with engineering society for deigning of modern tools is also needed.
	PO12	Designing and development of modern tools are life long learning processes.
	PSO1	This course develops competent and creativity of electrical engineering in the field of research, manufacturing, safety and quality services.
	PSO2	This course also helps students in advance studies and certificate program
CO3	PO1	Understanding of various constraint of power system is needed knowledge of mathematics, science and engineering fundamentals.
	PO2	Understanding of various constraint of power system requires research literature review.
	PO4	Investigation is also part of understanding the concept of power system
	PO5	Modern tools of IT and computers is also play significant role for understanding power system problem
	PO7	Understand the impact of the professional engineering solutions in social and environment context.
	PO10	Communication with engineering society helps to understand power system more deeply.
	PO12	Understanding power system is life-long learning process.
	PSO1	This course develops competent and creativity of electrical engineering in the field of research, manufacturing, safety and quality services.
	PSO2	This course also helps students in advance studies and certificate program

Semester 7

Course Name: Advanced Power Electronics
Course Code: ELE-702

CO-PO Mapping

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	2		1		1					2	3	2	1
2	3	3	2	1	1		1					2	3	2	1
3	3	3	2				1					2	3	2	1
4	3	3	2				1					2	3	2	1
5	3	3	3			1						2	3	2	1

CO-PO Mapping Justification

Cos	Pos		Justification
CO1	PO1	3	The operation of devices and understanding their suitability for application in bigger systems is strongly correlated to engineering fundamentals
	PO2	3	Strongly correlated to complex engineering problem analysis
	PO3	2	Moderately correlated to design solutions for complex engineering problems
	PO4	0	Minimal.
	PO5	1	Less moderately correlated
	PO6	0	Minimal.
	PO7	1	Less moderately correlated
	PO8	0	Minimal
	PO9	0	Minimal
	PO10	0	Minimal
	PO11	0	Minimal

	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlatedto continuing education in Electrical Engineering
	PSO3	1	Less moderately correlated
CO2	PO1	3	The study of operation and modulation for power converters is strongly correlated to engineering knowledge
	PO2	3	Strongly correlated
	PO3	2	Moderately correlated
	PO4	1	Less moderately correlated
	PO5	1	Less moderately correlated
	PO6	0	Minimal
	PO7	1	Less moderately correlated
	PO8	0	Minimal.
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal.
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlatedto design, research, manufacturing, safety, quality, Technical Services.
	PSO2	2	Moderately correlatedto continuing education in Electrical Engineering
	PSO3	1	Less moderately correlated.
CO3	PO1	3	Study of non-isolated DC-DC converters is crucial and strongly correlated to engineering knowledge fundamentals
	PO2	3	Strongly correlated to problem analysis since the design of these converters is based on the problem at hand in power electronics

	PO3	2	Moderately correlated
	PO4	0	Minimal.
	PO5	0	Minimal.
	PO6	0	Minimal.
	PO7	1	Less moderately correlated
	PO8	0	Minimal.
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal.
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlatedto design, research, manufacturing, safety, quality, Technical Services.
	PSO2	2	Moderately correlated
	PSO3	1	Less moderately correlated
CO4	PO1	3	Study of isolated DC-DC converters is crucial and strongly correlated to engineering knowledge fundamentals
	PO2	3	Strongly correlated
	PO3	2	Moderately correlated
	PO4	0	Minimal.
	PO5	0	Minimal.
	PO6	0	Minimal.
	PO7	1	Less moderately correlated
	PO8	0	Minimal.

	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated to design, research, manufacturing, safety, quality, Technical Services.
	PSO2	2	Moderately correlatedto continuing education in Electrical Engineering
	PSO3	1	Less moderately correlated
CO5	PO1	3	Study of power line disturbances and power conditioners is crucial and strongly correlated to engineering knowledge fundamentals
	PO2	3	Strongly correlated
	PO3	3	Stronglycorrelated
	PO4	0	Minimal.
	PO5	0	Minimal.
	PO6	1	Less moderately correlated to understanding the role of electrical engineers towards the society in terms of power losses incurred to the utility as per the choice of modulation in power converters for high power applications
	PO7	0	Minimal.
	PO8	0	Minimal.
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated to design, research, manufacturing, safety, quality, Technical Services.
	PSO2	2	Moderately correlated to continuing education in Electrical Engineering

	PSO3	1	Less moderately correlated

Course Name: Electronic Measurements and Instrumentation
Course Code: ECE - 708

CO-PO Mapping

	Measurements and instrumentation														
Course outcomes	**Program Outcomes**												**Program specific outcomes**		
COs	**PO -1**	**PO -2**	**PO -3**	**PO -4**	**PO -5**	**PO -6**	**PO -7**	**PO -8**	**PO -9**	**PO-10**	**PO-11**	**PO-12**	**PSO-1**	**PSO-2**	**PSO-3**
C708.1	2	2	1	-	-	-	-	-	-	-	-	1	2	2	3
C708.2	3	3	3	-	-	1	-	-	-	-	-	1	2	2	3
C708.3	1	2	3	1	-	-	-	-	1	1	1	1	2	2	3
C708.4	3	2	3	1	-	-	-	-	-	-	-	2	2	2	3

CO-PO Mapping Justification

CO1(708.1): To familiarize with measurement standards and systems with their responses and get a detailed understanding of various electronic meters

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3	1	It is slightly correlated to design solutions for complex engineering problems and design system components or processes and data interpretation.
PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11	-	It is not related to research based knowledge and synthesis of information to provide valid conclusions. It has no relation to modern tools or softwares for prediction and modelling of problems. It has no correlation to reasoning and contextual knowledge to benefit engineering and society. No relevance to any of the program outcomes because its not related to environment, ethics, teamwork, communication and project management.
PO12	1	It is slightly correlated because it gives lifelong learning and preparation of an individual in context to technological change.
PSO1	2	It is moderately correlated to all courses from electronics and communication.
PSO2	2	It is moderately correlated to ability to advance in academic and research pursuits in Electronics and allied disciplines.
PSO3	3	It is highly correlated to systems containing electronics, electrical and hardware devices for analytical knowledge.

CO2 (708.2): To introduce transducers, sensors and actuators used in measurements

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.

PO2	3	It is extremely correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes and data interpretation.
PO4	3	It is highly related to research based knowledge and synthesis of information to provide valid conclusions.
PO6	1	It is somehow related to an engineers responsibility towards society.
PO5, PO7, PO8, PO9, PO10, PO11	-	No relevance to any of the program outcomes because its not related to environment, ethics, teamwork, communication and project management.
PO12	1	It is slightly correlated because it gives lifelong learning and preparation of an individual in context to technological change.
PSO1	2	It is moderately correlated to all courses from electronics and communication.

PSO2	2	It is moderately correlated to ability to advance in academic and research pursuits in Electronics and allied disciplines.
PSO3	3	It is highly correlated to systems containing electronics, electrical and hardware devices for analytical knowledge

CO3(708.3): Understanding of Instrumentation amplifiers and various wave analysers

PO/PSO	Mapping	Justification
PO1	1	It is slightly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes and data interpretation.
PO4	1	It is feebly related to research based knowledge and synthesis of information to provide valid conclusions.
PO5, PO6, PO7 and PO8	-	No relevance to any of the program outcomes because it is not related to environment and ethics

PO9, PO10, PO11 and PO12	1	It is slightly correlated to team work, communication, finance and project management. It is also correlated to lifelong learning and preparation of an individual in context to technological change.
PSO1	2	It is moderately correlated to all courses from electronics and communication.
PSO2	2	It is moderately correlated to ability to advance in academic and research pursuits in Electronics and allied disciplines.
PSO3	3	It is highly correlated to systems containing electronics, electrical and hardware devices for analytical knowledge.

CO4 (708.4): To understand the working of Phase and Frequency meters and to get knowledge about data acquisition system and its interfacing with microcontrollers

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes and data interpretation.
PO4	1	It is slightly related to research based knowledge and synthesis of information to provide valid conclusions.

PO5, PO6, PO7, PO8, PO9, PO10, PO11	-	It bears no relevance to any of the program outcomes because it is not related to environment, ethics, teamwork, communication and project management.
PO12	2	It is quite correlated because it gives lifelong learning and preparation of an individual in context to technological change.
PSO1	2	It is moderately correlated to all courses from electronics and communication.
PSO2	2	It is moderately correlated to ability to advance in academic and research pursuits in Electronics and allied disciplines.
PSO3	3	It is highly correlated to systems containing electronics, electrical and hardware devices for analytical knowledge.

Course Name: Power Station Practice
Course Code: ELE-704

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1				2	2	2	2	1
CO2	3	3	3	2	1	3	3				3	2	2	3	1
CO3	2	3	3	3	1	3	3				3	2	2	3	1
CO4	3	3	3	2	1	3	3				3	2	2	3	1

CO-PO Mapping Justification

CO 1: To study economic aspects and power factor improvement.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to

		manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO 2 To study Power tariff.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a

		team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO 3 : To design and study of neutral grounding.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and

		management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO 4: To study about different types of power stations and their auxiliaries.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO8, PO9, PO10	-	No relevance found upon this Criteria, so mapped to level 0.

PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

Course Name: Power System-3
Course Code: ELE-703

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	-	1	1	-	-	-	-	2	1	1	1	2
CO2	2	2	2	3	-	1	-	-	-	-	2	2	3	-	2
CO3	3	1	2	2	-	-	-	-	-	-	-	1	1	-	-
CO4	3	1	2	3	1	2	-	-	-	-	-	2	-	1	2
CO5	3	2	1	-	-	1	-	-	-	-	3	1	-	2	2

CO-PO Mapping Justification

Cos	POs/PSOs	Co-po mapping	Co-relation
CO1	PO1	3	Analysis and evaluation of electric circuits need strong knowledge of mathematics, science and engineering fundamentals
	PO2	3	Basic laws of electric circuit and determination of electric parameters need to identify, formulate and review literature from engineering and science.
	PO3	1	Basic analysis provides design and development of electric circuit
	PO5	1	Moderate tool is uses for analysis
	PO6	1	Very small reasoning uses in basic law
	PO11	2	Demonstration of knowledge and understand moderately employs in basic laws
	PO12	1	Study and analyses the basic laws at various stages.
	PSO1	1	Graduates will apply the knowledge of different processors to analyze the performance tradeoffs.
	PSO2	1	Graduates are able to design and develop different processors to solve the real world problems.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

COs	POs/PSOs	Co-po mapping	Co-relation
CO2	PO1	2	Apply the knowledge of fundamentals of electrical science & engineering in designing system.

