LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)
L.B.REDDY NAGAR, MYLAVARAM-521 230.A.P. INDIA
Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi
NAAC Accredited with "A" grade, Accredited by NBA
New Delhi & Certified by ISO 9001:2015
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
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COURSE HANDOUT

Part-A

PROGRAM : **B.Tech. II-Sem., EEE-A**

ACADEMIC YEAR : **2018-19**

COURSE NAME & CODE : **Professional Communication -II (17FE02)**

L-T-P STRUCTURE : **3-0-0**

COURSE CREDITS : **3**

COURSE INSTRUCTOR : **B Sagar**

COURSE COORDINATOR : **Prof.B.Samrajya Lakshmi**

PRE-REQUISITES: Students should have basics in English vocabulary and Grammar & they should write error free sentences.

Course Educational Objective (CEOs): To Improve vocabulary, Grammar, Verbal – Non verbal Communication; to develop adaptability, assertive skills and Team spirit for skillful management in work place; and to Interpret technical data given in the form of charts, graphs & pictograms for writing technical reports.

Course Outcomes (COs) : At the end of the course, the student will be able to

CO1: Use appropriate vocabulary to interpret data thoroughly and to write reports effectively.
CO2: Face any situation with confidence and voice opinions/decisions assertively.
CO3: Use English Language effectively in spoken and written forms.
CO4: Work effectively in teams for better result.
CO5: Communicate effectively using verbal and non-verbal dimensions aptly.

Course Articulation Matrix:

Course Code	COs	Programme Outcomes												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
17FE02	CO1		1		1		1			3	3		2			
	CO2		1		1		1			3	3		2			
	CO3		1		1		1			3	3		2			
	CO4		1		1		1		1	3	3		2			
	CO5		1		1		1		1	3	3		2			
1 = Slight (Low) 2 = Moderate (Medium) 3 =Substantial(High)																

BOS APPROVED TEXT BOOKS:

T1	Board of Editors, "Fluency in English – A Course book for Engineering Students", Orient Black Swan, Hyderabad, 2016.
T2	Dhanavel S.P, "English and Soft Skills", Orient Black Swan, Hyderabad, 2010.

BOS APPROVED REFERENCE BOOKS:

R1	Murphy, "English Grammar with CD", Cambridge University Press, New Delhi, 2004.
R2	Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, New Delhi, 2008.
R3	Baradwaj Kumkum, "Professional Communication", I.K.International Publishing House Pvt.Lt. New Delhi, 2008.
R4	Raman, Meenakshi, Sharma, Sangeeta, . "Technical Communication -Principles and Practice" Oxford University Press, New Delhi, Third Edition. 2015.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): EEE-A

UNIT-I :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to UNIT-I	1	17-12-18		TLM1			
2.	Good Manners – J.C.Hill	1	19-12-18		TLM1	CO1	T1	
3.	Idioms	1	21-12-18		TLM1, TLM2, TLM5	CO1	T1	
4.	One-word Substitutes	1	24-12-18		TLM1, TLM2, TLM5	CO1	T1	
5.	Sequence of tenses	1	26-12-18		TLM1, TLM2, TLM5	CO1	T1	
6.	Subject – Verb Agreement (Concord)	1	28-12-18		TLM1, TLM2, TLM5	CO1	T1	
7.	If- Rudyard Kipling	1	31-12-18		TLM1	CO1	T1	
8.	Information Transfer	1	02-01-19		TLM1, TLM2	CO1	T1	
No. of classes required to complete UNIT-I					No. of classes taken: 08			

UNIT-II :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.	Verger – Somerset	1	04-01-19 07-01-19		TLM1, TLM6	CO2	T2	

	Maugham							
10.	Assertive skills from the story/ personal level/ workplace	1	09-01-19		TLM1, TLM6	CO2	T2	
	Expanding proverbs on Assertive skills	1	11-01-19		TLM1, TLM2, TLM5, TLM6	CO2	T2	
11.	White washing the fence – Mark Twain	1	21-01-19		TLM1, TLM6	CO2	T2	
12.	Teamwork skills from the story/ work place	1	23-01-19		TLM1, TLM6	CO2	T2	
13.	Expanding proverbs on Teamwork	1	25-01-19		TLM1, TLM2, TLM5, TLM6	CO2	T2	
14.	Note-making	1	28-01-19		TLM1, TLM2, TLM5, TLM6	CO2	T2	
15.	Abstract/Summary writing	1	30-01-19 01-02-19		TLM1, TLM2, TLM5, TLM6	CO2	T2	
No. of classes required to complete UNIT-II					No. of classes taken:			

UNIT-III:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
16.	Oh Father, Dear Father – Raj Kinger	1	11-02-19		TLM1	CO3	T1	
17.	Foreign Languages and their Influence on English	1	13-02-19		TLM1, TLM2, TLM5, TLM6	CO3	T1	
18.	Conditional Sentences	1	15-02-19		TLM1, TLM2, TLM5, TLM6	CO3	T1	
19.	Degrees of Comparison	1	18-02-19		TLM1, TLM2, TLM5, TLM6	CO3	T1	
20.	Question Tags	1	20-02-19		TLM1, TLM2, TLM5, TLM6	CO3	T1	
21.	Basic Education – M.K. Gandhi	1	22-02-19		TLM1, TLM6	CO3	T1	

22.	Report Writing	1	25-02-19		TLM1, TLM2, TLM5, TLM6	CO3	T1	
23.	Report Writing	1	27-02-19		TLM1, TLM2, TLM5, TLM6	CO3	T1	
No. of classes required to complete UNIT-III				No. of classes taken:				

UNIT-IV :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
24.	Sen˜or Payroll – W E Barrett	1	01-03-19		TLM1, TLM6	CO4	T2	
25.	Organizational Communication	1	04-03-19		TLM1, TLM6	CO4	T2	
26.	Adaptability skills from the story	1	06-03-19		TLM1, TLM6	CO4	T2	
27.	Adaptability skills at work place & Real life	1	08-03-19		TLM1, TLM6	CO4	T2	
28.	Expanding proverbs on Adaptability skills	1	11-03-19		TLM1, TLM2, TLM5, TLM6	CO4	T2	
29.	Active & Passive Voice	1	13-03-19		TLM1, TLM2, TLM5, TLM6	CO4	T2	
30.	Active & Passive Voice	1	15-03-19		TLM1, TLM2, TLM5, TLM6	CO4	T2	
31.	Direct & Indirect Speech	1	18-03-19		TLM1, TLM2, TLM5, TLM6	CO4	T2	
32.	Direct & Indirect Speech	1	20-03-19		TLM1, TLM2, TLM5, TLM6	CO4	T2	
No. of classes required to complete UNIT-IV				No. of classes taken:				

UNIT-V :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
33.	A real good smile – Bill Naughton	1	22-03-19 25-03-19		TLM1, TLM6	CO5	T2	
34.	Non-Verbal Communication Skills from the	1	27-03-19		TLM1, TLM6	CO5	T2	

	story							
35.	Non-Verbal Communication skills through real life experiences	1	29-03-19		TLM1, TLM6	CO5	T2	
36.	articulation and gestures	1	01-04-19		TLM1, TLM2, TLM5, TLM6	CO5	T2	
37.	'Wh' & 'Yes' or 'No' questions	1	03-04-19		TLM1, TLM2, TLM5, TLM6	CO5	T2	
38.	Wh' & 'Yes' or 'No' questions	1	05-04-19		TLM1, TLM2, TLM5, TLM6	CO5	T2	
39.	Proverbial expansion on Non-Verbal Communication	1	08-04-19		TLM1, TLM2, TLM5, TLM6	CO5	T2	
40.	Proverbial expansion on Non-Verbal Communication	1	10-04-19		TLM1, TLM2, TLM5, TLM6	CO5	T2	
No. of classes required to complete UNIT-V					No. of classes taken:			

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
41.	Common Errors	1	12-04-19		TLM1, TLM2, TLM5, TLM6	CO5	T2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part - C

EVALUATION PROCESS:

Evaluation Task	**Cos**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	1,2	A2=5
I-Mid Examination	1,2	B1=20
Quiz -1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20

Quiz -2	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D(>95%=5, 90-95%=4,85-90%=3,80-85%=2,75-80%=1)		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations	**1,2,3,4,5**	**E=60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: 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.
4. **Conduct investigations of complex problems**: 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.
5. **Modern tool usage**: 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.
6. **The engineer and society**: 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.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the enginee**ring 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.
12. **Life-long learning**: 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.

Course Instructor	Course Coordinator	Module Coordinator	HOD

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COURSE HANDOUT

Part-A

PROGRAM : B.Tech. II-Sem., EEE(B)

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Professional Communication - II (17FE02)

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : K.SRIDEVI

COURSE COORDINATOR : Dr.B.Samrajya Lakshmi

PRE-REQUISITES: Students should have basics in English vocabulary and Grammar & they should write error free sentences

Course Educational Objective (CEOs): To Improve vocabulary, Grammar, Verbal – Non verbal Communication; to develop adaptability, assertive skills and Team spirit for skillful management in work place; and to Interpret technical data given in the form of charts, graphs & pictograms for writing technical reports.

Course Outcomes (COs) : At the end of the course, the student will be able to

- CO1 : Express the ideas aptly and briefly using word- substitutes and idioms effectively in spoken and written forms.
- CO2 : Comprehend the given texts and Communicate confidently in formal and informal contexts.
- CO3 : Use grammatically error free sentences in writing and speaking.
- CO4 : Interpret the information given in Tables, Bar graphs, Line graphs, Pie charts, Flow charts, Tree Diagrams & Pictograms accurately and present it aptly & ethically.
- CO5 : Write notes, reports & Abstract/Summary based on the information given ethically.

Course Code	COs	Programme Outcomes											PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
17FE02	CO1		1		1		1			3	3		2			
	CO2		1		1		1			3	3		2			
	CO3		1		1		1			3	3		2			
	CO4		1		1		1		1	3	3		2			
	CO5		1		1		1		1	3	3		2			
1 = Slight (Low) 2 = Moderate (Medium) 3-Substantial(High)																

Course Articulation Matrix:

BOS APPROVED TEXT BOOKS:

T1	Board of Editors, "Fluency in English – A Course book for Engineering Students", Orient Black Swan, Hyderabad, 2016.
T2	Dhanavel S.P, "English and Soft Skills", Orient Black Swan, Hyderabad, 2010.

BOS APPROVED REFERENCE BOOKS:

R1	Murphy, "English Grammar with CD", Cambridge University Press, New Delhi, 2004.
R2	Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, New Delhi, 2008.
R3	Baradwaj Kumkum, "Professional Communication", I.K.International Publishing House Pvt.Lt., New Delhi, 2008.
R4	Raman, Meenakshi, Sharma, Sangeeta, . "Technical Communication -Principles and Practice" Oxford University Press, New Delhi, Third Edition. 2015.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A/B/C

UNIT-I :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to UNIT-I	1	17-12-2018		TLM1			
2.	Good Manners – J.C.Hill	1	18-12-2018		TLM1	CO1	T1	
3.	Idioms	1	22-12-2018		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
4.	One-word Substitutes	1	24-12-2018		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
5.	Sequence of tenses	1	29-12-2018		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
6.	Subject – Verb Agreement (Concord)	1	31-12-2018		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
7.	If- Rudyard Kipling	1	05-01-2019		TLM1	CO1	T1	
8.	Information Transfer	1	07-01-2019		TLM1, TLM2	CO1	T1,R2,R4	
No. of classes required to complete UNIT-I					No. of classes taken: 08			

UNIT-II :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.	Verger – Somerset Maugham	1	08-01-2019		TLM1, TLM6	CO2	T2	
10.	Assertive skills from the story/ personal level/ workplace	1	19-01-2019		TLM1, TLM6	CO2	T2	
11.	Expanding proverbs on Assertive skills	1	21-01-2019		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
12.	White washing the fence – Mark Twain	1	22-01-2019		TLM1, TLM6	CO2	T2	
13.	Teamwork skills from the story/ work place	1	28-01-2019		TLM1, TLM6	CO2	T2	
14.	Expanding proverbs on Teamwork	1	29-01-2019		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
15.	Note-making	1	02-02-2019		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
16.	Abstract/Summary writing	1			TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
No. of classes required to complete UNIT-II					No. of classes taken: 8			

UNIT-III :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Oh Father, Dear Father – Raj Kinger	1	11-02-2019		TLM1	CO3	T1	
18.	Foreign Languages and their Influence on English	1	12-02-2019		TLM1, TLM2, TLM5, TLM6	CO3	T1,R2, R4	
19.	Conditional Sentences	1	16-02-2019		TLM1, TLM2, TLM5, TLM6	CO3	T1,R1, R3	
20.	Degrees of	1	18-02-2019		TLM1, TLM2,	CO3	T1,R1, R3	

	Comparison				TLM5, TLM6			
21.	Question Tags	1	19-02-2019		TLM1, TLM2, TLM5, TLM6	CO3	T1,R1, R3	
22.	Basic Education – M.K. Gandhi	1	23-02-2019		TLM1, TLM6	CO3	T1	
23.	Report Writing	1	25-02-2019		TLM1, TLM2, TLM5, TLM6	CO3	T1,R2, R4	
24.	Report Writing	1	26-02-2019		TLM1, TLM2, TLM5, TLM6	CO3	T1,R2, R4	
No. of classes required to complete UNIT-III					No. of classes taken:8			

UNIT-IV :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
25.	Sen˜or Payroll – W E Barrett	1	02-03-2019		TLM1, TLM6	CO4	T2	
26.	Organizational Communication	1	05-03-2019		TLM1, TLM6	CO4	T2,R2,R4	
27.	Adaptability skills from the story	1	11-03-2019		TLM1, TLM6	CO4	T2,R2,R4	
28.	Adaptability skills at work place & Real life	1	12-03-2019		TLM1, TLM6	CO4	T2,R2,R4	
29.	Expanding proverbs on Adaptability skills	1	16-03-2019		TLM1, TLM2, TLM5, TLM6	CO4	T2,R2,R4	
30.	Active & Passive Voice	1	18-03-2019		TLM1, TLM2, TLM5, TLM6	CO4	T2,R1,R3	
31.	Active & Passive Voice	1	19-03-2019		TLM1, TLM2, TLM5, TLM6	CO4	T2,R1,R3	
32.	Direct & Indirect Speech	1	23-03-2019		TLM1, TLM2, TLM5, TLM6	CO4	T2,R1,R3	
33.	Direct & Indirect Speech	1	25-03-2019		TLM1, TLM2, TLM5, TLM6	CO4	T2,R1,R3	
No. of classes required to complete UNIT-IV					No. of classes taken: 9			

UNIT-V :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
34.	A real good smile – Bill Naughton	1	26-03-2019		TLM1, TLM6	CO5	T2	
35.	Non-Verbal Communication Skills from the story	1	30-03-2019		TLM1, TLM6	CO5	T2,R2,R4	
36.	Non-Verbal Communication skills through real life experiences	1	01-04-2019		TLM1, TLM6	CO5	T2,R2,R4	
37.	articulation and gestures	1	02-04-2019		TLM1, TLM2, TLM5, TLM6	CO5	T2,R2,R4	
38.	'Wh' & 'Yes' or 'No' questions	1	06-04-2019		TLM1, TLM2, TLM5, TLM6	CO5	T2,R1,R3	
39.	Proverbial expansion on Non-Verbal Communication	1	08-04-2019		TLM1, TLM2, TLM5, TLM6	CO5	T2,R2,R4	
40.	Common Errors	1	09-04-2019		TLM1, TLM2, TLM5, TLM6	CO5	T2,R1,R3	
No. of classes required to complete UNIT-V					No. of classes taken: 7			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
41.	SOP	1	13-04-2019		TLM1, TLM2, TLM5, TLM6		R2,R4	
42.	Letter of Recommendation	1	13-04-2019		TLM1, TLM2, TLM5, TLM6		R2,R4	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part - C

EVALUATION PROCESS:

Evaluation Task	Cos	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	1,2	A2=5
I-Mid Examination	1,2	B1=20
Quiz -1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz -2	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D(>95%=5, 90-95%=4,85-90%=3,80-85%=2,75-80%=1)		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations	**1,2,3,4,5**	**E=60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

13. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

14. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

15. **Design/development of solutions**: 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.

16. **Conduct investigations of complex problems**: 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.

17. **Modern tool usage**: 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.

18. **The engineer and society**: 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.

19. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

20. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

21. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

23. **Project management and finance**: 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.

24. **Life-long learning**: 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.

K. Sridevi	Dr.B.Samrajya Lakshmi	Dr.B.Samrajya Lakshmi	Dr. A.Ramireddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
http://www.lbrce.ac.in, eee.lbrce@gmail.com Phone: 08659-222933, Fax: 08659-222931

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., II-Sem., EEE-A

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Transformation Techniques and Vector Calculus – 17FE06

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 4

COURSE INSTRUCTOR : Smt. K. Bhanu Lakshmi

COURSE COORDINATOR : Y.P.C.S. Anil Kumar

PRE-REQUISITES: Integration and Vectors

COURSE EDUCATIONAL OBJECTIVES (CEOs): In this course the students are introduced to Integral transformations which include Laplace Transforms and Z – Transforms. They will also learn Multiple Integrals in different coordinate systems and Vector Calculus.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Apply the concepts of Laplace Transforms to solve ordinary differential equations.

CO2: Apply Z - Transforms to solve difference equations

CO3: Discriminate among Cartesian, Polar and Spherical coordinates in multiple integrals and their respective applications to areas and volumes.

CO4: Evaluate the directional derivative, divergence and angular velocity of a vector function.

CO5: Apply Vector Integration for curves, surfaces and volumes and relationship among themselves.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

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

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

BOS APPROVED REFERENCE BOOKS:

R1 Michael D. Greenberg , "Advanced Engineering Mathematics", 2nd Edition, TMH, New Delhi, 2011.

R2 Erwin Krezig, "Advanced Engineering Mathematics", 8thEdition, John Wiley & Sons, New Delhi, 2011.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I : Laplace Transforms and Inverse Laplace Transforms

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	17/12/18		TLM1			
2.	Course Outcomes	1	18/12/18		TLM1			
3.	Introduction to UNIT-I	1	20/12/18		TLM1	CO1	T1,T2	
4.	Laplace Transforms of standard functions	1	21/12/18		TLM1	CO1	T1,T2	
5.	Linear Property, Shifting Theorems, Change of Scale Property	1	22/12/18		TLM1	CO1	T1,T2	
6.	Multiplication by 't'	1	24/12/18		TLM1	CO1	T1,T2	
7.	Division by 't'	1	27/12/18		TLM1	CO1	T1,T2	
8.	TUTORIAL - 1	1	28/12/18		TLM3	CO1	T1,T2	
9.	Unit Step function, Transforms of derivatives	1	29/12/18		TLM1	CO1	T1,T2	
10.	Transformation of integrals, Dirac's Delta function.	1	31/12/18		TLM3	CO1	T1,T2	
11.	Inverse Laplace Transforms, Linear Property, Shifting Properties	1	03/01/19		TLM1	CO1	T1,T2	
12.	TUTORIAL - 2	1	04/01/19		TLM3	CO1	T1,T2	
13.	Convolution theorem	1	05/01/19		TLM1	CO1	T1,T2	
14.	Application of L.T. to ordinary differential equation	1	07/01/19		TLM1	CO1	T1,T2	
15.	Application of L.T. to ordinary differential equation	1	08/01/19		TLM1	CO1	T1,T2	

16.	Assignment/Quiz	1	10/01/19		TLM6	CO1	T1,T2	
No. of classes required to complete UNIT-I		16			No. of classes taken:			

UNIT-II : Z-Transforms

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT II	1	11/01/19		TLM1	CO2	T1,T2	
18.	Z-transform	1	17/01/19		TLM1	CO2	T1,T2	
19.	Properties	1	18/01/19		TLM1	CO2	T1,T2	
20.	Damping rule	1	19/01/19		TLM1	CO2	T1,T2	
21.	Shifting rule	1	21/01/19		TLM1	CO2	T1,T2	
22.	Initial and final value theorems	1	22/01/19		TLM3	CO2	T1,T2	
23.	Inverse Z-transform	1	24/01/19		TLM1	CO2	T1,T2	
24.	TUTORIAL - 3	1	25/01/19		TLM3	CO2	T1,T2	
25.	Convolution theorem	1	28/01/19		TLM1	CO2	T1,T2	
26.	Solution of difference equation by Z-transform	1	31/01/19		TLM1	CO2	T1,T2	
27.	TUTORIAL - 4	1	01/02/19		TLM3	CO2	T1,T2	
28.	Solution of difference equation by Z-transform	1	02/02/19		TLM1	CO2	T1,T2	
29.	Assignment/Quiz	1	02/02/19		TLM6	CO2	T1,T2	
No. of classes required to complete UNIT-II		13			No. of classes taken:			