	PO2	2	Basic laws of electric circuit and determination of electric parameters need to identify, and formulate from engineering and science.
	PO3	2	Basic analysis provides design and development of electric circuit
	PO4	3	Analyze the performance of a system using linear and non-linear Electrical system
	PO6	1	Very small reasoning uses in basic law
	PO11	2	Demonstration of knowledge and understand moderately employs in basic laws
	PO12	2	Study and analyses the basic laws at various stages.
	PSO1	3	Graduates are able to design and develop different processors to solve the real world problems.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

COs	**POs/PSOs**	**Co-po mapping**	**Co-relation**
CO3	PO1	3	Analyze the performance of a system using linear and non-linear Electrical system
	PO2	1	Demonstration of knowledge and understand moderately employs in basic laws
	PO3	2	Basic analysis provides design and development of electric circuit
	PO4	3	Apply the knowledge of fundamentals of electrical science & engineering in designing system.
	PO6	2	Very small reasoning uses in basic law
	PO12	2	Study and analyses the basic laws at various stages.
	PSO2	1	Implement the super scalar techniques.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

COs	**POs/PSOs**	**Co-po mapping**	**Co-relation**
CO4	PO1	3	Apply the knowledge of fundamentals of electrical science & engineering in designing system.
	PO2	1	Basic laws of electric circuit and determination of electric parameters need to identify, formulate and review literature from engineering and science.
	PO3	2	Basic analysis provides design and development of electric circuit
	PO4	3	Analyze the performance of a system using linear and non-linear Electrical system

	PO5	1	Demonstration of knowledge and understand moderately employs in basic laws
	PO6	2	Very small reasoning uses in basic law
	PO12	2	Study and analyses the basic laws at various stages.
	PSO2	1	Graduates are able to design and develop different processors to solve the real world problems.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

COs	**POs/PSOs**	**Co-po mapping**	**Co-relation**
CO5	PO1	3	Analyze the performance of a system using linear and non-linear Electrical system
	PO2	1	Basic laws of electric circuit and determination of electric parameters need to formulate for engineering and science.
	PO3	2	Basic analysis provides design and development of electric circuit
	PO4	3	Apply the knowledge of fundamentals of electrical science & engineering in designing system.
	PO6	2	Very small reasoning uses in basic law
	PO12	2	Study and analyses the basic laws at various stages.
	PSO2	1	Implement the super scalar techniques.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

Course Name: Power System Protection
Course Code: ELE- 701

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1				2	2	2	2	1
CO2	3	3	3	2	1	3	3				3	2	2	3	1
CO3	2	3	3	3	1	3	3				3	2	2	3	1
CO4	3	3	3	2	1	3	3				3	2	2	3	1

CO-PO Mapping Justification

CO1(232.1) : **Develop the basic concept of Protective Relaying & Classification of Relays.**

PO/PSO	Mapping	Justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in electrical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO2 (232.2) Compare and contrast different types of electromagnetic relays

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	It is partially correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.

PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in electrical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3(232.3): Apply the concept of Protective relays for the protection of generators.

PO/PSO	Mapping	justification
PO1	2	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The COs is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in electrcal and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO4(232.4) :Develop the basic knowledge of fuses and circuit breakers

PO/PSO	Mapping	justification
PO1	3	It is less correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	1	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3	1	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	1	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	1	The COs is partially correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Less correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	1	Partially correlated to ability to advance in academic and research pursuits in electrical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

Course Name: Power System Protection Lab
Course Code: ELE- 701P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1				2	2	2	2	1
CO2	3	3	3	2	1	3	3				3	2	2	3	1
CO3	2	3	3	3	1	3	3				3	2	2	3	1
CO4	3	3	3	2	1	3	3				3	2	2	3	1

CO-PO Mapping Justification

COs	PO/ PSO	Mapping	Justification
1	PO1	3	Strongly correlated as the study of various kinds of relays requires the strong knowledge of mathematics, science and engineering fundamentals
	PO2	2	Moderately correlated due to the fact that it requires less review research literature.
	PO3	1	Minimally correlated as requires minimal correlation to meet the specified needs with appropriate consideration for the public health and safety.
	PO4	1	Minimal correlated as it requires minimal use of research-based knowledge and research methods including design of experiments.
	PO5	1	Minimal correlated as required minimal techniques, resources, and modern engineering and IT tools
	PO6	2	Moderately correlated as it involves reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	1	Minimally correlated as in terms of societal and environmental contexts.
	PO8		
	PO9		
	PO10		
	PO11	2	Moderately correlated as it demonstrates the knowledge and understanding of the engineering and management principles and apply these to one's own work

	PO12	2	Moderately correlated as it has ability to engage in independent and life-long learning in the broadest context of technological change
	PSO1	2	Moderately correlated as it makes the students competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
	PSO2	2	Moderately correlated as Students shall be able to progress through an advanced degree, certificate programs and other professionally related fields.
	PSO3	1	Minimal as Students should can understand the things but take minimal lead in innovation and entrepreneurship activities.
2	**PO1**	3	Strongly correlated as the study requires the strong knowledge of mathematics, science and engineering fundamentals
	PO2	3	Strongly correlated as it requires large review research literature.
	PO3	3	Strongly correlated as requires large correlation to meet the specified needs with appropriate consideration for the public health and safety.
	PO4	2	Minimal correlated as it requires minimal use of research-based knowledge and research methods including design of experiments.
	PO5	1	Minimal correlated as required minimal techniques, resources, and modern engineering and IT tools.
	PO6	3	Strongly correlated as it involves reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	3	Strongly correlated in terms of societal and environmental contexts.
	PO8		
	PO9		
	PO10		
	PO11	3	Strongly correlated as it demonstrates the knowledge and understanding of the engineering and management principles and apply these to one's own work
	PO12	2	Moderately correlated as it has ability to engage in independent and life-long learning in the broadest context of technological change
	PSO1	2	Moderately correlated as it makes the students competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality,

			Technical Services.
	PSO2	3	Strongly correlated as Students shall be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
	PSO3	1	Minimal as Students should can understand the things but take minimal lead in innovation and entrepreneurship activities.
3	**PO1**	3	Strongly correlated as the study requires the strong knowledge of mathematics, science and engineering fundamentals
	PO2	3	Strongly correlated as it requires large review research literature.
	PO3	3	Strongly correlated as requires large correlation to meet the specified needs with appropriate consideration for the public health and safety.
	PO4	2	Minimal correlated as it requires minimal use of research-based knowledge and research methods including design of experiments.
	PO5	1	Minimal correlated as required minimal techniques, resources, and modern engineering and IT tools
	PO6	3	Strongly correlated as it involves reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	3	Strongly correlated in terms of societal and environmental contexts.
	PO8		
	PO9		
	PO10		
	PO11	3	Strongly correlated as it demonstrates the knowledge and understanding of the engineering and management principles and apply these to one's own work
	PO12	2	Moderately correlated as it has ability to engage in independent and life-long learning in the broadest context of technological change
	PSO1	2	Moderately correlated as it makes the students competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
	PSO2	3	Strongly correlated as Students shall be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.

	PSO3	1	Minimal as Students should can understand the things but take minimal lead in innovation and entrepreneurship activities.
4	**PO1**	3	Strongly correlated as the study requires the strong knowledge of mathematics, science and engineering fundamentals
	PO2	3	Strongly correlated as it requires large review research literature.
	PO3	3	Strongly correlated as requires large correlation to meet the specified needs with appropriate consideration for the public health and safety.
	PO4	2	Moderately correlated as it requires minimal use of research-based knowledge and research methods including design of experiments.
	PO5	1	Minimal correlated as required minimal techniques, resources, and modern engineering and IT tools
	PO6	3	Strongly correlated as it involves reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	3	Strongly correlated in terms of societal and environmental contexts.
	PO8		
	PO9		
	PO10		
	PO11	3	Strongly correlated as it demonstrates the knowledge and understanding of the engineering and management principles and apply these to one's own work
	PO12	2	Moderately correlated as it has ability to engage in independent and life-long learning in the broadest context of technological change
	PSO1	2	Moderately correlated as it makes the students competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
	PSO2	3	Strongly correlated as Students shall be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
	PSO3	1	Minimal as Students should can understand the things but take minimal lead in innovation and entrepreneurship activities.

Course Name: Project Preliminary Work/ Seminar
Course Code: ELE-706P

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	-	1	-	-	-	-	3	2	3	1	2
CO2	2	1	1	-	-	1	-	-	-	-	1	2	1	-	2

CO-PO Mapping Justification

COs	POs/PSOs	Co-po mapping	Co-relation
CO1	PO1	2	Analysis and evaluation of electric circuits need strong knowledge of mathematics, science and engineering fundamentals
	PO2	2	Basic laws of electric circuit and determination of electric parameters need to identify, formulate and review literature from engineering and science.
	PO3	3	Basic analysis provides design and development of electric circuit
	PO6	1	Moderate tool is uses for analysis
	PO11	3	Demonstration of knowledge and understand moderately employs in basic laws
	PO12	2	Study and analyses the basic laws at various stages.
	PSO1	3	Graduates will apply the knowledge of different processors to analyze the performance tradeoffs.
	PSO2	1	Graduates are able to design and develop different processors to solve the real world problems.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

COs	POs/PSOs	Co-po mapping	Co-relation
CO2	PO1	2	Apply the knowledge of fundamentals of electrical science & engineering in designing system.
	PO2	1	Basic laws of electric circuit and determination of electric parameters need to identify, and formulate from engineering and science.
	PO3	1	Basic analysis provides design and development of electric circuit
	PO6	1	Very small reasoning uses in basic law
	PO11	1	Demonstration of knowledge and understand moderately employs in basic laws
	PO12	2	Study and analyses the basic laws at various stages.
	PSO1	1	Graduates are able to design and develop different processors to solve the real world problems.
	PSO3	2	Graduates will apply the knowledge to analyze the various performance metrics in electrical system design.

Course Name: Utilization & Traction
Course Code: ELE- 11/E

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		2				3				2	1	2	3	1
CO2	2		1	2		3	2				1	2	1	2	1
CO3	3	2	1		1	2	3	1				3	3	1	2
CO4	1		3		2		2	2			2	1	1	2	3

CO-PO Mapping Justification

CO 1: Understand the motor ratings for different applications

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate considerationforthepublichealthandsafety,andthecultural,societal,andenvironmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complexengineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilitiesrelevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allieddisciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO2: Analyze the characteristics and control strategies of locomotives for track electrification.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is moderately correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal,and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	Itishighlycorrelatedtoapplyreasoninginformedbythecontextualknowledgeto assess societal, health, safety, legal and cultural issues and the consequent
		responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities withhighstandardsofprofessionalandmoralethicsandprovethemselveseneficial to society at large.

CO3: Analyze the characteristics and intensity of lightning systems for different types of lamps.

PO/PSO	Mapping	Justification
PO1	2	It is moderately correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal,and environmental considerations.

PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

CO4: Understand the heating and welding concepts for different Electrical applications

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	3	It is highly correlated in any way to identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal,and environmental considerations.
PO4	2	It is moderately correlated to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	It is less correlated to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	3	It is highly correlated to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	3	Highly correlated to 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.
PO11	3	It is highly correlated to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	The CO is moderately correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	2	Moderately correlated for proficient electrical engineers employable to serve in the industry, government and allied services.
PSO2	3	Highly correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	1	Partially correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves eneficial to society at large.