UNIT-III : Multiple Integrals

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
30.	Introduction to UNIT III	1	11/02/19		TLM1	CO3	T1,T2	
31.	Multiple Integrals	1	12/02/19		TLM1	CO3	T1,T2	
32.	Change of variables	1	14/02/19		TLM1	CO3	T1,T2	
33.	Double Integrals - Cartesian coordinates	1	15/02/19		TLM1	CO3	T1,T2	
34.	Double Integrals-Polar co ordinates	1	16/02/19		TLM1	CO3	T1,T2	
35.	Double Integrals-Spherical co ordinates	1	19/02/19		TLM3	CO3	T1,T2	
36.	Triple Integrals - Cartesian	1	21/02/19		TLM1	CO3	T1,T2	

	coordinates							
37.	TUTORIAL - 5	1	22/02/19		TLM3	CO3	T1,T2	
38.	Triple Integrals - Polar coordinates	1	23/02/19		TLM1	CO3	T1,T2	
39.	Triple Integrals - Spherical coordinates	1	25/02/19		TLM1	CO3	T1,T2	
40.	Change of order of Integration	1	26/02/19		TLM1	CO3	T1,T2	
41.	Change of order of Integration	1	28/02/19		TLM1	CO3	T1,T2	
42.	TUTORIAL - 6	1	01/03/19		TLM3	CO3	T1,T2	
43.	Applications to Areas	1	02/03/19		TLM1	CO3	T1,T2	
44.	Applications to Volumes	1	05/03/19		TLM1	CO3	T1,T2	
45.	Assignment/Quiz	1	07/03/19		TLM6	CO3	T1,T2	
No. of classes required to complete UNIT-III		16			No. of classes taken:			

UNIT-IV : Vector Differentiation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
46.	Introduction to UNIT IV	1	08/03/19		TLM1	CO4	T1,T2	
47.	Vector Differentiation	1	09/03/19		TLM1	CO4	T1,T2	
48.	Gradient	1	11/03/19		TLM1	CO4	T1,T2	
49.	Directional Derivative	1	12/03/19		TLM1	CO4	T1,T2	
50.	Divergence	1	14/03/19		TLM1	CO4	T1,T2	
51.	TUTORIAL - 7	1	15/03/19		TLM3	CO4	T1,T2	
52.	Curl	1	16/03/19		TLM1	CO4	T1,T2	
53.	Solenoidal fields, Irrotational fields, potential surfaces	1	18/03/19		TLM1	CO4	T1,T2	
54.	Laplacian, second order operators	1	19/03/19		TLM1	CO4	T1,T2	
55.	TUTORIAL - 8	1	22/03/19		TLM3	CO4	T1,T2	
56.	Properties	1	23/03/19		TLM1	CO4	T1,T2	
57.	Properties	1	25/03/19		TLM1	CO4	T1,T2	
58.	Assignment/Quiz	1	26/03/19		TLM6	CO4	T1,T2	
No. of classes required to complete UNIT-IV		13			No. of classes taken:			

UNIT-V : Vector Integration

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
59.	Introduction to UNIT V	1	28/03/19		TLM1	CO5	T1,T2	
60.	Line Integral	1	29/03/19		TLM1	CO5	T1,T2	
61.	Work done and area	1	30/03/19		TLM1	CO5	T1,T2	
62.	Surface Integrals	1	01/04/19		TLM1	CO5	T1,T2	
63.	Volume Integrals	1	02/04/19		TLM1	CO5	T1,T2	
64.	Greens theorem	1	04/04/19		TLM1	CO5	T1,T2	
65.	TUTORIAL - 9	1	05/04/19		TLM3	CO5	T1,T2	
66.	Stokes theorem	1	08/04/19		TLM1	CO5	T1,T2	
67.	Gauss Divergence theorem	1	09/04/19		TLM1	CO5	T1,T2	
68.	TUTORIAL - 10	1	11/04/19		TLM3	CO5	T1,T2	
69.	Assignment/Quiz	1	12/04/19		TLM6	CO5	T1,T2	
No. of classes required to complete UNIT-V		14			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
70.	Further applications in Multiple Integrals		13/04/18		TLM!		T1,T2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM2	PPT	**TLM6**	Assignment or Quiz
TLM3	Tutorial	**TLM7**	Group Discussion/Project
TLM4	Demonstration (Lab/Field Visit)		

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment	1	A1=5
Assignment	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz	1,2	D1=10
Assignment	3	A3=5
Assignment	4	A4=5
Assignment	5	A5=5

II-Mid Examination	3,4,5	B2=20
Quiz	3,4,5	D2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Mid Marks: D=75% of Max(D1,D2)+25% of Min(D1,D2)	1,2,3,4,5	D=10
Attendence: E		E=5
Cumulative Internal Examination : A+B+D+E	**1,2,3,4,5**	**40**
Semester End Examinations: C	**1,2,3,4,5**	**60**
Total Marks: A+B+D+E+C	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)
PROGRAMME OUTCOMES (POs)
PSOs

Course Instructor	Course Coordinator	Module Coordinator	HOD

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COURSE HANDOUT

Part-A

PROGRAM : B.Tech., II-Sem., EEE B

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Transformation Techniques and Vector Calculus – 17FE06

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 4

COURSE INSTRUCTOR : G.VIJAYA LAKSHMI

COURSE COORDINATOR : Y.P.C.S. Anil Kumar

PRE-REQUISITES: Integration and Vectors

COURSE EDUCATIONAL OBJECTIVES (CEOs): In this course the students are introduced to Integral transformations which include Laplace Transforms and Z – Transforms. They will also learn Multiple Integrals in different coordinate systems and Vector Calculus.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Apply the concepts of Laplace Transforms to solve ordinary differential equations.

CO2: Apply Z - Transforms to solve difference equations

CO3: Discriminate among Cartesian, Polar and Spherical coordinates in multiple integrals and their respective applications to areas and volumes.

CO4: Evaluate the directional derivative, divergence and angular velocity of a vector function.

CO5: Apply Vector Integration for curves, surfaces and volumes and relationship among themselves.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

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

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

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T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

BOS APPROVED REFERENCE BOOKS:

R1 Michael D. Greenberg , "Advanced Engineering Mathematics", 2nd Edition, TMH, New Delhi, 2011.

R2 Erwin Kreyszig, "Advanced Engineering Mathematics", 8thEdition, John Wiley & Sons, New Delhi, 2011.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I : Laplace Transforms and Inverse Laplace Transforms

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	17/12/18		TLM1			
2.	Course Outcomes	1	18/12/18		TLM1			
3.	Introduction to UNIT-I	1	19/12/18		TLM1	CO1	T1,T2	
4.	Laplace Transforms of standard functions	1	20/12/18		TLM1	CO1	T1,T2	
5.	Linear Property, Shifting Theorems, Change of Scale Property	1	21/12/18		TLM1	CO1	T1,T2	
6.	Multiplication by 't'	1	24/12/18		TLM1	CO1	T1,T2	
7.	Division by 't'	1	26/12/18		TLM1	CO1	T1,T2	
8.	Unit Step function, Transforms of derivatives	1	27/12/18		TLM1	CO1	T1,T2	
9.	Transformation of integrals, Dirac's Delta function.	1	28/12/18		TLM1	CO1	T1,T2	
10.	TUTORIAL-1	1	31/12/18		TLM3	CO1	T1,T2	
11.	Inverse Laplace Transforms, Linear Property, Shifting Properties	1	02/01/19		TLM1	CO1	T1,T2	
12.	Convolution theorem	1	03/01/19		TLM1	CO1	T1,T2	
13.	Application of L.T. to ordinary differential equation	1	04/01/19		TLM1	CO1	T1,T2	
14.	TUTORIAL-2	1	07/01/19		TLM3	CO1	T1,T2	
15.	Application of L.T. to ordinary differential equation	1	08/01/19		TLM1	CO1	T1,T2	

16.	Assignment/Quiz	1	09/01/19		TLM6	CO1	T1,T2	
No. of classes required to complete UNIT-I		14			No. of classes taken:			

UNIT-II : Z-Transforms

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT II	1	10/01/19		TLM1	CO2	T1,T2	
18.	Z-transform	1	11/01/19		TLM1	CO2	T1,T2	
19.	Properties	1	17/01/19		TLM1	CO2	T1,T2	
20.	Damping rule	1	18/01/19		TLM1	CO2	T1,T2	
21.	Shifting rule	1	21/01/19		TLM1	CO2	T1,T2	
22.	Initial and final value theorems	1	22/01/19		TLM1	CO2	T1,T2	
23.	Inverse Z-transform	1	23/01/19		TLM1	CO2	T1,T2	
24.	Inverse Z-transform	1	24/01/19		TLM1	CO2	T1,T2	
25.	TUTORIAL-3	1	25/01/19		TLM3	CO2	T1,T2	
26.	Convolution theorem	1	28/01/19		TLM1	CO2	T1,T2	
27.	Solution of difference equation by Z-transform	1	29/01/19		TLM1	CO2	T1,T2	
28.	Solution of difference equation by Z-transform	1	30/01/19		TLM1	CO2	T1,T2	
29.	TUTORIAL-4	1	31/01/19		TLM3	CO2	T1,T2	
30.	Assignment/Quiz	1	01/02/19		TLM6	CO2	T1,T2	
No. of classes required to complete UNIT-II		14			No. of classes taken:			

UNIT-III: Multiple Integrals

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
31.	Introduction to UNIT III	1	11/02/19		TLM1	CO3	T1,T2	
32.	Multiple Integrals	1	12/02/19		TLM1	CO3	T1,T2	
33.	Change of variables	1	13/02/19		TLM1	CO3	T1,T2	
34.	Double Integrals - Cartesian coordinates	1	14/02/19		TLM1	CO3	T1,T2	
35.	Double Integrals-Polar co ordinates	1	15/02/19		TLM1	CO3	T1,T2	
36.	Double Integrals-Spherical co ordinates	1	18/02/19		TLM1	CO3	T1,T2	

37.	Triple Integrals - Cartesian coordinates	1	19/02/19		TLM1	CO3	T1,T2	
38.	Triple Integrals - Polar coordinates	1	20/02/19		TLM1	CO3	T1,T2	
39.	Triple Integrals - Spherical coordinates	1	21/02/19		TLM1	CO3	T1,T2	
40.	TUTORIAL-5	1	22/02/19		TLM3	CO3	T1,T2	
41.	Change of order of Integration	1	25/02/19		TLM1	CO3	T1,T2	
42.	Change of order of Integration	1	26/02/19		TLM1	CO3	T1,T2	
43.	Applications to Areas	1	27/02/19		TLM1	CO3	T1,T2	
44.	Applications to Volumes	1	28/02/19		TLM1	CO3	T1,T2	
45.	TUTORIAL-6	1	01/03/19		TLM3	CO3	T1,T2	
46.	Assignment/Quiz	1	04/03/19		TLM6	CO3	T1,T2	
No. of classes required to complete UNIT-III		16			No. of classes taken:			

UNIT-IV: Vector Differentiation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
47.	Introduction to UNIT IV	1	06/03/19		TLM1	CO4	T1,T2	
48.	Vector Differentiation	1	07/03/19		TLM1	CO4	T1,T2	
49.	Gradient	1	08/03/19		TLM1	CO4	T1,T2	
50.	Directional Derivative	1	11/03/19		TLM1	CO4	T1,T2	
51.	Divergence	1	12/03/19		TLM1	CO4	T1,T2	
52.	Curl	1	13/03/19		TLM1	CO4	T1,T2	
53.	Solenoidal fields, Irrotational fields, potential surfaces	1	14/03/19		TLM1	CO4	T1,T2	
54.	TUTORIAL-7	1	15/03/19		TLM3	CO4	T1,T2	
55.	Laplacian second order operators	1	18/03/19		TLM1	CO4	T1,T2	
56.	Properties	1	19/03/19		TLM1	CO4	T1,T2	
57.	Properties	1	20/03/19		TLM1	CO4	T1,T2	
58.	TUTORIAL-8	1	22/03/19		TLM3	CO4	T1,T2	
59.	Assignment/Quiz	1	25/03/19		TLM6	CO4	T1,T2	
No. of classes required to complete UNIT-IV		13			No. of classes taken:			

UNIT-V: Vector Integration

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
60.	Introduction to UNIT V	1	26/03/19		TLM1	CO5	T1,T2	
61.	Line Integral	1	27/03/19		TLM1	CO5	T1,T2	
62.	Work done and area	1	28/03/19		TLM1	CO5	T1,T2	
63.	Surface Integrals	1	29/03/19		TLM1	CO5	T1,T2	
64.	Volume Integrals	1	01/04/19		TLM1	CO5	T1,T2	
65.	Greens theorem	1	02/04/19		TLM1	CO5	T1,T2	
66.	Stokes theorem	1	03/04/19		TLM1	CO5	T1,T2	
67.	Related problems	1	04/04/19		TLM1	CO5	T1,T2	
68.	TUTORIAL-9	1	05/04/19		TLM3	CO5	T1,T2	
69.	Gauss Divergence theorem	1	08/04/19		TLM3	CO5	T1,T2	
70.	Related problems	1	09/04/19		TLM1	CO5	T1,T2	
71.	TUTORIAL-10	1	10/04/19		TLM1	CO5	T1,T2	
72.	Assignment/Quiz	1	11/04/19		TLM6	CO5	T1,T2	
No. of classes required to complete UNIT-V		14			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
73.	Further applications in Multiple Integrals		12/04/19		TLM1		T1,T2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM2	PPT	**TLM6**	Assignment or Quiz
TLM3	Tutorial	**TLM7**	Group Discussion/Project
TLM4	Demonstration (Lab/Field Visit)		

Part - C

EVALUATION PROCESS:

Evaluation Task	Units	Marks
Assignment– 1	1	A1=5
Assignment– 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment– 3	3	A3=5

Assignment– 4	4	A4=5
Assignment– 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment: A=Avg(Best of Four(A1,A2,A3,A4,A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Online Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations : E	**1,2,3,4,5**	**60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PROGRAMME OUTCOMES (POs)

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: 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. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and ynthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: 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. **The engineer and society**: 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: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project management and finance: 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: Life-long learning: 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.

G.VIJAYA LAKSHMI	Y.P.C.S. Anil Kumar	Dr. A. Rami Reddy	Dr. A. Rami Reddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

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NAAC Accredited with "A" grade, Accredited by NBA
New Delhi & Certified by ISO 9001:2015
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
http://www.lbrce.ac.in, eee.lbrce@gmail.com Phone: 08659-222933, Fax: 08659-222931

Part-A

PROGRAM& DEPT	**:** B.Tech., II-Sem & EEE-A
ACADEMIC YEAR	**:** 2018-19
COURSE NAME & CODE	**:** Applied Chemistry - 17FE14
L-T-P STRUCTURE	**:** 3-1-0
COURSE CREDITS	**:** 4
COURSE INSTRUCTOR	**: S.Vijayadasaradha**
COURSE COORDINATOR	**: Dr.V.Parvathi**
PRE-REQUISITES	**:** Knowledge of atomic weights, molecular weights, equivalent weights, galvanic cell, working principle of battery, concept of polymerization.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course, students will learn the concepts and applications of chemistry in engineering. It aims at strengthening the students with the fundamental concepts of chemistry. It provides them with the knowledge of water specification for different industries along with solutions to the problems that arise due to hardness of water.

It enables the students to know analysis of fuels and alternate fuels used in diverse fields. It makes the students to effectively use the knowledge of electrochemistry, battery technology, and corrosion science in engineering applications It enables the students to identify the role of polymers and lubricants in various fields.

COURSE OUTCOMES (COs)

After completion of course, students will be able to

CO1: Identify the troubles due to hardness of water and its maintenance in industrial applications.

CO2: Analyze issues related to conventional fuels and apply the concepts of advanced fuels like bio, nuclear and rocket fuels in energy production.

CO3: Analyze different types of electrodes and batteries for technological applications..

CO4: Apply principles of corrosion for design and effective maintenance of various equipments.

CO5: Identify the important applications of engineering materials like plastics, rubbers and lubricants.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

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
CO1	Identify the troubles due to hardness of water and its maintenance in industrial applications.	3	3	2			2	1					2
CO2	Analyze issues related to conventional fuels and apply the concepts of advanced fuels like bio, nuclear and rocket fuels in energy production.	3	2				3	2					2
CO3	Analyze different types of electrodes and batteries for technological applications.	3	3	3				2					2
CO4	Apply principles of corrosion for design and effective maintenance of various equipments.	3	2	3			2	1					2
CO5	Identify the important applications of engineering materials like plastics, rubbers and lubricants.	2	2				2	1					2
Where, 3-Substantial (High) - 2- Moderate (Medium) 1 – Slight (Low)													

BOS APPROVED TEXT BOOKS:

T1 Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 3rd Edition, 2003.

T2 Jain, Jain, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16th Edition, 2015.

BOS APPROVED REFERENCE BOOKS:

R1 Shikha Agarwal, "A text book of Engineering Chemistry", Cambridge University Press, New Delhi, 1st Edition, 2015.

R2 S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12th Edition, 2010.

R3 Y. Bharathi Kumari, Jyotsna Cherukuri, "A Text book of Engineering Chemistry", VGS Publications, Vijayawada, 1st Edition, 2009

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-EEE-A

UNIT-I : WATER TECHNOLOGY

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	17-12-18		**TLM1**			
2.	Course Outcomes	1	19-12-18		**TLM1**			
3.	Introduction to **UNIT-I**	1	20-12-18		**TLM1**	**CO1**	T1	
4.	Sources of water and quality. Hardness of water, temporary and permanent hardness.	1	21-12-18		**TLM1**	**CO1**	T1	
5.	Units and their inter relation, problems on hardness	1	24-12-18		**TLM1**	**CO1**	T1	
6.	Disadvantages of hard water in industries	1	26-12-18		**TLM1**	**CO1**	T1, T2	
7.	TUTORIAL-1	1	27-12-18		**TLM3**	**CO1**		
8.	Scale and sludge formation,	1	28-12-18		**TLM1**	**CO1**	T1,T2	
9.	Caustic embrittlement, carryover(priming and foaming)	1	31-12-18		**TLM1**	**CO1**	T1,T2	
10.	Boiler corrosion	1	02-01-19		**TLM1**	**CO1**	T1,T2	
11.	Ion- Exchange Process, merits and demerits	1	03-01-19		**TLM1**	**CO1**	T1, T2	
12.	Electro dialysis and reverse osmosis.	1	04-01-19		**TLM1**	**CO1**	T1, T2	
13.	TUTORIAL-2	1	07-01-19		**TLM3**	**CO1**		
14.	QUIZ QUESTIONS	1	09-01-19		**TLM3**	**CO1**		
15.	ASSIGNMENT	1	10-01-19		**TLM3**	**CO1**		
No. of classes required to complete UNIT-I		**15**			No. of classes taken:			

UNIT-II: CONVENTIONAL FUELS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
16.	Definition & classification of fuels (solid, liquid and gaseous fuels, merits and demerits) & characteristics of a good fuel.	1	11-01-19		**TLM1**	**CO2**	T1, T2	
17.	Coal – origin, proximate analysis of coal and significance	1	17-01-19		**TLM1**	**CO2**	T1, T2	
18.	Petroleum-origin, types of crude oil and refining of petroleum	1	18-01-19		**TLM1**	**CO2**	T1, T2	
19.	Moving bed catalytic cracking	1	21-01-19		**TLM1**	**CO2**	T1, T2	

20.	Synthetic petrol – Fischer Tropsch's process.	1	23-01-19		**TLM1**	**CO2**	T1, T2	
21.	Natural gas, composition and C.N.Gadvantages. Characteristics of bio fuels, sources of bio mass and advantages production of fuel from rape seed oil.	1	24-01-19		**TLM1**	**CO2**	T1, T2	
22.	TUTORIAL-1	1	25-01-19		**TLM3**	**CO2**		
23.	Nuclear fission fusion, differences between chemical and nuclear fuel Characteristics of fuel elements.	1	28-01-19		**TLM1**	**CO2**	T1	
24.	Characteristics of good propellants, classification, examples and mechanism and mechanism of propulsion.	1	30-01-19		**TLM1**	**CO2**	T1	
25.	TUTORIAL-2	1	31-01-19		**TLM3**	**CO2**		
26.	ASSIGNMENT	1	01-02-19		**TLM3**	**CO2**		
No. of classes required to complete UNIT-II		**11**			No. of classes taken:			

UNIT-III: ELECTRO CHEMISTRY&BATTERIES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
27.	Electrode potential, standard reduction and oxidation potentials (S.R.P and S.O.P), EMF	1	11-02-19		**TLM1**	**CO3**	T1	
28.	Standard hydrogen electrode (S.H.E), calomel electrode	1	13-02-19		**TLM1**	**CO3**	T1	
29.	Measurement of electrode potential electro chemical series and applications	1	14-02-19		**TLM1**	**CO3**	T1	
30.	Derivation of Nernst equation	1	15-02-19		**TLM1**	**CO3**	T1	
31.	problems on Nernst equation	1	18-02-19		**TLM1**	**CO3**	T1	
32.	Primary, secondary and reserve batteries	1	20-02-19		**TLM1**	**CO3**	T1, T2	