Semester 8

Course Name: Electrical Drives
Course Code: ELE-13/E (Elective)

CO-PO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	1	1	1	1	1	1		2		1	1	2	2	3
CO 2	3	2	2	1	2	2	1		2		1	1	2	2	1
CO 3	3	2	2	2	2	2	1		2		2	2	3	2	2
CO 4	3	2	3	2	3	2	2		3		3	2	3	3	2
CO 5	3	3	3	3	3	2	2		3		3	3	3	3	3

CO-PO Mapping Justification

CO1	PO1	Knowledge of drives is directly related with Engineering knowledge.
	PO2	Problem analysis is not much needed in application and utilization of drives.
	PO3	Detailed design/ development is not desired in application and utilization of drive.
	PO4	Applying the knowledge of drives does not conduct the investigations of complex problems in details.
	PO5	Modern tool usage is not much desired in application and utilization of drives.
	PO6	Sometimes the knowledge of drives helps the society.
	PO7	The knowledge of drives is less related with environment and sustainability.
	PO8	No correlation.
	PO9	Application and utilization of drives somehow requires individual and team work.
	PO10	No correlation.
	PO11	Application and utilization of drives involves less project management and finance.
	PO12	Basic knowledge is not sufficient for long-term learning.
	PSO1	Knowledge of drives somehow makes the students competent in the field of engineering.
	PSO2	Knowledge of drives somehow helps students in their future studies.
	PSO3	Application and utilization of drives helps students to take lead in innovation and entrepreneurship activities.
CO2	PO1	Controlling the speed of drives requires Engineering knowledge.
	PO2	Problem analysis is somehow needed in controlling the speed of drive.
	PO3	Somehow design/ development is desired in speed control of drives.
	PO4	Speed control of drives does not conduct the investigations of complex problems in details.
	PO5	Modern tool usage is somehow desired in speed control of drives.
	PO6	Somehow the speed control of drives helps the society.
	PO7	The speed control of drives is less related with environment and sustainability.
	PO8	No correlation.
	PO9	Speed control of drives somehow requires individual and team work.
	PO10	No correlation.

	PO11	Speed control of drives involves less project management and finance.
	PO12	Basic methods for speed control of drive is not sufficient for long-term learning.
	PSO1	Speed control of drives somehow makes the students competent in the field of engineering.
	PSO2	Knowledge of speed control of drives somehow helps students in their future studies.
	PSO3	Basic methods of speed control of drives not helps much to the students to take lead in innovation and entrepreneurship activities.
CO3	**PO1**	Four quadrant operation of drives requires Engineering knowledge.
	PO2	Problem analysis is somehow required in operating the drive in all quadrants.
	PO3	Somehow design/ development is desired in operating the drive in all quadrants.
	PO4	Four quadrant operation of drives somehow conduct the investigations of complex problems in details.
	PO5	Modern tool usage is somehow desired in four quadrant operation of drives.
	PO6	Somehow the operation of lift helps the society.
	PO7	The four quadrant of drives is less related with environment and sustainability.
	PO8	No correlation.
	PO9	All quadrant operation of drives somehow requires individual and team work.
	PO10	No correlation.
	PO11	Four quadrant of drives involves somehow project management and finance.
	PO12	Four quadrant of drives is somehow required for long-term learning.
	PSO1	Operation of drives in all four quadrants makes the students competent in the field of engineering.
	PSO2	Knowledge of four quadrant operation of drives somehow helps students in their future studies.
	PSO3	Knowledge of four quadrant operation of drives somehow helps students to take lead in innovation and entrepreneurship activities.
CO4	**PO1**	Applying different braking methods requires Engineering knowledge.
	PO2	Problem analysis is somehow needed in realizing the braking methods of drive.
	PO3	Design/ development is desired in realizing the braking methods of drive.
	PO4	Braking operation of drives somehow conduct the investigations of complex problems in details.
	PO5	Modern tool usage is desired in braking methods of drives.
	PO6	Somehow the braking methods of drive helps the society.
	PO7	The efficient braking of drive is somehow related with environment and sustainability.
	PO8	No correlation.
	PO9	Braking methods of drive requires individual and team work.
	PO10	No correlation.
	PO11	Braking of drive involves project management and finance.
	PO12	Knowledge of braking methods of drive is somehow required for long-term learning.
	PSO1	Application of proper braking method makes the students competent in the field of engineering.
	PSO2	Knowledge of proper braking methods of drive helps students in their future studies.
	PSO3	Knowledge of braking methods of drive somehow helps students to take lead in innovation and entrepreneurship activities.
CO5	**PO1**	Selection of particular type of drive requires Engineering knowledge.
	PO2	Problem analysis is required in suggesting the particular type of drive.
	PO3	Design/ development is desired in suggesting the particular type of drive.
	PO4	Selection of particular type of drive conduct the investigations of complex problems in details.

	PO5	Modern tool usage is desired in selection of proper drive.
	PO6	Somehow the selection of particular drive helps the society.
	PO7	The proper selection of drive is somehow related with environment and sustainability.
	PO8	No correlation.
	PO9	Proper selection of drive requires individual and team work.
	PO10	No correlation.
	PO11	Selection of particular drive involves project management and finance.
	PO12	Selection of particular drive is required for long-term learning.
	PSO1	Proper selection of drive makes the students competent in the field of engineering.
	PSO2	Particular selection of drive helps students in their future studies.
	PSO3	Proper selection of drive somehow helps students to take lead in innovation and entrepreneurship activities.

Course Name: General Management & Economics
Course Code: **HSS-801**

CO-PO Mapping

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1						2	2				3	3
2		3	2				1					3
3		3					2				3	3
4		3						2	3		3	3
5						2			3		3	3
6		3	2								2	3

CO-PO Mapping Justification

Cos	Pos		Justification
CO1	PO1	0	Minimal
	PO2	0	Minimal
	PO3	0	Minimal
	PO4	0	Minimal
	PO5	0	Minimal
	PO6	2	Moderately correlated to the engineer and society as it helps to assess societal and cultural issues relevant to professional engineering practice.
	PO7	2	Moderately correlated to environment and sustainability as it helps to understand environmental contexts and a need for sustainable development.
	PO8	0	Minimal
	PO9	0	Minimal
	PO10	0	Minimal
	PO11	3	Strongly correlated management and finance as it provides the understanding of management principles, their application and as well as inculcates the skills of the leader to lead and manage the projects in multidisciplinary environments.

	PO12	3	Strongly correlated to lifelong learning because economics is a continues learning process.
CO2	PO1	0	Minimal
	PO2	3	Strongly correlated as it helps to identify and formulate the problems through relevant research review.
	PO3	2	Moderately correlated as it helps to provide suitable solutions with appropriate consideration of culture as well as environment.
	PO4	0	Minimal.
	PO5	0	Minimal.
	PO6	0	Minimal.
	PO7	1	Satisfied
	PO8	0	Minimal.
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	0	Minimal.
	PO12	3	Strongly correlated as the pricing strategies and market knowledge needs to be understood on continuous basis.
CO3	PO1	0	Minimal.
	PO2	3	Strongly correlated as it helps to meet the specified needs with appropriate societal considerations.
	PO3	0	Minimal.
	PO4	0	Minimal.
	PO5	0	Minimal.
	PO6	0	Minimal.
	PO7	2	Moderately correlated as it helps to understand the need for sustainable development.
	PO8	0	Minimal.
	PO9	0	Minimal.
	PO10	0	Minimal.
	PO11	3	Strongly correlated as it provides the requisite knowledge for managing the project cost effectively.
	PO12	3	Strongly correlated as the knowledge of economic concepts is required in every perspective of life.

CO4	PO1	0	Minimal.
	PO2	3	Strongly correlated to problem analysis as it helps to identify when change is required to solve the problem and then adapt to the change.
	PO3	0	Minimal.
	PO4	0	Minimal.
	PO5	0	Minimal.
	PO6	0	Minimal.
	PO7	0	Minimal.
	PO8	2	Moderately correlated
	PO9	3	Strongly correlated as it helps to lead the change as effective managers.
	PO10	0	Minimal.
	PO11	3	Strongly correlated as it helps to utilize knowledge of management principles in one's work and work as a leader in the team.
	PO12	3	Strongly correlated to lifelong learning as change recognition and adaption is required throughout.
CO5	PO1	0	Minimal
	PO2	0	Minimal
	PO3	0	Minimal
	PO4	0	Minimal
	PO5	0	Minimal
	PO6	2	Moderately correlated
	PO7	0	Minimal
	PO8	0	Minimal
	PO9	3	Strongly correlated to individual and team work as functions of management help an individual to work as an effective member as well as a leader.
	PO10	0	Minimal
	PO11	3	Strongly correlated to project management and finance as it provides the understanding of management and finance to manage the multidisciplinary projects.
	PO12	3	Strongly correlated to lifelong learning as the process of management as well as its functions are required by all the professionals throughout their careers.
CO6	PO1	0	Minimal

	PO2	3	Strongly correlated
	PO3	2	Moderately correlated
	PO4	0	Minimal
	PO5	0	Minimal
	PO6	0	Minimal
	PO7	0	Minimal
	PO8	0	Minimal
	PO9	0	Minimal
	PO10	0	Minimal
	PO11	2	Moderately correlated
	PO12	3	Strongly correlated

Course Name: High Voltage Engineering Lab
Course Code: ELE-803P

CO-PO Mapping

\	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	2	2	2	1	1			2			2	3	3	1
CO 2	3	2	2	1	1	1			2			2	3	3	1
CO 3	3	2	2	1	1	1			2			2	3	3	1
CO 4	3	2	2	2	1	1			2			2	3	3	1

CO-PO Mapping Justification

CO1: Handle equipment for generation and measurement of high A.C., D.C. and impulse voltages.

PS/PSO	Mapping	Justification
PO1	2	CO1 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	This Lab course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	2	The Lab course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	1	The Lab course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.
PO9	2	Lab course emphasizes on individual and team work performance to achieve end result.
PO12	2	High voltage engineering Lab introduces primary concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PSO1	3	With experimental knowledge of High Voltage Engineering, students are made competent, creative and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PSO2	3	The Lab course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PSO3	1	The experiments do not prepare students for entrepreneurship activities with little emphasis on innovation.

CO2: Carry out breakdown withstand tests and flashover tests on high-voltage equipment according to standards.

PS/PSO	Mapping	Justification
PO1	3	CO2 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	This Lab course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	1	The Lab course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	1	The Lab course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.
PO9	2	Lab course emphasizes on individual and team work performance to achieve end result.
PO12	2	High voltage engineering Lab introduces primary concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PSO1	3	With experimental knowledge of High Voltage Engineering, students are made competent, creative and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PSO2	3	The Lab course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PSO3	1	The experiments do not prepare students for entrepreneurship activities with little emphasis on innovation.

CO3: Understand the effect of electrode geometry on the breakdown characteristics of gaseous gaps.

PS/PSO	Mapping	Justification
PO1	3	CO3 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	This Lab course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	1	The Lab course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	1	The Lab course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.

PO9	2	Lab course emphasizes on individual and team work performance to achieve end result.
PO12	2	High voltage engineering Lab introduces primary concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PSO1	3	With experimental knowledge of High Voltage Engineering, students are made competent, creative and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PSO2	3	The Lab course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PSO3	1	The experiments do not prepare students for entrepreneurship activities with little emphasis on innovation.

CO4: Determine the breakdown voltage of insulating liquids according to standards.

PS/PSO	**Mapping**	**Justification**
PO1	3	CO4 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	This Lab course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	2	The Lab course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	1	The Lab course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.
PO9	2	Lab course emphasizes on individual and team work performance to achieve end result.
PO12	2	High voltage engineering Lab introduces primary concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PSO1	3	With experimental knowledge of High Voltage Engineering, students are made competent, creative and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PSO2	3	The Lab course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PSO3	1	The experiments do not prepare students for entrepreneurship activities with little emphasis on innovation.

Course Name: High Voltage Engineering
Course Code: ELE- 803

CO-PO Mapping

\	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	2	1	2	1						2	3	3	1
CO 2	3	2	2	1	2	1						2	3	3	1
CO 3	3	2	2	1	2	1	1					2	3	3	1
CO 4	3	2	2	2	2	1	1					2	3	3	1

CO-PO Mapping Justification

CO1: Understand the significance of high voltage testing of power system equipment and study the various methods of generation of high AC, DC and impulse test voltages and high impulse test currents.

PS/PSO	Mapping	Justification
PO1	3	CO1 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	The course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	1	The course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	2	The course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.
PO12	2	High voltage engineering forms a fundamental concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PS01	3	With the knowledge of High Voltage Engineering, students are made competent, creative and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PS02	3	The course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PS03	1	The course does not prepare students for entrepreneurship activities with little emphasis on innovation.

CO2: Understand the complications involved in the measurement of high voltages and study the various methods of measurement of high ac, dc and impulse test voltages and high impulse currents.

PS/PSO	Mapping	Justification
PO1	3	CO2 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	The course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	1	The course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	2	The course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.
PO12	2	High voltage engineering forms a fundamental concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PS01	3	With the knowledge of High Voltage Engineering, students are made competent, creative and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PS02	3	The course makes sure that students can progress through an advanced degree, certificate programs, or participate in continuing education in Electrical Engineering.
PS03	1	The course does not prepare students for entrepreneurship activities with little emphasis on innovation.

CO3: Describe the mechanisms of conduction and breakdown in gaseous dielectrics; effect of uniform and non-uniform field gaps, breakdown under dc and ac fields, impulse breakdown.

PS/PSO	Mapping	Justification
PO1	3	CO3 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	The course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	1	The course does not fundamentally deal with research-based analysis and design. Most of the concepts have been well established in literature. However, experimentation has been given due consideration.
PO5	2	The course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.

PO7	1	The Course does not provide the solutions to societal and environmental context.
PO12	2	High voltage engineering forms a fundamental concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PS01	3	With the knowledge of High Voltage Engineering, students are made competent, creative, and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PS02	3	The course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PS03	1	The course does not prepare students for entrepreneurship activities with little emphasis on innovation.

CO4: Identify the breakdown mechanisms of solid and liquid dielectrics; describe the suitability of these dielectrics in high voltage equipment.

PS/PSO	Mapping	Justification
PO1	3	CO4 is a fundamental engineering concept, knowledge of which is extremely important for all electrical engineering graduates.
PO2	2	High voltage engineering deals with identification & formulation of complex engineering problems to a certain degree using mathematical concepts.
PO3	2	The course deals with generation of high AC & DC voltage & current and appropriate consideration is given to safety norms.
PO4	2	CO4 emphasizes on research-based analysis and design.
PO5	2	The course introduces appropriate high voltage engineering concepts, highlights the techniques used in generation of high voltage AC, DC and relies on modern engineering and IT tools, with a slightly lesser reliance on advanced control engineering concepts.
PO6	1	The Course provides lesser emphasis to societal, health, safety, legal and cultural issues.
PO7	1	The Course does not provide the solutions to societal and environmental context.
PO12	2	High voltage engineering forms a fundamental concept for electrical engineering graduates particularly for those who find job as power engineers. Power engineer has to deal with high voltage and current life-long. The course makes sure that students are prepared for the same.
PS01	3	With the knowledge of High Voltage Engineering, students are made competent, creative, and imaginative Electrical Engineers that can find opportunity as power engineers in various sectors.
PS02	3	The course makes sure that students can progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering.
PS03	1	The course does not prepare students for entrepreneurship activities with little emphasis on innovation.

Course Name: MAINTENANCE & DESIGN OF ELECTRICAL SUB STATIONS
Course Code: ELE-9/E

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	-	-	-	-	-	-	1	2	2	1
CO2	3	3	2	2	1	-	-	-	1	-	-	-	2	2	1
CO3	3	2	2	2	1	-	-	-	-	-	-	1	2	2	1
CO4	3	3	2	2	1	-	-	-	1	-	-	-	2	2	1
CO5	2	2	2	-	1	-	-	-	1	-	-	1	2	2	1

CO-PO Mapping Justification

COs	POs/PSOs	Co-relation
CO1	PO1	Knowledge of mathematics, science and engineering is needed for understand substation, bus bar arrangement and different substation equipment
	PO2	First Principles of mathematics and engineering is used in understand substation, bus bar arrangement and different substation equipment.
	PO3	Substation and its operation are also associated with public health in term of safety
	PO4	Research based knowledge and research methods are used for understanding the substation, bus bar and different substation equipment.
	PO5	Modern tools are used in substation, bus bar arrangement and different substation equipment
	PO12	substation, bus bar arrangement and different substation equipment need life-long learning
	PSO1	This Course creates competent, creativity and imaginative in electrical engineering, also motivates students for research, and technical services.
	PSO2	By acquiring knowledge of substation and its components, switches, circuit breakers, students can explore in their higher studies and business field.
	PSO3	This course makes student to lead in innovation and entrepreneurship activities with high professional standards.
CO2	PO1	Gaining knowledge of CT, PT, circuit breakers and protective relay requires understanding of mathematics, science and engineering fundamentals.
	PO2	Formulation and research review are needed for problem analysis of CT, PT, circuit breakers and protective relay
	PO3	Design solutions for complex engineering problem such as designing of CT, PT, circuit breakers and protective relay needs appropriate consideration of public health and safety.
	PO4	Research based knowledge and research methodology are including in design of CT, PT, circuit breakers and protective relay
	PO5	To apply appropriate techniques and resources, modern engineering and IT tools are needed in CT, PT, circuit breakers and protective relay
	PO9	Individual and team work are needed in understanding and designing of CT, PT, circuit breakers and protective relay
	PSO1	This Course creates competent, creativity and imaginative in electrical engineering, also motivates students for research, and technical services.
	PSO2	By acquiring knowledge of substation and its components, switches, circuit breakers, students can explore in their higher studies and business field.
	PSO3	This course makes student to lead in innovation and entrepreneurship activities with high professional standards.

CO3	PO1	Knowledge of mathematics, science and engineering is needed for understand general earthing of a substation and complete design of earthing grid
	PO2	First Principles of mathematics and engineering is used in understand general earthing of a substation and complete design of earthing grid
	PO3	Earthing of a substation and complete design of earthing grid are also associated with public health in term of safety
	PO4	Research based knowledge and research methods are used for understanding general earthing of a substation and complete design of earthing grid
	PO5	Modern tools are used in general earthing of a substation and complete design of earthing grid
	PO12	General earthing of a substation and complete design of earthing grid need life-long learning
	PSO1	This Course creates competent, creativity and imaginative in electrical engineering, also motivates students for research, and technical services.
	PSO2	By acquiring knowledge of substation and its components, switches, circuit breakers, students can explore in their higher studies and business field.
	PSO3	This course makes student to lead in innovation and entrepreneurship activities with high professional standards.
CO4	PO1	Gaining knowledge of auxiliaries: its working diagram and control cable requires understanding of mathematics, science and engineering fundamentals.
	PO2	Formulation and research review are needed for problem analysis of auxiliaries: its working diagram and control cable
	PO3	Design solutions for complex engineering problem such as designing of auxiliaries: its working diagram and control cable needs appropriate consideration of public health and safety.
	PO4	Research based knowledge and research methodology are including in design of auxiliaries: its working diagram and control cable
	PO5	To apply appropriate techniques and resources, modern engineering and IT tools are needed in auxiliaries: its working diagram and control cable
	PO9	Individual and team work are needed in understanding and designing of auxiliaries: its working diagram and control cable
	PSO1	This Course creates competent, creativity and imaginative in electrical engineering, also motivates students for research, and technical services.
	PSO2	By acquiring knowledge of substation and its components, switches, circuit breakers, students can explore in their higher studies and business field.
	PSO3	This course makes student to lead in innovation and entrepreneurship activities with high professional standards.
CO5	PO1	Gas insulated substation needs knowledge of mathematics, science and engineering fundamentals.
	PO2	Formulation and research review are needed for gas insulated substation
	PO3	Design solution of gas insulated substation needs appropriate consideration for public health and safety.
	PO5	Modern engineering and IT tools are included in gas insulated substation
	PO9	Individual and team work are also needed for designing of gas insulated substation
	PO12	Understanding and designing of Gas insulated substation are life-long learning procees.
	PSO1	This Course creates competent, creativity and imaginative in electrical engineering, also motivates students for research, and technical services.
	PSO2	By acquiring knowledge of substation and its components, switches, circuit breakers, students can explore in their higher studies and business field.
	PSO3	This course makes student to lead in innovation and entrepreneurship activities with high professional standards.

Course Name: PROJECT
Course Code: ELE-802

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	-	-	3	2	-	2	-	2	2	2
CO2	-	-	-	2	1	-	1	-	-	-	-	-	2	2	2
CO3	2	3	2	2	2	-	-	-	-	-	-	-	2	2	2
CO4	-	-	-	-	2	-	-	-	-	1	-	-	2	2	2

CO-PO Mapping Justification

COs	POs/PSOs	Co-relation
CO1	PO1	Real world problem needs knowledge of mathematics, science and fundamental knowledge of engineering
	PO2	Literature review in essential for real world problem
	PO3	Real world problem must consider public health, safety and environmental consideration
	PO4	Real world problem needs research-based knowledge for experiment, analysis and interpretation of data
	PO5	Problem of real-world problem uses modern tool to solve problem
	PO8	While solving engineering problem ethics must be followed and obey
	PO9	Team work and multidisciplinary setting require for development of project
	PO11	Project management and finance is core principle while solving real world problem
	PSO1	Hardware and/or software project develops creativity and high level imaginative electrical engineering skill which help in manufacture and quality technical services.
	PSO2	Project knowledge can be extended for higher studies and research as well. Also, professional related filed can also be motivated.
	PSO3	Project can also lead to innovation and entrepreneurship activities with high professional standard and moral ethics.
CO2	PO4	Awareness of design methodology and its implementation requires research-based knowledge and research method including design of experiment and interpretation of data
	PO5	Awareness about modern tools is essential for design and implementation of methodology.
	PO7	Awareness about impact of professional engineering solutions in societal and environmental context.
	PSO1	Hardware and/or software project develops creativity and high level imaginative electrical engineering skill which help in manufacture and quality technical services.
	PSO2	Project knowledge can be extended for higher studies and research as well. Also, professional related filed can also be motivated.
	PSO3	Project can also lead to innovation and entrepreneurship activities with high professional standard and moral ethics.

CO3	PO1	Knowledge of advance technique needs mathematics, science and engineering knowledge
	PO2	Knowledge of advance technique requires review of research literature
	PO3	Design and development-based knowledge must require for advance technique
	PO4	Investigation of complex problem must involve in advance technique
	PO5	Advance tool knowledge is needed
	PSO1	Hardware and/or software project develops creativity and high level imaginative electrical engineering skill which help in manufacture and quality technical services.
	PSO2	Project knowledge can be extended for higher studies and research as well. Also, professional related filed can also be motivated.
	PSO3	Project can also lead to innovation and entrepreneurship activities with high professional standard and moral ethics.

CO4	PO5	Modern and advance tool of IT and computer is required while writing technical report
	PO10	While writing report discussion and communication with technical society is needed for effective writing
	PSO1	Hardware and/or software project develops creativity and high level imaginative electrical engineering skill which help in manufacture and quality technical services.
	PSO2	Project knowledge can be extended for higher studies and research as well. Also, professional related filed can also be motivated.
	PSO3	Project can also lead to innovation and entrepreneurship activities with high professional standard and moral ethics.