33.	TUTORIAL-1	1	21-02-19		**TLM3**	**CO3**		
34.	Dry battery, Nickel Cadmium battery	1	22-02-19		**TLM1**	**CO3**	T1	
35.	Magnesium Copper, reserve battery, Hydrogen- Oxygen fuel cells.	1	25-02-19		**TLM1**	**CO3**	T1, T2	
36.	TUTORIAL-2	1	27-02-19		**TLM3**	**CO3**		
37.	Assignment	1	28-02-19		**TLM3**	**CO3**		
No. of classes required to complete UNIT-III		**11**			No. of classes taken:			

UNIT-IV: SCIENCE OF CORROSION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
38.	Definition, examples. Types of dry corrosion- oxidative corrosion	1	01-03-19		**TLM1**	**CO4**	T1	
39.	Pilling Bed worth rule, corrosion by other gases and liquid metal corrosion.	1	06-03-19		**TLM1**	**CO4**	T1	
40.	Mechanism - Oxygen absorption, Hydrogen evolution	1	07-03-19		**TLM1**	**CO4**	T1	
41.	TUTORIAL-01	1	08-03-19		**TLM3**	**CO4**		
42.	galvanic corrosion, concentration cell corrosion	1	11-03-19		**TLM1**	**CO4**	T1	
43.	Passivity galvanic series	1	13-03-19		**TLM1**	**CO4**	T1	
44.	Nature of metal and nature of environment.	1	14-03-19		**TLM1**	**CO4**	T1	
45.	TUTORIAL-02	1	15-03-19		**TLM3**	**CO4**		
46.	Cathodic protection	1	18-03-19		**TLM1**	**CO4**	T1	
47.	Electro plating and metal cladding.	1	20-03-19		**TLM1**	**CO4**	T1	
48.	Assignment	1	22-03-19		**TLM3**	**CO4**		
No. of classes required to complete UNIT-IV		**11**			No. of classes taken:			

UNIT-V: CHEMISTRY OF ENGINEERING MATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
49.	Definition, basic terminology, differences between thermosets & thermoplasts	1	25-03-19		**TLM1**	**CO5**	T1	
50.	Types of polymerization	1	27-03-19		**TLM1**	**CO5**	T1	
51.	TUTORIAL-01	1	28-03-19		**TLM3**	**CO5**		
52.	Preparation, properties and engineering applications of Teflon and bakelite	1	29-03-19		**TLM1**	**CO5**	T1	
53.	conducting polymers-extrinsic and intrinsic	1	01-04-19		**TLM1**	**CO5**	T1	
54.	Definition, processing of natural rubber, draw backs, vulcanization and advantages	1	03-04-19		**TLM1**	**CO5**	T1	
55.	TUTORIAL-02	1	04-04-19		**TLM3**	**CO5**		
56.	Preparation, properties and applications of BUNA-S and Thiokol.	1	08-04-19		**TLM1**	**CO5**	T1	
57.	Characteristics of a good lubricant and properties of lubricants and applications.	1	10-04-19		**TLM1**	**CO5**	T1	
58.	Assignment	1	11-04-19		**TLM3**	**CO5**		
No. of classes required to complete UNIT-V		**10**			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign
59.	Batteries used in mobile phones of popular companies	2	12-04-19					
60.	Industrial applications of electroplating	2	12-04-19					
61.	Polymers in industrial applications	2	12-04-19					

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment	1	A1=5
Assignment	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz	1,2	D1=10
Assignment	3	A3=5
Assignment	4	A4=5
Assignment	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz	3,4,5	D2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Mid Marks: D=75% of Max(D1,D2)+25% of Min(D1,D2)	1,2,3,4,5	D=10
Attendance: E		E=5
Cumulative Internal Examination : A+B+D+E	**1,2,3,4,5**	**40**
Semester End Examinations: C	**1,2,3,4,5**	**60**
Total Marks: A+B+D+E+C	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4.Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: 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. **Conduct investigations of complex problems**: 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. **Modern tool usage**: 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. **The engineer and society**: 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: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: 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: Life-long learning: 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.

PSOs **(Program Specific Outcomes)**

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute Electricalpower.

PSO-b: Design and analyze electrical machines, modern drive and lighting systems.

PSO-c: Specify, design, implement and test analog and embedded signal processing electronicsystems.

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

Signature			
S.Vijayadasaradha	Dr. V. Parvathi	Dr. V. Parvathi	Dr. A .Rami Reddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

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New Delhi & Certified by ISO 9001:2015
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
http://www.lbrce.ac.in, eee.lbrce@gmail.com Phone: 08659-222933, Fax: 08659-222931

COURSE HANDOUT

Part-A

PROGRAM& DEPT	**:** B.Tech., II-Sem & EEE -B
ACADEMIC YEAR	**:** 2018-19
COURSE NAME & CODE	**:** Applied Chemistry - 17FE14
L-T-P STRUCTURE	**:** 4
COURSE CREDITS	**:** 4
COURSE INSTRUCTOR	**: Dr.V.Parvathi**
COURSE COORDINATOR	**: Dr.V.Parvathi**
PRE-REQUISITES	**:** Knowledge of atomic weights, molecular weights, equivalent weights, galvanic cell, working principle of battery, concept of polymerization.

COURSE EDUCATIONAL OBJECTIVES (CEOs) :

In this course, students will learn the concepts and applications of chemistry in engineering. It aims at strengthening the students with the fundamental concepts of chemistry. It provides them with the knowledge of water specification for different industries along with solutions to the problems that arise due to hardness of water.

It enables the students to know analysis of fuels and alternate fuels used in diverse fields. It makes the students to effectively use the knowledge of electrochemistry, battery technology, and corrosion science in engineering applications It enables the students to identify the role of polymers and lubricants in various fields.

COURSE OUTCOMES (COs)

After completion of course, students will be able to

CO1: Identify the troubles due to hardness of water and its maintenance in industrial applications.

CO2: Analyze issues related to conventional fuels and apply the concepts of advanced fuels like bio, nuclear and rocket fuels in energy production.

CO3: Analyze different types of electrodes and batteries for technological applications..

CO4: Apply principles of corrosion for design and effective maintenance of various equipments.

CO5: Identify the important applications of engineering materials like plastics, rubbers and lubricants.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

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
CO1	Identify the troubles due to hardness of water and its maintenance in industrial applications.	3	3	2	-	-	2	1	-	-	-	-	2
CO2	Analyze issues related to conventional fuels and apply the concepts of advanced fuels like bio, nuclear and rocket fuels in energy production.	3	2	-	-	-	3	2	-	-	-	-	2
CO3	Analyze different types of electrodes and batteries for technological applications..	3	3	3	-	-	-	2	-	-	-	-	2
CO4	Apply principles of corrosion for design and effective maintenance of various equipments.	3	2	3	-	-	2	1	-	-	-	-	2
CO5	Identify the important applications of engineering materials like plastics, rubbers and lubricants.	2	2	-	-	-	2	1	-	-	-	-	2
Where, 3-Substantial (High) - 2- Moderate (Medium) 1 – Slight (Low)													

BOS APPROVED TEXT BOOKS:

T1 Shashi Chawla, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 3rd Edition, 2003.

T2 Jain, Jain, "A Text book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 16th Edition, 2015.

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R2 S.S. Dara, S.S. Umare, "A Text book of Engineering Chemistry", S. Chand Publications, New Delhi, 12th Edition, 2010.

R3 Y. Bharathi Kumari, Jyotsna Cherukuri, "A Text book of Engineering Chemistry", VGS Publications, Vijayawada, 1st Edition, 2009

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : WATER TECHNOLOGY

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	18-12-18		TLM1			
2.	Course Outcomes	1	19-12-18		TLM1			
3.	Introduction to **UNIT-I**	1	21-12-18		TLM1	CO1	T1	
4.	Sources of water and quality. Hardness of water, temporary and permanent hardness.	1	22-12-18		TLM1	CO1	T1	
5.	units and their inter relation, problems on hardness	1	26-12-18		TLM1	CO1	T1	
6.	disadvantages of hard water in industries	1	28-12-18		TLM1	CO1	T1, T2	
7.	TUTORIAL-1	1	29-12-18		TLM3	CO1		
8.	scale and sludge formation,	1	02-01-19		TLM1	CO1	T1,T2	
9.	caustic embrittleent,carryover(priming and foaming)	1	04-01-19		TLM1	CO1	T1,T2	
10.	Ion- Exchange Process, merits and demerits	1	05-01-19		TLM1	CO1	T1,T2	
11.	Electro dialysis and reverse osmosis.	1	08-01-19		TLM1	CO1	T1, T2	
12.	TUTORIAL-2, QUIZ QUESTIONS	1	09-01-19		TLM3	CO1		
13.	ASSIGNMENT	1	11-01-19		TLM3	CO1		
No. of classes required to complete UNIT-I		**13**			No. of classes taken:			

UNIT-II : CONVENTIONAL FUELS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
14.	Definition & classification of fuels (solid,liquid and gaseoues fuels, merits anddemerits)&characteristics of a good fuel.	1	18-01-19		TLM1	CO2	T1, T2	
15.	Coal – origin, proximate analysis of coal and significance	1	19-01-19		TLM1	CO2	T1, T2	
16.	petroleum-origin, types of crude oil and refining of petroleum	1	22-01-19		TLM1	CO2		
17.	Moving bed catalytic cracking and synthetic petrol –Fischer Tropsch's process.	1	23-01-19		TLM1	CO2	T1, T2	
18.	Naturalgas, composition and C.N.G advantages.	1	25-01-19		TLM1	CO2	T1, T2	

	Characteristics of bio fuels, sources of bio mass and advantages production of fuel from rape seed oil.							
19.	TUTORIAL-1	1	29-01-19		TLM3	CO2		
20.	Nuclear fission fusion, differences between chemical and nuclear fuel Characteristics of fuel elements.	1	30-01-19		TLM1	CO2	T1	
21.	Characteristics of good propellants, classification, examples and mechanism and mechanism of propulsion.	1	01-02-19		TLM3	CO2	T1	
22.	TUTORIAL-2,ASSIGNMENT	1	02-02-19		TLM3	CO2		
No. of classes required to complete UNIT-II		**9**			No. of classes taken:			