Course Name: Renewable Sources of Electrical Energy

Course Code: ELE-14/E

CO-PO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1			1	3	2					1	2	1
CO 2	3	3	3	3	1	2	2	1			1	1	3	3	3
CO 3	3	3	3	2	1	1	1	1					3	2	2
CO 4	1	2	1	1		2	2				1	2	2	3	2

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	1	Basic knowledge is connected
	PO2	2	Research literature can be reviewed and sort of things
	PO3	1	Basic understanding about design / development of solutions can be attributed
	PO4		No correlation
	PO5		No correlation
	PO6	1	Correlate the societal activities/responsibilities with basic sources of energy
	PO7	3	Strongly connect with the environmental aspects with renewable energy sources
	PO8	2	Understand professional ethics and responsibilities relating to renewable energy sources
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12		No correlation
	PSO1	1	Slight understanding of electrical engineering relating to renewable energy
	PSO2	2	Higher studies in renewable energies
	PSO3	1	Understand the need of the society with inclusion of renewable energy sources
CO2	PO1	3	Apply basic science and engineering knowledge to understand and analyze major renewable energy sources.
	PO2	3	Problem identification and analysis with solar and wind energy sources.
	PO3	3	Design and development of solutions using solar and wind energy sources.
	PO4	3	Final stage / end user requirement fulfillment
	PO5	1	Slight usage of the advanced tools.
	PO6	2	Acceptable results to the society with the knowledge of solar and wind energy sources
	PO7	2	Environmental and societal impact of solar and wind energy sources

	PO8	**1**	Ethical norms pertaining to solar and wind energy sources
	PO9		No correlation
	PO10		No correlation
	PO11	**1**	Slight understanding of technical and financial relation to solar and wind energy sources
	PO12	**1**	Basic understanding for long-term requirement
	PSO1	**3**	Creative knowledge is inculcated for design and research in relation to solar and wind energy sources
	PSO2	**3**	Higher studies and professional requirement in relation to solar and wind energy is instilled
	PSO3	**3**	Advanced technological development for better opportunity is infused
CO3	**PO1**	**3**	Basic science and engineering knowledge for ocean energy technology
	PO2	**3**	Problem identification and analysis can be carried out
	PO3	**3**	Plan and progress of engineering solutions
	PO4	**2**	Can be able to fulfill the high-end requirement
	PO5	**1**	Slight usage of the advanced tools.
	PO6	**1**	Safety and other responsibilities with respect to ocean energy is taught
	PO7	**1**	Environmental and societal impact of ocean energy is taught
	PO8	**1**	Slight understanding of ethical norms
	PO9		No correlation
	PO10		No correlation
	PO11		No correlation
	PO12		No correlation
	PSO1	**3**	Creative knowledge is inculcated for design and research
	PSO2	**2**	Higher studies and professional requirement is brought into highlight
	PSO3	**2**	Technological development for better opportunity is imparted
CO4	**PO1**	**1**	Basic knowledge is connected
	PO2	**2**	Research analysis can be carried out
	PO3	**1**	Slight knowledge of design / development of solutions is imparted
	PO4	**1**	Future options are highlighted
	PO5		No correlation
	PO6	**2**	Correlate the societal activities/responsibilities with future energy sources
	PO7	**2**	Environmental aspects for future energy sources
	PO8		No correlation
	PO9		No correlation
	PO10		No correlation
	PO11	**1**	Probable engineering and management principles pertaining to future energy sources
	PO12	**2**	Preparation for the future energy: needs and requirement
	PSO1	**2**	Understand energy conservation and preparedness for future energy usages
	PSO2	**3**	Motivated for higher/further learning in the upcoming energy fields
	PSO3	**2**	Better usage of future energy for benefitting society at large

Course Name: Selected topics in advanced control
Course Code: ELE- 3/E

CO-PO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	2	1	2	3	1	2			3	2	3	2
CO 2	3	2	1	2				1	2	2		3	1	2	2
CO 3	2	2		1	1	3	3			3	2	3	3	2	3
CO 4	2	3	2	3		3	2	1	1			2	3	3	3
CO 5	3	3	2	3		3		2	3	2	3	3	2	3	2

CO-PO Mapping Justification

CO	PO / PSO	Mapping	Justification
CO1	PO1	3	Basic knowledge is connected
	PO2	3	Research literature can be reviewed
	PO3	3	Basic understanding about design / development of solutions can be attributed
	PO4	2	Correlates the societal activities with basic concepts
	PO5	1	Addresses fundamental concepts
	PO6	2	Correlate the concepts with basics
	PO7	3	Strongly relates the concepts and applications
	PO8	1	Correlation between basic aims
	PO9	2	Correlate the concepts with basics
	PO10		No correlation
	PO11		No correlation
	PO12	3	Strongly relates the concepts and applications
	PSO1	2	Slight understanding of electrical engineering relating to control
	PSO2	3	Higher studies in control design
	PSO3	2	Basic understanding of control applications
CO2	PO1	3	Apply basic science and engineering knowledge to understand and analyze major renewable energy sources.
	PO2	2	Problem identification and analysis
	PO3	1	Design and development of solutions using solar
	PO4	2	Final stage / end user requirement fulfillment
	PO5		No correlation
	PO6		No correlation
	PO7		No correlation
	PO8	1	Basic concepts corelated
	PO9	2	Application of basic concepts
	PO10	2	Application of basic concepts
	PO11		No correlation
	PO12	3	Basic understanding for long-term requirement
	PSO1	1	Creative knowledge is inculcated for design and research in relation to control engineering
	PSO2	2	Higher studies and professional requirement in relation to

			control engineering
	PSO3	**2**	Advanced technological development for better opportunity is infused
CO3	**PO1**	**2**	Basic science and engineering knowledge for control theory
	PO2	**2**	Problem identification and analysis carried out
	PO3		No Correlation
	PO4	**1**	Useful to extension of knowledge
	PO5	**1**	Slight usage of the advanced tools.
	PO6	**3**	Strong correlation between concepts and applications
	PO7	**3**	Strong correlation between concepts and applications
	PO8		No correlation
	PO9		No correlation
	PO10	**3**	Strong correlation between concepts and applications
	PO11	**2**	Moderate correlation between concepts and applications
	PO12	**3**	Strong correlation between concepts and applications
	PSO1	**3**	Creative knowledge is inculcated for design and research
	PSO2	**2**	Higher studies and professional requirement is brought into highlight
	PSO3	**3**	Technological development for better opportunity is imparted
CO4	**PO1**	**2**	Basic knowledge is connected
	PO2	**3**	Research analysis can be carried out
	PO3	**2**	Slight knowledge of design / development of solutions is imparted
	PO4	**3**	Future scope is highlighted
	PO5		No correlation
	PO6	**3**	Strong correlation between concepts and applications
	PO7	**2**	Moderate correlation between concepts and applications
	PO8	**1**	Basic knowledge of concepts
	PO9	**1**	Basic knowledge of concepts
	PO10		No correlation
	PO11		No correlation
	PO12	**2**	Preparation for the future engineering needs
	PSO1	**3**	Strong correlation between concepts and applications
	PSO2	**3**	Motivated for higher/further learning
	PSO3	**3**	Advanced concepts introduced
CO5	**PO1**	**3**	Strong correlation between concepts and applications
	PO2	**3**	Strong correlation between concepts and applications
	PO3	**2**	Basic knowledge of control design
	PO4	**3**	Strong correlation between concepts and applications
	PO5		No correlation
	PO6	**3**	Strong correlation between concepts and applications
	PO7		No correlation
	PO8	**2**	Mathematical analysis of theoretical concepts
	PO9	**3**	Strong correlation between concepts and applications
	PO10	**2**	Mathematical analysis of theoretical concepts
	PO11	**3**	Strong correlation between theory and design
	PO12	**3**	Strong correlation between concepts and applications
	PSO1	**2**	Introduction of future scope of research
	PSO2	**3**	Strong correlation between concepts and applications
	PSO3	**2**	Mathematical analysis of theoretical concepts

DEPARTMENT OF ELECTRICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

The second meeting of the Departmental Under-Graduate Committee (DUGC) was held on June 13, 2019 in the committee Room of the Department. Following members were present:

1. Prof. A. H. Bhat, Chairman
2. Prof. Aijaz Ahmad, Special Invitee
3. Prof. S. A. Lone, Member
4. Dr. S. J. Iqbal, Member
5. Dr. Mohammad Abid Bazaz, Convener
6. Ms. Tabish Nazir, Member
7. Ms. Aqsa Rouf, Student Representative

Dr. G. R. Beigh (Member from sister department) could not attend the meeting due to some pre-occupations. The other student members could not attend the meeting because of ongoing examinations.

The committee deliberated upon some academic matters and proposed the following changes in the under-graduate courses offered by the Department:

1. The course structure for B. Tech. in Electrical Engineering for the batch starting from Autumn 2019 was finalized and is attached as Appendix.
2. As decided in the last meeting of DUGC, Basic Electrical Engineering Course will henceforth be offered in 1st year to Electrical Engineering students as well as to other allied branches. In order to optimize the resources and for equitable distribution of teaching load, it was decided to offer the Basic Electrical Engineering course (Theory & Lab) to Electrical Engineering, Civil Engineering (two sections), and Chemical Engineering in 1st semester, and to other branches viz. ECE, Mechanical Engineering, CSE, IT and Metallurgical Engineering in 2nd semester. The other departments are requested to make necessary changes in their course structures accordingly.
3. Since the Basic Electrical Engineering course offered to Electrical Engineering students at present in 3rd Semester has been slashed, the 4-credits of this course are distributed with one additional credit to Electronics-I, EMF & Waves, Electrical Engineering Materials and Mathematics-III.
4. In BTech 5th Semester, Control Systems-II course to have 4-credits instead of 3-credits and Computer Aided Simulation of Electrical Machines to have 1 credit instead of 2- credits with two contact hours per week.
5. In BTech 5th Semester, Microprocessors and DSP Lab. to be named Microprocessors Lab.
6. In BTech. 7th Semester, Electronics Measurement and Instrumentation Lab. to be slashed and instead Power Station Practice Lab. (Field Visits) of 1-credit is proposed. Project Preliminary Work and Seminar to be shown as separate courses.
7. In BTech 8th Semester, Project to have 9-credits only with 1 additional credit to Elective-I, Elective-II and High Voltage Engineering.

The meeting came to an end with a vote of thanks to the chair.

Ms. Aqsa Rouf | Ms. Tabish Nazir Mir | Dr. S. J. Iqbal | Prof. S. A. Lone

Dr. Mohammad Abid Bazaz
(Convener)

Prof. A. H. Bhat
Chairman

National Institute Of Technology
Hazratbal, Kashmir-190006

Da

Minutes of the SUGC Meeting

The 4th meeting of SUGC was convened on 6th January 2020 in the institute committee r different issues related to UG program. The following were present:-

1.	Prof. Aijaz Ahmad	Chairman/Convener SUGC
2.	Prof. M.A. Ahangar	HOD Civil Engineering Deptt.
3.	Prof. B.A. Mir	Nominee of Chairman Senate
4.	Dr. Attikur Rahman	HOD Metallurgical & Mat. Sc. Engg
5.	Prof. M. Ikram	Convener DUGC Physics Deptt.
6.	Dr. Gousia Qazi	Associate Dean Academics
7.	Dr. Mohammad Abid Bazaz	Convener DUGC Elect. Engg.
8.	Dr. Tanweer Jalal	Convener DUGC Mathematics
9.	Dr. Tanveer Rasool	Convener DUGC Chemical. Engg.
10.	Dr. M. Ahsan Chisti	Convener DUGC CS. Engg.
11.	Dr. Shabir Ahmad Sofi	Convener DUGC IT deptt.
12.	Dr. Obbo Chandra Sekhar	HOD T&P
13	Dr. Irfan Samad Wani	Metallurgical & Material Science
14.	Dr. Majid Hamid Koul	Convener DUGC Mechanical Engg. deptt.
15.	Dr. Jay Shrivastava	Convener DUGC Humanities Deptt.

was discussed and following resolutions were passed

1	**To discuss the revised B.Tech. Schemes received from concerned departments, to be implemented from 2019 batch.**
n-	**Approved.** The revised undergraduate scheme from 3rd to 8th semester to be implemented from 2019 batch, received from concerned departments, was presented and discussed in detail. The departments for which the schemes were discussed are: Electrical Engg., Civil Engg., Mechanical Engg., Electronics and Comm., Chemical Engg., Metallurgical & Material Engg. Computer Science & Information Technology. All schemes were uniformly restricted to 150 credits (excluding 50 credits of first year) maintaining the present credit system of 200 credits for each UG program. The complete schemes (copy enclosed- Annexure A) was unanimously approved subject to minor modification. The course code of subjects could not be finalized and accordingly the job was assigned to following three member committee: 1) Dr. M.A. Bazaz 2) Dr. Tanveer Rasool 3) Dr. Majid Hamid Koul The committee will ensure uniform course code structure for all the programs and will submit the report to Chairman SUGC latest by 9th January 2020. The syllabi of courses could not be finalized as the same was pending from some departments. All such departments were requested to submit the same immediately so that the same can be finalized at the earliest.
	Discuss the mechanism to prevent entry of unauthorized persons in the central evaluation hall
	Approved. In order to restrict the entry of unauthorized person in the central evaluation hall so that evaluation by proxy faculty/research scholars is avoided, the following measures were recommended. 1. Before the start of evaluation process Dean Academics will circulate a notice among all faculty through respective Heads of Departments to refrain from proxy evaluation and about subsequent action against the defaulters. 2. The answer scripts for evaluation shall be handed over to the concerned faculty after making proper entry in the evaluation register by the concerned staff in the evaluation hall with receipt signature of the faculty. 3. If the staff on duty in the evaluation hall finds some suspicious person involved in evaluation he must inform Dean (Academic) immediately who along with concerned HOD will take on spot necessary action.

3/4	beyond the institute statutes was discussed threadbare. It was observed that if everything goes smooth it will require a minimum of two more years for the student to complete the degree (two semesters & 18 backlogs). That means student can complete his degree in 14-15 years. In previous similar cases placed on the file institute has permitted some students to complete the degree in 7-8 years. However it was pointed out by some members that one student of E&C deptt. Mr. Murli was allowed to complete his B.Tech. degree beyond 10-11 years. It was resolved that the details about this case will be obtained from Dean (Academics) & then take a final decision.

The items SUGC-4/1 will be put before next senate meeting

The meeting came to an end with a vote of thanks to the chair.

9.1.2020

By Order

(Prof. Aijaz Ahmad)
Chairman SUGC

Copy to:

1. P.A. to Director for information of Director please.
2. Dean Academic for information & with the request to place item SUGC-4/1 before the senate.
3. All Deans/Heads of Departments for information please
4. Registrar for information & with the request to place item SUGC-4/1 before the senate.
5. All SUGC members for information please
6. Concerned file

Item Senate-26/19

To ratify the action taken by the Director in having approved Minutes of SUGC Meetings.

Four SUGC meeting have been convened on 12-07-2019, 25-07-2019, 03-01-2020 & 06-01-2020 in the Institute Committee room under the chairmanship of Prof. Aijaz Ahmad, Chairman SUGC:

Various proposals pertaining to UG Programme have been discussed. Some of the main resolution/policy adopted by the Institute are as under:

1. Restructure of scheme of course for B.Tech 1st and 2nd semester w.e.f. from Autumn 2019 (50 credits) (Common for all Branches)
2. Revised and uniform course structure from 3rd to 8th Semester for all Departments.
3. Branch Sliding after completion of 2nd semester.

Details resolution and guidelines unanimously recommended by SUGC and approved by Director are **Annexed at Page No. 71 - 82**

Senate is requested to ratify the action taken by the Director.

Senate-26/13	**To ratify the action taken by the Director in having allowed the allotment of Ph.D Candidates to available supervisors proportionately as a special case in the Department of Mathematics.**
Resolution No. 13/26	Ratified.
Senate-26/14	**To ratify the action taken by the Director in having approved modification in constitution of DUGC and DPGC.**
Resolution No. 14/26	Ratified.
Senate-26/15	**To ratify the action taken by the Director in having approved the operation of re-registration form and fee modalities for re-registration cases.**
Resolution No. 15/26	Ratified.
Senate-26/16	**To ratify the action taken by the Director in having allowed Mr Faizan Jameel Shah to continue his M. Tech Programme as Part time candidate and to consider the proposal for reviewing the relevant statute.**
Resolution No. 16/26	Ratified. Statute with regard to conversion of M.Tech from Full time to Part time has been reviewed and no change has been approved by Senate. However, Senate approved, that such cases shall be dealt from case to case basis with a relaxation of 6-12 months in statutory requirement, depending upon the merit of the case.
Senate-26/17	**To ratify the action taken by the Director in having allowed the Changes in already approved Academic Calendar of 2019, scheme of examination for Autumn Semester 2019 and to approve the academic calendar for year 2020.**
Resolution No. 17/26	Ratified. Academic calendar proposed for year 2020 is approved. Senate allowed DAA office to make necessary changes in the Academic calendar in view of extension of registration date(s) for Spring Session, after issuing date sheet and conclusion of odd semester examination, which is scheduled from 25th February 2020.
Senate-26/18	**To ratify the action taken by the Director in having approved Minutes of SPGC Meetings.**
Resolution No. 18/26	Ratified except the date of enrollment in respect of Mr. Sheikh Ghulam Mohammad for Ph.D Programme under new category **"Sponsored Part time foreign Candidate Category"** and new title **"Studies of Welded and Concrete Structures using Non-destructive Technologies"** is approved from the date it has been recommended by Doctoral Committee (DC) (i.e. 14th December 2018) in the Department of Mechanical Engineering under joint supervision of Prof. S.N Ahmad and Prof. Rakesh Sehgal.
Senate-26/19	**To ratify the action taken by the Director in having approved Minutes of SUGC Meetings.**
Resolution No. 19/26	Point No. 1 & 3 Ratified. Point 2 has been referred back to SUGC for appropriate recommendations, in view of discussion made for Item No. 2, 26th Senate (ATR for Resolution No.08/25). All HODs are requested to initiate necessary action with regard to introduction of max 10 credit online courses in the new schemes (from 3rd to 8th Semester) effective for Batch 2019.
Senate-26/20	**To discuss and devise the policy for residency period and course completion for Ph.D Programme under Sponsored Category (TEQIP-III) for Session 2019.**
Resolution No. 20/26	Item was discussed at length. Since as per guidelines of NPIU, residency period is to waived off in respect of candidates who have been admitted under TEQIP III. However, Senate resolved to advise the students to complete course work as per rules of NIT Srinagar in consultation with concerned department co-ordinator.

MAPPING of Course Outcomes (COs) with Program Outcomes (POs)

1st Year Courses

2019-2020

Semester 1

ourse Name: Basic English and Communication Skills

Course Code: HUL 100

CO-PO Mapping

CO-PO Mapping for Basic English and Communication Skills															
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1						2			2	3	2	3			
CO2										3					
CO3						2			2	3	2	2			
CO4									3	3	2				

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	2	**Moderately correlated**: Effective reading skills and enhanced word knowledge will enable students to apply reason informed by the contextual knowledge in assessing societal, health, safety, legal and cultural issues.
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated**: Effective reading and vocabulary skills help students function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly Correlated**: Effective reading and vocabulary skills accomplish effective communication on engineering activities as students are able to understand and write effective reports and design documentation. Communicate effectively on complex engineering activities with the engineering

	PO11	2	**Moderately correlated**: Effective reading and vocabulary skills enable students to demonstrate knowledge and understanding of engineering and management principles.
	PO12	3	**Highly correlated**: With effective reading and vocabulary skills students are better prepared to engage in independent and life-long learning.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO2	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	0	Not correlated
	PO10	3	**Highly correlated**: Correct usage of English grammar helps communicate effectively on engineering activities, write effective reports, and design documentation.
	PO11	0	Not correlated
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO3	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	2	**Moderately correlated:** Writing coherent paragraphs and formal letters enables students to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated:** Writing coherent paragraphs and formal letters enables students to function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.

	PO10	3	**Highly correlated:** Exhibiting technical writing skills helps write effective project reports and communicate efficiently with the engineering community and with society at large.
	PO11	2	**Moderately correlated:** Effective writing skills facilitate better demonstration of knowledge and understanding of the engineering and management principles, efficient management of projects, and better application of the same to one's work as an individual, as a member, and as a leader in a team and multidisciplinary environments.
	PO12	2	**Moderately correlated:** Effective writing skills enable students to engage in independent and life-long learning.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO4	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	3	**Highly correlated:** Effective oral presentation skills enable students to function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly correlated:** Learning effective oral presentation skills in English helps students give presentations in an engineering discipline along with giving and receiving clear instructions. This course outcome enables students to communicate effectively on complex engineering activities with the engineering community and with society at large.
	PO11	2	**Moderately correlated:** Effective oral communication skills help students demonstrate the knowledge and understanding of the engineering and management principles.
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated

Course Name: Computer Programming

Course Code: ITP 101

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2		3						2	2
CO2	3	3	3		3						2	2
CO3	3	3	3		3						2	2
CO4	3	3	3		3						2	2
CO5	2	3	3		2						2	2

Course Name: Computer Programming Lab

Course Code: ITP100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	3	2					1			1
CO2	2	3	3	2	2				1			3
CO3	2	3	3	2								3
CO4	2	3	3	2								3

Course Name: Mathematics-II

Course Code: MAL-100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**2**	**2**	**1**	**2**	**2**	**1**							2	2	1
CO2	**2**	**2**	**2**	**3**	**2**	**2**							2	3	1
CO3	**2**	**2**	**2**	**2**	**2**	**1**							2	3	1
CO4	**1**	**2**	**2**	**2**	**1**	**1**							2	1	1
CO5	**1**	**2**	**2**	**1**	**2**										

Course Name: BASIC ELECTRICAL ENGINEERING

Course Code: **EET-101**

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	1	-	-	-	-	-	2	1	1	1	2
CO2	2	2	2	3	2	-	-	-	-	-	2	2	3	-	2
CO3	3	1	2	2	-	-	-	-	-	-	-	1	1	-	-
CO4	3	1	2	3	1	-	-	-	-	-	-	2	-	1	2
CO5	3	2	2	1	2	-	-	-	-	-	3	1	1	2	2

CO-PO Mapping Justification

CO1: Analyse the behaviour of different electric circuit parameters and have a thorough understanding of different types of energy sources.

PS/PSO	Mapping	Justification
PO1	3	Very highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	3	Very Highly related to the design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO3	1	Loosely related to creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO4	2	Highly related to the application of informed reasoning by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO5	1	Loosely related to effective communication 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.
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering

		and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	1	Loosely related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	1	Loosely influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO2: Analyse the different configurations of DC circuits using basic circuit laws like KVL, KCL and tools like mesh analysis and nodal analysis.