UNIT-III : ELECTRO CHEMISTRY&BATTERIES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
23.	Electrode potential, standard reduction and oxidation potentials (S.R.P and S.O.P), EMF	1	12-02-19		TLM1	CO3	T1	
24.	Standard hydrogen electrode (S.H.E), calomel electrode	1	13-02-19		TLM1	CO3	T1	
25.	Measurement of electrode potential electro chemical series and applications	1	15-02-19		TLM1	CO3	T1	
26.	Derivation and problems on Nernst equation	1	16-02-19		TLM1	CO3	T1	
27.	Primary, secondary and reserve batteries, Dry battery	1	19-02-19		TLM1	CO3	T1, T2	
28.	TUTORIAL-1	1	20-02-19		TLM3	CO3		
29.	Nickel Cadmium battery, Magnesium - Copper reserve battery, hydrogen oxygen fuel cell	1	22-02-19		TLM1	CO3	T1, T2	

30.	Hydrogen- Oxygen fuel cells.	1	23-02-19		TLM1	CO3	T1	
31.	TUTORIAL-2 Assignment	1	26-02-19		TLM3	CO3		
No. of classes required to complete UNIT-III		**9**			No. of classes taken:			

UNIT-IV : SCIENCE OF CORROSION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
32.	Definition, examples. Types of dry corrosion- oxidative corrosion	1	27-02-19		TLM1	CO4	T1	
33.	Pilling Bed worth rule, corrosion by other gases and liquid metal corrosion.	1	01-03-19		TLM1	CO4	T1	
34.	Mechanism - Oxygen absorption, Hydrogen evolution	1	02-03-19		TLM1	CO4	T1	
35.	TUTORIAL-01	1	05-03-19		TLM3	CO4		
36.	galvanic corrosion, concentration cell corrosion	1	06-03-19		TLM1	CO4	T1	
37.	Passivity galvanic series	1	08-03-19		TLM1	CO4	T1	
38.	Nature of metal and nature of environment.	1	12-03-19		TLM1	CO4	T1	
39.	TUTORIAL-02	1	13-03-19		TLM3	CO4		
40.	cathodic protection, electro plating and metal cladding.	1	15-03-19		TLM1	CO4	T1	
41.	Assignment	1	16-03-19		TLM3	CO4		
No. of classes required to complete UNIT-IV		**10**			No. of classes taken:			

UNIT-V : CHEMISTRY OF ENGINEERING MATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
42.	Definition, basic terminology, differences between thermosets & thermoplasts	1	19-03-19		TLM1	CO5	T1	
43.	Types of polymerization	1	20-03-19		TLM1	CO5	T1	

44.	TUTORIAL-01	1	22-03-19		TLM3	CO5		
45.	Preparation, properties and engineering applications of Teflon and bakelite	1	23-03-19		TLM1	CO5	T1	
46.	conducting polymers-extrensic and intrensic	1	26-03-19		TLM1	CO5	T1	
47.	Definition, processing of natural rubber, draw backs, vulcanization and advantages	1	27-03-19		TLM1	CO5	T1	
48.	TUTORIAL-02	1	29-03-19		TLM3	CO5		
49.	Preparation, properties and applications of BUNA-S and Thiokol.	1	30-03-19		TLM1	CO5	T1	
50.	Characteristics of a good lubricant and properties of lubricants and applications.	1	02-04-19		TLM1	CO5	T1	
51.	Assignment	1	03-04-19		TLM3	CO5		
No. of classes required to complete UNIT-V		**10**			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign
52.	Batteries used in mobile phones of popular companies	1	09-04-19		TLM1 TLM5			
53.	Industrial applications of electroplating	1	10-04-19		TLM1			
54.	Polymers in industrial applications	1	12-04-19		TLM1			
55.								

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment	1	A1=5
Assignment	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz	1,2	D1=10
Assignment	3	A3=5
Assignment	4	A4=5
Assignment	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz	3,4,5	D2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Mid Marks: D=75% of Max(D1,D2)+25% of Min(D1,D2)	1,2,3,4,5	D=10
Attendence: E		E=5
Cumulative Internal Examination : A+B+D+E	**1,2,3,4,5**	**40**
Semester End Examinations: C	**1,2,3,4,5**	**60**
Total Marks: A+B+D+E+C	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4.Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: 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. **Conduct investigations of complex problems**: 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. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: 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: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: 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: Life-long learning: 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.

PSOs **(Program Specific Outcomes)**

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute Electricalpower.

PSO-b: Design and analyze electrical machines, modern drive and lighting systems.

PSO-c: Specify, design, implement and test analog and embedded signal processing electronicsystems.

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

Signature			
Dr. V. Parvathi	Dr. V. Parvathi	Dr. V. Parvathi	Dr. A .Rami Reddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

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COURSE HANDOUT

Part-A

PROGRAM : B.Tech., II-Sem., EEE-A

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Thermal and Hydro Prime movers & 17ME51

L-T-P STRUCTURE : 2-2-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : B.Kamala Priya

COURSE COORDINATOR : S.Rami Reddy

PRE-REQUISITES: APPLIED PHYSICS**,**

COURSE EDUCATIONAL OBJECTIVES (CEOs): The purpose of this course is to acquire knowledge in analysis of Gas turbines, steam turbines and hydraulic turbines using principles of thermodynamics and fluid mechanics and to deepen the understanding of Flow measurement and Pressure measurement devices.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Comprehend the laws of Basic Thermodynamics and Fluid Mechanics

CO2 : Analyze the performance of steam turbines and gas turbines using principles of thermodynamics

CO3 : Demonstrate working of different types of IC engines

CO4 : Illustrate Pressure and Flow measurement devices with concepts of Fluid mechanics

CO5 : Evaluate the performance of Hydraulic machines.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

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

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**

1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Rajput, Thermal Engineering, Lakshmi publications, 2010

T2 P.N.Modi and S.M Seth, Fluid mechanics and hydraulic machinery, 15th Edition,Standard Book house

BOS APPROVED REFERENCE BOOKS:

R1 R.k Bansal, Fluid Mechanics and Hydraulic Machinery, 15th Edition,Standard Book House

R2 Rama Durgaiah, Fluid Mechanics and Hydraulic Machinery edition, New age International, 1st edition, 2006

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Basic Thermodynamics, Zeroth law, First law and second law of thermodynamics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to basic thermodynamics and Thermodynamic systems	1	17-12-18		TLM1	CO1	T1	
2.	Sate, path, process, cycle	1	18-12-18		TLM1	CO1	T1	
3.	Work done in constant pressure and constant volume process	1	19-12-18		TLM1	CO1	T1	
4.	Work done in isothermal,reversible adiabatic and polytropic process	1	21-12-18		TLM1	CO1	T1	
5.	Problems on work done during thermodynamic processes in closed systems	1	24-12-18		TLM1	CO1	T1	
6.	First law and zeroth law of thermodynamics	1	26-12-18		TLM1	CO1	T1	
7.	Internal energy, Enthalpy and specific heat	1	28-12-18		TLM1,TLM2	CO1	T1	
8.	Steady flow energy equation and problems	1	31-12-18		TLM1	CO1	T1	
9.	Second law of thermodynamics and Kelvin Planck and Clausius statement for heat engine	1	02-01-19		TLM1	CO1	T1	
10.	Refrigerator,heat pump, Reversible process, Carnot cycle and Problems	1	3-01-19		TLM1,TLM2	CO1	T1	
11.	TUTORIAL-1	1	5-01-19		TLM1	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT-II : Internal combustion Engines and Gas Turbines

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12	Introduction and classification of internal combustion engines	1	7-01-19		TLM1	CO1	T1	
13	Working principle of spark ignition engines and compressionignition engines	1	8-01-19		TLM1	CO1	T1	
14	Working of 2-stroke engines and 4-stroke engines	1	9-01-19		TLM3	CO1	T1	
15	Valve Timing Diagrams for 4-stroke IC Engines and port timing diagrams for 2-strokeIC engines	1	11-01-19		TLM1	CO3	T1	
16	Parameters of performance-Brake power and determination of frictional power, Performance tests and problems	1	18-01-19		TLM1,TLM4,TLM2	CO3	T1	
17	TUTORIAL-2	1	21-01-19		TLM1,TLM4,TLM2	CO3	T1	
18	Determination of frictional power and Indicated power	1	22-01-19		TLM1,TLM4	CO3	T1	
19	Introduction and Classification of Gas turbines and Analysis of Closed and Open cycle Gas turbine power plant	1	23-01-19		TLM1	CO3	T1	
20	TUTORIAL-3	1	25-01-19		TLM1	CO1	T1	
21	Performance parameters of Gas Turbines	1	28-01-19		TLM1	CO3	T1	
22	Derivation for efficiency of closed cycle gas turbine	1	29-01-19		TLM1	CO3	T1	
23	Problems on ideal and actual gas turbine cycles	1	30-01-19		TLM1,TLM2	CO2	T1	
24	TUTORIAL-4	1	01-02-19		TLM1	CO2	T1	
No. of classes required to complete UNIT-II		13			No. of classes taken:			

UNIT-III : Steam Turbines

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
25	Introduction to steam turbines and Working principle of steam turbines	1	11-02-19		TLM1, TLM2	CO2	T1	
26	TUTORIAL-5	1	12-02-19		TLM3	CO2		
27	Impulse turbine and mechanical details and velocity diagram of Impulse turbine	1	13-02-19		TLM1, TLM2	CO2	T1	
28	Effect of friction and power developed for impulse turbine	1	15-02-19		TLM1	CO2	T1	
29	Axial thrust and blade efficiency of impulse turbine	1	18-02-19		TLM1	CO2	T1	
30	TUTORIAL-6	1	19-02-19		TLM1	CO2	T1	
31	Pressure Compounding and Velocity Compounding of steam turbine	1	20-02-19		TLM3	CO2		
32	construction of velocity triangles and applications of steam turbine	1	22-02-19		TLM1	CO2	T1	
33	TUTORIAL-07	1	25-02-19		TLM1	CO2	T1	
34	Problems on velocity triangles and impulse turbine	1	26-02-19		TLM1	CO2	T1	
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV: Fundamentals of Fluid Mechanics and Pressure and Flow measurement devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
35	Introduction to fluid mechanics, properties of fluids	1	27-02-19		TLM1	CO2	T1	
36	Density, specific weight, pressure, specific gravity, viscosity	1	01-03-19		TLM3	CO1	T2	
37	TUTORIAL-08	1	05-03-19		TLM1	CO2	T1	
38	Types of Fluids and flows	1	06-03-19		TLM1	CO2	T1	
39	Continuity Equation	1	8-03-19		TLM1	CO1	T2	
40	Momentum Equation	1	11-03-19		TLM1	CO1	T2	