PS/PSO	**Mapping**	**Justification**
PO1	2	Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	Highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	2	Highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO11	2	Highly related to demonstration of knowledge and understanding of the engineering

		and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	2	Highly related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO3: Apply network analysis theorems like Superposition theorem, Thevenin's theorem, Norton's theorem and Maximum Power Transfer theorem to DC circuits and networks.

PS/PSO	**Mapping**	**Justification**
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	Very highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	3	Very Highly related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.

CO4: Use phasor representation for steady state analysis of sinusoidally excited AC circuits and apply different network techniques for their analysis.

PS/PSO	Mapping	Justification
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	1	Loosely related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	Highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	3	Very highly related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	1	Loosely related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO12	2	Highly related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS02	1	Loosely influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

CO5: Understand the concept of active, reactive power and power factor correction in AC circuits. Analyse various configurations of 3-phase AC circuits.

PS/PSO	Mapping	Justification
PO1	3	Very Highly related to the application of knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2	2	Highly related to Identification, formulation, review of research literature, and analysis of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	2	Highly related to the Design of solutions for complex engineering problems and design of system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	1	Loosely related to the use of research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	2	Very highly related to Creation, selection, and application of appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO11	3	Very Highly related to demonstration of knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	1	Loosely related to recognition of the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PS01	1	Loosely related to engaging students of electrical engineering with competent, creative and imaginative Electrical Engineers employable in fields of design, research, manufacturing, safety, quality, Technical Services.
PS02	2	Highly influences the students to be able to progress through an advanced degree, certificate programs or participate in continuing education in Electrical Engineering, business, and other professionally related fields.
PS03	2	Highly related to students taking lead in innovation and entrepreneurship activities with high professional standards and moral ethics and prove themselves beneficial to society at large

Course Name: PHYSICS - 1

Course Code: PHY 101

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1							1			
CO2	3	3	3	2	2							1			
CO3	3	3	3	1	2							1			
CO4	3	2	2	1	1							1			
CO5	3	2	2	1	1							1			

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	3	Strongly correlated to application of Quantum Mechanics Fundamentals in various branches of Engineering
	PO2	3	Moderately correlated to the theoretical knowledge of Quantum Mechanics for data interpretation
	PO3	2	Moderately correlated to knowledge of Quantum Mechanics Fundamentals in advanced engineering
	PO4	1	Satisfactory helps to achieve the skills through regular class discussion /seminar /poster presentation
	PO5	1	Low correlated to achieve the skills through learning various simulation tools
	PO6	1	Low correlated
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	

	PSO3	0	
CO2	PO1	3	Strongly correlated to basics of Laser fundamentals in engineering knowledge
	PO2	3	Strongly correlated to the theoretical knowledge of laser in designing and conducting Experiments
	PO3	3	Strongly correlated to the Knowledge of laser fundamentals for designing materials
	PO4	2	Moderately correlated to conduct investigation, analysis and interpretation of data based on Laser problems through regular class discussion /seminar /poster presentation
	PO5	1	Less correlated to Application of laser in Advanced Engineering Fields
	PO6	1	Less correlated
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO3	PO1	3	Strongly correlated
	PO2	3	Strongly correlated to various requirements to fabricate optical fibers
	PO3	3	Strongly correlated
	PO4	1	Less correlated
	PO5	1	Less correlated
	PO6	1	Less correlated
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	

	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	
CO4	PO1	3	Strongly correlated to science by studying nuclear science and fission and fusion reaction takes place in physical science
	PO2	3	Strongly correlated to first principles of mathematics, natural sciences, and engineering sciences.
	PO3	3	Strongly correlated
	PO4	1	Minimal
	PO5	1	Minimal
	PO6	1	Minimal
	PO7	0	
	PO8	0	
	PO9	0	
	PO10	0	
	PO11	0	
	PO12	0	
	PSO1	0	
	PSO2	0	
	PSO3	0	

Course Name: Engineering Drawing

Course Code: CIP 100

CO-PO Mapping

	POs												PSOs		
COs	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	2	2	2	-	3	3	2	2	3	3	3
2	3	3	3	3	2	2	2	-	3	3	2	2	3	3	3
3	3	3	3	3	2	2	2	-	3	3	2	2	3	3	3
4	3	3	3	3	2	2	2	-	3	3	2	2	3	3	3

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	3	Strongly correlated to science and engineering.
	PO2	3	Strongly correlated to complex engineering analysis
	PO3	3	Strongly correlated to design solutions for complex engineering problems
	PO4	3	Strongly Correlated
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8	0	Minimal, No literature survey or there is no complex designs involvement
	PO9	3	Strongly correlated to Engineering.
	PO10	3	Strongly correlated to Engineering
	PO11	2	Moderately related
	PO12	2	Moderately correlated to lifelong learning because science and engineering are continuous learning process
	PSO1	3	Strongly correlated
	PSO2	3	Strongly correlated
	PSO3	3	Strongly correlated
CO2	PO1	3	Strongly correlated to science and engineering.
	PO2	3	Strongly correlated to complex engineering analysis
	PO3	3	Strongly correlated to design solutions for complex engineering problems
	PO4	3	Strongly Correlated
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8	0	Minimal, No literature survey or there is no complex designs involvement
	PO9	3	Strongly correlated to Engineering.

	PO10	3	Strongly correlated to Engineering
	PO11	2	Moderately related
	PO12	2	Moderately correlated to lifelong learning because science and engineering are continuous learning process
	PSO1	3	Strongly correlated
	PSO2	3	Strongly correlated
	PSO3	3	Strongly correlated
CO3	PO1	3	Strongly correlated to science and engineering.
	PO2	3	Strongly correlated to complex engineering analysis
	PO3	3	Strongly correlated to design solutions for complex engineering problems
	PO4	3	Strongly Correlated
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8	0	Minimal, No literature survey or there is no complex designs involvement
	PO9	3	Strongly correlated to Engineering.
	PO10	3	Strongly correlated to Engineering
	PO11	2	Moderately related
	PO12	2	Moderately correlated to lifelong learning because science and engineering are continuous learning process
	PSO1	3	Strongly correlated
	PSO2	3	Strongly correlated
	PSO3	3	Strongly correlated
CO4	PO1	3	Strongly correlated to science and engineering.
	PO2	3	Strongly correlated to complex engineering analysis
	PO3	3	Strongly correlated to design solutions for complex engineering problems
	PO4	3	Strongly Correlated
	PO5	2	Moderately correlated
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8	0	Minimal, No literature survey or there is no complex designs involvement
	PO9	3	Strongly correlated to Engineering.
	PO10	3	Strongly correlated to Engineering
	PO11	2	Moderately related
	PO12	2	Moderately correlated to lifelong learning because science and engineering are continuous learning process
	PSO1	3	Strongly correlated
	PSO2	3	Strongly correlated
	PSO3	3	Strongly correlated

Course Name: Engineering Chemistry

Course Code: CYL 100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2			1	1					2	2	2	2
CO2	2	3	3	1		1	3	1	1	2		2	2	2	1
CO3	3	2	2			2	2			2	2	3	2	3	2
CO4	1	3	1			1	2			2		2	3	2	2

3: Excellent (highly correlated); 2: Good (moderate); 1: Satisfied (Low); Blank: Not correlated

CO-PO/PSO Mapping Justification

COs	PO/ PSO	Mapping	Justification
1	PO1	2	Moderately correlated
	PO2	1	Minimal
	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	1	Minimal
	PO7	1	Minimal
	PO8		
	PO9		
	PO10		
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	2	Moderately correlated
	PSO3	2	Moderately correlated
2	PO1	2	Moderately correlated
	PO2	3	Strongly correlated
	PO3	3	Strongly correlated

	PO4	1	Minimal
	PO5		
	PO6	1	Minimal
	PO7	3	Strongly correlated
	PO8	1	Minimal
	PO9	1	Minimal
	PO10	2	Moderately correlated
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	1	
3	**PO1**	3	Strongly correlated
	PO2	3	Strongly correlated
	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10	2	Moderately correlated
	PO11	2	Moderately correlated
	PO12	3	Strongly correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	2	Moderately correlated
4	**PO1**	2	Moderately correlated
	PO2	2	Moderately correlated

	PO3	1	Minimal
	PO4		
	PO5		
	PO6	1	Minimal
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10	2	Moderately correlated
	PO12	2	Moderately correlated
	PSO1	3	Strongly correlated
	PSO2	2	Moderately correlated
	PSO3	2	Moderately correlated

Course Name: Chemistry Laboratory

Course Code: CYP 100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2			1	1					2	2	2	2
CO2	2	3	3	1		1	3	1	1	2		2	2	2	1
CO3	3	2	2			2	2			2	2	3	2	3	2
CO4	3	2	2			2	2			2	2	3	2	3	2

CO-PO Mapping Justification

COs	PO/ PSO	Mapping	Justification
1	**PO1**	2	Moderately correlated
	PO2	1	Minimal
	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	1	Minimal
	PO7	1	Minimal
	PO8		
	PO9		
	PO10		
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	2	Moderately correlated
	PSO3	2	Moderately correlated
2	**PO1**	2	Moderately correlated
	PO2	3	Strongly correlated
	PO3	3	Strongly correlated

	PO4	1	Minimal
	PO5		
	PO6	1	Minimal
	PO7	3	Strongly correlated
	PO8	1	Minimal
	PO9	1	Minimal
	PO10	2	Moderately correlated
	PO11		
	PO12	2	Moderately correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	1	Moderately correlated
3	**PO1**	3	Strongly correlated
	PO2	2	Moderately correlated
	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10	2	Moderately correlated
	PO11	2	Moderately correlated
	PO12	3	Strongly correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	2	Moderately correlated
4	**PO1**	3	Strongly correlated
	PO2	2	Moderately correlated

	PO3	2	Moderately correlated
	PO4		
	PO5		
	PO6	2	Moderately correlated
	PO7	2	Moderately correlated
	PO8		
	PO9		
	PO10	2	Moderately correlated
	PO11	2	Moderately correlated
	PO12	3	Strongly correlated
	PSO1	2	Moderately correlated
	PSO2	3	Strongly correlated
	PSO3	2	Moderately correlated

Semester 2

Course Name: WORKSHOP PRACTICE

Course Code: WSP 100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1		2	2	2	2	3	2		3	2	1	1
CO2	3	1	1		2	2	2	2	3	2		3	2	1	1
CO3	3	1	1		2	2	2	2	3	2		3	2	1	1
CO4	3	1	1		2	2	2	2	3	2		3	2	1	1

CO-PO Mapping Justification

CO1: Identify and apply relevant tools and techniques in various Machining Operations.

PO/PSO	Mapping	Justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	1	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	1	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4		No relevance found upon this Criteria, so mapped to level 0.
PO5	2	It is moderately correlated with the selection of appropriate resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	2	It is moderately correlated to the reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	2	Its moderately related to the impact of the professional engineering solutions in societal and environmental contexts thus demonstrating the knowledge of, and need for sustainable development.

PO/PSO	Mapping	Justification
PO8	**2**	Its moderately related to the application of ethical principles and commitment to professional ethics and responsibilities and norms of the engineering practice.
PO9	**3**	Its highly related to the effective functioning as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**2**	Its moderately related to the effective communication 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.
PO11		No relevance found upon this Criteria, so mapped to level 0.
PO12	**3**	Its highly related to the recognition of need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	**2**	It is highly correlated with the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	**1**	It is partially correlated to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts
PSO3	**1**	It is partially correlated to design, develop and modify the chemical processes and to analyse these by applying the physicochemical and biological techniques.

CO2: Introduce various joints, tools, operations and techniques in Welding and Sheet-Metal Shop.

PO/PSO	Mapping	Justification
PO1	**3**	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	**1**	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**1**	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO/PSO	Mapping	Justification
PO4		No relevance found upon this Criteria, so mapped to level 0.
PO5	**2**	It is moderately correlated with the selection of appropriate resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**2**	It is moderately correlated to the reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**2**	Its moderately related to the impact of the professional engineering solutions in societal and environmental contexts thus demonstrating the knowledge of, and need for sustainable development.
PO8	**2**	Its moderately related to the application of ethical principles and commitment to professional ethics and responsibilities and norms of the engineering practice.
PO9	**3**	Its highly related to the effective functioning as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**2**	Its moderately related to the effective communication 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.
PO11		No relevance found upon this Criteria, so mapped to level 0.
PO12	**3**	Its highly related to the recognition of need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	**2**	It is highly correlated with the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	**1**	It is partially correlated to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts
PSO3	**1**	It is partially correlated to design, develop and modify the chemical processes and to analyse these by applying the physicochemical and biological techniques.

CO3: Recognize and apply basic principles and techniques of Forging and Foundry Shop.

PO/PSO	Mapping	Justification
PO1	**3**	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	**1**	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**1**	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4		No relevance found upon this Criteria, so mapped to level 0.
PO5	**2**	It is moderately correlated with the selection of appropriate resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**2**	It is moderately correlated to the reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**2**	Its moderately related to the impact of the professional engineering solutions in societal and environmental contexts thus demonstrating the knowledge of, and need for sustainable development.
PO8	**2**	Its moderately related to the application of ethical principles and commitment to professional ethics and responsibilities and norms of the engineering practice.
PO9	**3**	Its highly related to the effective functioning as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**2**	Its moderately related to the effective communication 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.
PO11		No relevance found upon this Criteria, so mapped to level 0.
PO12	**3**	Its highly related to the recognition of need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO/PSO	Mapping	Justification
PSO1	**2**	It is highly correlated with the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	**1**	It is partially correlated to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts
PSO3	**1**	It is partially correlated to design, develop and modify the chemical processes and to analyse these by applying the physicochemical and biological techniques.

CO4: Study and practice of basic operations using different types of tools and fixtures in Carpentry and Fitting Shop.

PO/PSO	Mapping	Justification
PO1	**3**	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	**1**	It is partially correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**1**	It is partially correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4		No relevance found upon this Criteria, so mapped to level 0.
PO5	**2**	It is moderately correlated with the selection of appropriate resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**2**	It is moderately correlated to the reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**2**	Its moderately related to the impact of the professional engineering solutions in societal and environmental contexts thus demonstrating the knowledge of, and need for sustainable development.

PO/PSO	Mapping	Justification
PO8	**2**	Its moderately related to the application of ethical principles and commitment to professional ethics and responsibilities and norms of the engineering practice.
PO9	**3**	Its highly related to the effective functioning as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**2**	Its moderately related to the effective communication 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.
PO11		No relevance found upon this Criteria, so mapped to level 0.
PO12	**3**	Its highly related to the recognition of need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	**2**	It is highly correlated with the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	**1**	It is partially correlated to acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts
PSO3	**1**	It is partially correlated to design, develop and modify the chemical processes and to analyse these by applying the physicochemical and biological techniques.

Course Name: Electrical Engineering Elements of Mechanical Engineering

Course Code: MEL – 100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2							2		3	3	2	3
CO2	3	2	2							2		3	3	2	3
CO3	3	2	2							2		3	3	2	3
CO4	3	2	2							2		3	3	2	3

CO-PO Mapping Justification

CO1 : Identify and select materials and manufacturing processes for fabricating prototypes and engineering products.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9,	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.

PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	3	Highly correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO2 : Explain the significance of thermodynamic processes in energy conversion and conservation.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9,	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.

PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	3	Highly correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3: Explain the significance of fluids engineering to energy conversion, and to diverse fields as aerodynamics, medicine, etc.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7,PO8, PO9,	-	No relevance found upon this Criteria, so mapped to level 0.

PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	3	Highly correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO4: Identify and select various motion and power transmission elements for a particular application.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3	3	It is highly correlated to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5,PO6,PO7, PO8, PO9,	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO11	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	3	Highly correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

Course Name: Mathematics-II

Course Code: MAL-101

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3								2	2	1
CO2	3	3	3	3	3								2	3	1
CO3	3	2	3	2	2								2	3	1
CO4	3	3	3	2	3								2	1	1
CO5	3	2	2	2	2								1	1	1

Course Name: Engineering Mechanics

Course Code: CIT — 100

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	POll	PO12	PSO1	PSO2	PSO3
CO1	3	2	2							2		3	3	2	3
CO2	3	2	2							2		3	3	2	3
CO3	3	2	2							2		3	3	2	3
CO4	3	2	2							2		3	3	2	3

CO-PO Mapping Justification

CO1: Determine the resultants in planer force systems. Identify and quantify all forces associated with a static framework.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems And design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5, PO6, PO7, PO8, PO9	-	No relevance found upon this Criteria, so mapped to level 0.
PO10	2	Less correlated to 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.
PO1l	0	No relevance found upon this Criteria, so mapped to level 0.

PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	3	Highly correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO2: Calculate the center of gravity, center of mass, and centroid for simple and composite volumes. Determine moment of area of plane sections. To determine the forces in members of a plane truss**.**

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	3	It is highly correlated to design solutions for complex engineering problems anddesign system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4, PO5, PO6, PO7, PO8,PO9,	-	No relevance found upon this Criteria, so mapped to level 0.

PO10	2	Less correlated to 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.
POH	0	No relevance found upon this Criteria, so mapped to level 0.
PO12	3	The CO is more correlated to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	3	Moderately correlated for proficient mechanical engineers employable to serve in the industry, government and allied services.
PSO2	2	Moderately correlated to ability to advance in academic and research pursuits in mechanical and allied disciplines.
PSO3	3	Highly correlated to ability to lead in innovation and entrepreneurship activities with high standards of professional and moral ethics and prove themselves beneficial to society at large.

CO3: Determine the resultants in planer force systems using energy principles.

PO/PSO	Mapping	justification
PO1	3	It is highly correlated to application of the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO2	2	It is Less correlated in any way to Identification & formulation of complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Course Name: Advanced English Communication Skills and Organisational Behaviour

Course Code: HUL 101

CO-PO Mapping

CO-PO Mapping for Advanced English Communication Skills and Organizational Behaviour														
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1						3			2	3	2	2			
CO2										3					
CO3						2			2	3	2	2			
CO4									3	3	2				

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	3	**Highly correlated**: By understanding an author's purpose, tone, and important information from the text students are better equipped to apply reason informed by the contextual knowledge in assessing societal, health, safety, legal and cultural issues.
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated**: Advanced reading skills help students function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly Correlated**: Advanced reading skills accomplish effective communication on engineering activities as students are able to understand reports and documentation.
	PO11	2	**Moderately correlated**: Advanced reading skills enable students to demonstrate a better understanding of the engineering and management principles.
	PO12	2	**Moderately correlated**: With effective reading skills students are better prepared to engage in independent and life-long learning.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO2	PO1	0	Not correlated
	PO2	0	Not correlated

	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	0	Not correlated
	PO10	3	**Highly correlated**: Correct usage of English grammar, punctuation, and sentences help communicate effectively on engineering activities, write effective reports, and design documentation.
	PO11	0	Not correlated
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO3	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	2	**Moderately correlated:** Writing academic essays and formal reports enables students to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	2	**Moderately correlated:** Ability to write academic essays, formal reports, emails, job cover letters, and résumés enable students to function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly correlated:** The ability to write academic essays, formal reports, emails, job cover letters, and résumés help students to communicate effectively with the engineering community and with society at large.
	PO11	2	**Moderately correlated:** Advanced writing skills facilitate better demonstration of knowledge and understanding of the engineering and management principles, efficient management of projects, and better application of the same to one's work as an individual, as a member, and as a leader in a team and multidisciplinary environments.
	PO12	2	**Moderately correlated:** Advanced writing skills enable students to engage in independent and life-long learning.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO4	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated

	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	3	**Highly correlated:** Demonstrating effective oral communication skills in social and academic contexts enable students to function effectively as an individual, as a member, or as a leader in diverse teams and multidisciplinary settings.
	PO10	3	**Highly correlated:** Learning effective oral presentation skills in English helps students give presentations in the engineering discipline along with giving and receiving clear instructions. This course outcome enables students to communicate effectively on complex engineering activities with the engineering community and with society at large.
	PO11	2	**Moderately correlated:** Advanced oral communication skills help students demonstrate the knowledge and understanding of the engineering and management principles.
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated

Course Name: Language Laboratory

Course Code: HUP 100

CO-PO Mapping

CO-PO Mapping for Language Laboratory															
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1										3					
CO2										3					
CO3									3	3	3	2			
CO4									3	3	3	2			

CO-PO Mapping Justification

COs	POs		Justification
CO1	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	0	Not correlated
	PO10	3	**Highly Correlated**: By demonstrating phonemic awareness and by making correct pronunciation students are able to accomplish effective communication and give and receive clear instructions.
	PO11	0	Not correlated
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO2	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	0	Not correlated

	PO10	3	**Highly correlated**: By demonstrating sound comprehension of native speakers of English, correctly identifying syllables, syllable structures, word stress, employing rules of intonation, and by exhibiting awareness of British and American accents students are able to communicate effectively and give and receive instructions clearly.
	PO11	0	Not correlated
	PO12	0	Not correlated
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO3	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	3	**Highly correlated**: Expressing opinions, agreements, disagreements, and actively participating in group discussions help students function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.
	PO10	3	**Highly correlated**: Expressing opinions, agreements, disagreements, and actively participating in group discussions help students communicate effectively on engineering activities.
	PO11	3	**Highly correlated**: Expressing opinions, agreements, disagreements, and actively participating in group discussions help students apply engineering and management principles to one's work as a member and leader in a team, to manage projects in multidisciplinary environments.
	PO12	2	**Moderately correlated:** Expressing opinions, agreements, disagreements, and actively participating in group discussions prepare the students to engage in life-long learning.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated
CO4	PO1	0	Not correlated
	PO2	0	Not correlated
	PO3	0	Not correlated
	PO4	0	Not correlated
	PO5	0	Not correlated
	PO6	0	Not correlated
	PO7	0	Not correlated
	PO8	0	Not correlated
	PO9	3	**Highly correlated**: Demonstrating effective oral communication and presentation skills help students function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.

	PO10	3	**Highly correlated**: Demonstrating effective oral communication and presentation skills enable students to communicate effectively on engineering activities.
	PO11	3	**Highly correlated**: Demonstrating effective oral communication and presentation skills help students apply engineering and management principles to one's work as a member and leader in a team, to manage projects in multidisciplinary environments.
	PO12	2	**Moderately correlated:** Demonstrating effective oral communication and presentation skills prepare the students to engage in life-long learning.
	PSO1	0	Not correlated
	PSO2	0	Not correlated
	PSO3	0	Not correlated