41	TUTORIA-09	1	12-03-19		TLM3	CO1,CO4	T2	
42	Bernoulli's Equation	1	13-03-19		TLM1	CO1	T2	
43	Problems on Bernoulli's Equation	1	15-03-19		TLM1	CO1	T2	
44	Simple Manometer and Piezometer	1	18-03-19		TLM1	CO1	T2	
45	U- tube manometer, single column Manometer	1	19-03-19		TLM1	CO1	T2	
46	TUTORIAL-10	1	20-03-19		TLM3	CO4	T2	
47	Differential U-tube manometer	1	22-03-19		TLM1	CO1	T2	
48	Orifice meter and Venturi meter	1	25-03-19		TLM1	CO1	T2	
49	Working of Rota meter	1	26-03-19		TLM1	CO4	T2	
50	Problems on Continuity Equation	1	27-03-19		TLM1	CO4	T2	
51	TUTORIAL-11		29-03-19		TLM3	CO5	T2	
No. of classes required to complete UNIT-IV		17			No. of classes taken:			

UNIT-V : Hydraulic Turbines

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
52	Introduction to hydraulic turbines and Classification of hydraulic turbines	1	01-04-19		TLM1	CO4	T2	
53	Pelton wheel turbine- working principle	1	02-04-19		TLM1,TLM2,TLM4	CO4	T2	
54	TUTORIAL-12	1	03-04-19		TLM1,TLM4	CO4	T2	
55	Kaplan turbine - working principle	1	05-04-19		TLM1	CO4	T2	
56	Propeller turbine-working principle	1	08-04-19		TLM3	CO4	T2	
57	Performance and work done expressions for turbines,Problems on Pelton Wheel	1	09-04-19		TLM1	CO4	T2	
58	TUTORIAL-13	1	10-04-19		TLM1	CO5	T2	
59	Problems on francis and Kaplan turbine	1	12-04-19		TLM1	CO5	T2	
No. of classes required to complete UNIT-V		08			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part - C

EVALUATION PROCESS:

Evaluation Task	Cos	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4. Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs..

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems**.**

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences**.**

Design/development of solutions: 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**.**

Conduct investigations of complex problems: 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.

Modern tool usage: 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.

The engineer and society: 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.
Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice**.**
Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings**.**
Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
Project management and finance: Demonstrate knowledge and understanding of the ring 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.
Life-long learning: 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**.**

Programme Specific Outcomes (PSOs):
PSO : Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO: Design and analyze electrical machines, modern drive and lighting systems
PSO: Specify, design, implement and test analog and embedded signal processing electronic systems
PSO: Design controllers for electrical and electronic systems to improve their performance.

Kamala Priya B	S Rami Reddy	Dr. P. Vijaya Kumar	Dr.S.Pichi Reddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

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COURSE HANDOUT

Part-A

PROGRAM : B.Tech., II-Sem., EEE-B

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Thermal and Hydro Prime movers & 17ME51

L-T-P STRUCTURE : 3-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr MALLIKARJUNA ARO DANDU**

COURSE COORDINATOR : **Mr. S RAMI REDDY**

PRE-REQUISITES: APPLIED PHYSICS**,**

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The purpose of this course is to acquire knowledge in analysis of Gas turbines, steam turbines and hydraulic turbines using principles of thermodynamics and fluid mechanics and to deepen the understanding of Flow measurement and Pressure measurement devices.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Comprehend the laws of Basic Thermodynamics and Fluid Mechanics.
CO2: Analyze the performance of steam turbines and gas turbines using principles of thermodynamics.
CO3: Demonstrate working of different types of IC engines.
CO4: Illustrate Pressure and Flow measurement devices with concepts of Fluid mechanics.
CO5: Evaluate the performance of Hydraulic machines.

COURSE ARTICULATION MATRIX (Correlation between COs Pos & PSOs):

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

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Thermal Engineering Mahesh M. Rarhore, Tata McGraw-Hill Education, 2010

T2 P. N. Modi and S.M Seth, Fluid mechanics and hydraulic machinery, 15th Edition, Standard Book house

BOS APPROVED REFERENCE BOOKS:

R1 R. K Bansal, Fluid Mechanics and Hydraulic Machinery, 15th Edition, Standard Book House

R2 Rajput, Thermal Engineering, Lakshmi publications, 2010

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I BASIC THERMODYNAMICS -15

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
1.	Fundamental concepts, Thermodynamic system,	1	17-12-2018		**TLM1**	CO1	**T1**	
2.	Types, State, Path, Process and Cycle	1	19-12-2018		**TLM2**	CO1	**T1**	
3.	Work done in constant pressure, Constant volume,	1	20-12-2018		**TLM1**	CO1	**T1**	
4.	Constant temperature, Reversible adiabatic	1	21-12-2018		**TLM1**	CO1	**T1**	
5.	Polytrophic process, **Zeroth Law** Equality of temperature	1	24-12-2018		**TLM1**	CO1	**T1**	
6.	**First Law** First law of Thermodynamics	1	26-12-2018		**TLM1**	CO1	**T1**	
7.	**TUTORIAL-01**	1	27-12-2018		**TLM3**	CO1	**T1**	
8.	Statement Internal energy, Enthalpy Specific Heat	1	28-12-2018		**TLM1**	CO1	**T1**	
9.	Study Flow energy equation	1	31-12-2018		**TLM1**	CO1	**T1**	
10.	**Second Law** Second Law of thermodynamics	1	02-01-2019		**TLM1**	CO1	**T1**	
11.	Kelvin-Plank and Clausius Statements, Reversible Process	1	03-01-2019		**TLM1**	CO1	**T1**	
12.	**Carnot Cycle**	1	04-01-2019		**TLM1, TLM2**	CO1	**T1**	
13.	Basic problems	1	07-01-2019		**TLM4**	CO1	**T1**	
14.	**TUTORIAL-02**	1	09-01-2019		**TLM3**	CO1	**T1**	
15.	Assignment-1/Quiz-1	1	10-01-2019		**TLM6**	--	--	
No. of classes required to complete UNIT-I = 15			No. of classes taken:					

UNIT-II INTERNAL COMBUSTION ENGINES-12

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
16.	Classification working principle of spark ignition and Compression ignition engine	1	11-01-2019		**TLM2**	CO3	**T2**	
17.	Two strokes and Four strokes engines, Valve timing and Port timing diagrams	1	17-01-2019		**TLM2**	CO3	**T2**	
18.	Parameters of performance, Brake power, Indicated power,	1	18-01-2019		**TLM1**	CO3	**T2**	
19.	frictional power, Performance test on internal combustion engines	1	21-01-2019		**TLM3**	CO3	**T2**	
20.	Basic problems	1	23-01-2019		**TLM3**	CO3	**T2**	

21.	TUTORIAL-03	1	24-01-2019		**TLM4**	CO3	**T2**	
22.	**Gas Turbines:** Introduction, Classification of gas turbine, Applications of Gas Turbines	1	25-01-2019		**TLM2**	CO2	**T2**	
23.	Analysis of closed and open cycle Gas turbine plant	1	28-01-2019		**TLM1**	CO2	**T2**	
24.	Performance parameters	1	30-01-2019		**TLM3**	CO2	**T2**	
25.	Basic problems	1	31-01-2019		**TLM3**	CO2	**T2**	
26.	TUTORIAL-04	1	01-01-2019		**TLM4**	CO2	**T2**	
27.	Assignment-2/Quiz-2	1	02-02-2019		**TLM6**	CO2	**T2**	
No. of classes required to complete UNIT-II = 12			No. of classes taken:					

UNIT-III STEAM TURBINES-11

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
28.	Introduction, working principle, Classification, Applications of steam turbines	1	11-02-2019		**TLM2**	CO2	**T1**	
29.	Impulse turbine, Mechanical details	1	13-02-2019		**TLM2**	CO2	**T1**	
30.	Velocity diagram, effect of friction	1	14-02-2019		**TLM1**	CO2	**T1**	
31.	Power developed, axial thrust	1	15-02-2019		**TLM1**	CO2	**T1**	
32.	Blade or diagram efficiency,	1	18-02-2019		**TLM3**	CO2	**T1**	
33.	Basic problems	1	20-02-2019		**TLM3**	CO2	**T1**	
34.	TUTORIAL-05	1	21-02-2019		**TLM4**	CO2	**T1**	
35.	Velocity compounding (Curtis Turbine) and pressure compounding (Reaction Turbine)	1	22-02-2019		**TLM2**	CO2	**T1**	
36.	Basic problems	1	25-02-2019		**TLM3**	CO2	**T1**	
37.	TUTORIAL-06	1	27-02-2019		**TLM4**	CO2	**T1**	
38.	Assignment-3/Quiz-3	1	28-02-2019		**TLM6**	--	--	
No. of classes required to complete UNIT-III = 11			No. of classes taken:					

UNIT-IV FLUID MECHANICS -11

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
39.	Introduction Properties of fluids pressure, density, specific Weight,	1	01-03-2019		**TLM1, TLM2**	CO1	**T2**	
40.	specific gravity, Viscosity, types of fluid, types of fluid flows	1	06-03-2019		**TLM1, TLM2**			
41.	Continuity, Momentum equation	1	07-03-2019		**TLM1**	CO1	**T2**	
42.	Bernoulli's equation	1	08-03-2019		**TLM1**	CO1	**T2**	
43.	**Pressure measurements** Simple manometer,	1	11-03-2019		**TLM1, TLM 2**	CO4	**T2**	

44.	piezometer. U-tube manometer	1	13-03-2019		**TLM1, TLM 2**	CO4	**T2**	
45.	Basic problems	1	14-03-2019		**TLM3**	CO4	**T2**	
46.	TUTORIAL-07	1	15-03-2019		**TLM4**	CO4	**T2**	
47.	**Flow measurements:** Orifice meter, Rota meter	1	18-03-2019		**TLM1, TLM 2**	CO4	**T2**	
48.	Basic problems	1	21-03-2019		**TLM3**	CO4	**T2**	
49.	TUTORIAL-08	1	22-03-2019		**TLM4**	CO4	**T2**	
50.	Assignment-4/Quiz-4	1	25-03-2019		**TLM6**	--	--	
No. of classes required to complete UNIT-IV = 11			No. of classes taken:					

UNIT-V HYDRAULIC TURBINES-10

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
51.	Introduction- Classification of Hydraulic turbines	1	27-03-2019		**TLM2**	CO5	**T2**	
52.	Performance and work done of Pelton wheel Working principle	1	28-03-2019		**TLM1**	CO5	**T2**	
53.	Basic problems	1	29-03-2019		**TLM3**	CO5	**T2**	
54.	Basic problems		01-04-2019		**TLM3**	CO5	**T2**	
55.	TUTORIAL-09	1	03-04-2019		**TLM4**	CO5	**T2**	
56.	Performance and work done of Francis Working principle	1	04-04-2019		**TLM2**	CO5	**T2**	
57.	Performance and work done of Francis Working principle	1	05-04-2019		**TLM2**	CO5	**T2**	
58.	Basic problems	1	08-04-2019		**TLM3**	CO5	**T2**	
59.	Basic problems	1	10-04-2019		**TLM3**	CO5	**T2**	
60.	TUTORIAL-10	1	11-04-2019		**TLM4**	CO5	**T2**	
61.	Assignment-5/Quiz-5	1	12-04-2019		**TLM6**	--	--	
No. of classes required to complete UNIT-V = 10			No. of classes taken:					

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**Thermal Power Plant LAYOUT**	**1**	12-04-2019		**TLM1, TLM 2**	2		
2.	**Hydraulic Power Plant LAYOUT**	**1**	13-04-2019		**TLM1, TLM 2**	5		

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	17-12-2018	02-02-2019	7W
I Mid Examinations	04-02-2019	08-02-2019	1W
II Phase of Instructions	09-02-2019	14-04-2019	9W

II Mid Examinations	15-04-2019	19-04-2019	1W
Preparation and Practicals	20-04-2019	04-05-2019	2W
Semester End Examinations	06-05-2019	18-05-2019	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online exam- I	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online exam- I	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Online exam C=(C1+C2)/2	1,2,3,4,5	C=10
Attendance	1,2,3,4,5	D=05
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B+C+D =40**
Semester End Examinations	**1,2,3,4,5**	**E=60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

		Dr. P. Vijaya Kumar	Dr. S. Pichi Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)
L.B.REDDY NAGAR, MYLAVARAM-521 230.A.P. INDIA
Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi
NAAC Accredited with "A" grade, Accredited by NBA
New Delhi & Certified by ISO 9001:2015
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
http://www.lbrce.ac.in, eee.lbrce@gmail.com Phone: 08659-222933, Fax: 08659-222931

COURSE HANDOUT

PROGRAM : B.Tech., II-Sem., EEE

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : **Electronic Circuits and Devices 17EE01**

L-T-P STRUCTURE : 3-2-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Dr J.Sivavara Prasad

COURSE COORDINATOR : Dr J.Sivavara Prasad

PRE-REQUISITE: Applied Physics

COURSE OBJECTIVE : This course enables the student to interpret the concepts of basic and special semiconductor devices and their applications.

Course Outcomes: At the end of the course, the student will be able to:
CO1 : Illustrate the working of different types of semiconductor devices and their characteristics
CO2 : Analyze the diode and transistor circuits
CO3 : Design transistor stabilizing circuits

Mappings of course outcomes (COs) with programme outcomes (POs) & PSOs – 17EE01 – ELECTRONIC CIRCUITS AND DEVICES																
		Pos											PSOs			
		a	b	c	d	e	f	g	H	i	j	k	l	PSO1	PSO2	PSO3	PSO4
COs	CO1	3				2							1	2		3	
	CO2	3				2							1	2		3	
	CO3	3				2								2		3	
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)																

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight(Low), **2 -** Moderate(Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 R.L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, Pearson/Prentice Hall,9th Edition,2006

T2 Jacob Millman, Christos C Halkias and SatyabrataJit, Millman's Electronic Devices and Circuits, Tata McGraw Hill, Second Edition, New Delhi, 2008.

BOS APPROVED REFERENCE BOOKS:

R1 S Salivahanan, N.Suresh Kumar and A Vallavaraj, Electronic Devices and Circuits, McGraw Hill, 5th edition, 2010.

R2 J.B Gupta Electronic Devices and Circuits, S.K. Kataria&Sons, 2nd Edition,2013.

R3 Mohammad H. Rashid," Spice for Circuits and Electronics using PSPICE" ,PHI, 2e, 2006

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : JUNCTION DIODE CHARACTERISTICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	18-12-18		TLM2	CO 1		
2.	Course Outcomes	1	19-12-18		TLM2	CO 1		
3.	Introduction to UNIT-I	1	20-12-18		TLM2	CO 1		
4.	Review of Semiconductor Physics	1	21-12-18		TLM1	CO 1		
5.	Review of Semiconductor Physics continued...	1	22-12-18		TLM1	CO 1		
6.	N and P type Semiconductors	1	26-12-18		TLM1	CO 1		
7.	Mass action law and continuity equation	1	27-12-18		TLM1	CO 1		
8.	Hall effect and Fermi level of Semiconductors	1	28-12-18		TLM1	CO 1		
9.	Energy band diagram of PN diode, Forward bias of Diode	1	29-12-18		TLM1	CO 1		
10.	TUTORIAL-1	1	1-1-19		TLM3	CO 1		
11.	Reverse bias and VI characteristics	1	2-1-19		TLM1	CO 1		
12.	Current components, Diode equation, Temperature dependence of V-I characteristics	1	3-1-19		TLM1	CO 1		
13.	Transition and Diffusion capacitances and problems	1	4-1-19		TLM1	CO 1		
14.	Breakdown mechanisms in PN diode	1	5-1-19		TLM1	CO 1		
15.	Zenar diode, Tunnel Diode	1	8-1-19		TLM1	CO 1		
16.	LED, LCD and Photo diode	1	9-1-19		TLM1	CO 1		
17	Numerical Problems	1	10-1-19		TLM1	CO 1		
18	TUTORIAL-2	1	11-1-19		TLM3	CO 1		
No. of classes required to complete UNIT-I		18			No. of classes taken: 18			

UNIT-II : RECTIFIERS AND FILTERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT-II	1	17-1-19		TLM1	CO 2		
18.	Half wave Rectifier	1	18-1-19		TLM1	CO 2		
19.	Full wave Rectifier	1	19-1-19		TLM1	CO 2		

20.	Bridge Rectifier	1	22-1-19		TLM1	CO 2		
21.	TUTORIAL - 03	1	23-1-19		TLM3	CO 2		
22.	Ripple factor, Harmonic components in Rectifiers	1	24-1-19		TLM1	CO 2		
23.	Numerical Problems	1	25-1-19		TLM1	CO 2		
24.	Filters, Inductor filter and capacitor filter	1	29-1-19		TLM1	CO 2		
25.	L-section filter, Π- section filter and multiple L- section filter	1	30-1-19		TLM1	CO 2		
26.	Multiple Π-section filter and comparison of various filter circuits in terms of ripple factors	1	31-1-19		TLM1	CO 2		
27.	Basics of Regulators and problems	2	1-2-19 2-2-19		TLM1	CO 2		
No. of classes required to complete UNIT-II		12			No. of classes taken:			

UNIT-III : TRANSISTOR AND FET CHARACTERISTICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
28.	I Mid Examinations		5-2-19					
29.	I Mid Examinations		6-2-19					
30.	I Mid Examinations		7-2-19					
31.	I Mid Examinations		8-2-19					
32.	Junction Transistor and current components	1	12-2-19		TLM1	CO 1		
33.	Transistor as an amplifier	1	13-2-19		TLM1			
34.	Transistor construction	1	14-2-19		TLM1			
35.	Current components in a Transistor	1	15-2-19		TLM1			
36.	Input and Output characteristics of Transistor in Common Base configurations	1	16-2-19		TLM1			
37.	Common Emitter and common collector configurations	1	19-2-19		TLM1			
38.	Comparison of Transistor Configurations	1	20-2-19		TLM1			
39.	TUTORIAL-04	1	21-2-19		TLM3			
40.	Relation between alpha, beta and gama	1	22-2-19		TLM1			
41.	Small signal model of Transistor	1	23-2-19		TLM1			
42.	JFET and its characteristics	1	26-2-19		TLM3	CO 1		
43.	MOSFET and its characteristics	1	27-2-19		TLM3	CO 1		
44.	MOSFET (enhancement and depletion mode)	1	28-2-19		TLM3	CO 1		

45.	Comparisons of Transistors	1	1-3-19		TLM3	CO 1		
46.	TUTORIAL-04	1	2-3-19		TLM3			
No. of classes required to complete UNIT-III		15			No. of classes taken:			

UNIT-IV : BIASING AND STABILISATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
47.	Introduction to Biasing	1	5-3-19		TLM1	CO 3		
48.	BJT biasing, DC equivalent model	1	6-3-19		TLM1	CO 3		
49.	Criteria for fixing operating point, Fixed bias	1	7-3-19		TLM1	CO 3		
50.	TUTORIAL-06	1	8-3-19		TLM3	CO 3		
51.	Collector to base bias and self bias	1	12-3-19		TLM1	CO 3		
52.	Stabilisation factors(S,S',S'')	1	13-3-19		TLM1	CO 3		
53.	Compensation techniques against variation in V_{BE}	1	14-3-19		TLM1	CO 3		
54.	Compensation techniques against variation in I_{c0}	1	15-3-19		TLM1	CO 3		
55.	Thermal runaway	1	16-3-19		TLM1	CO 3		
56.	Thermal stability	1	19-3-19		TLM1	CO 3		
57.	TUTORIAL-07	1	20-3-19		TLM3	CO 3		
58.	FET biasing	1	22-3-19		TLM1	CO 3		
59.	Assignment/Quiz-4	1	23-3-19		TLM1	CO 3		
No. of classes required to complete UNIT-IV		12			No. of classes taken:			

UNIT-V : AMPLIFIERS AND SPECIAL SEMICONDUTOR DEVICES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
60.	Introduction to small signal low frequency transistor circuits	1	26-3-19		TLM1			
61.	h-parameters representation of a transistor	1	27-3-19		TLM1			
62.	Analysis o single stage transistor amplifier using h-parameters	1	28-3-19		TLM1			
63.	Voltage gain, Current gain, Input Impedance and Output Impedance	1	29-3-19		TLM1			
64.	Comparisons of transistor parameters A_I,R_i,A_v,R_o	1	30-3-19		TLM1			
65.	FET amplifier CD ,CSconfiguration	1	2-4-19		TLM1			
66.	Introduction to special diodes- PIN diode, Schottky diode,	1	3-4-19		TLM1	CO 1		
67.	Photo diode, Power diode and LCD	1	5-4-19		TLM1	CO 1		
68.	V-I characteristics of SCR, UJT	1	6-4-19		TLM3	CO 1		

69.	IGBT, DIAC and power MOSFET	1	9-4-19		TLM1	CO 1		
70.	TUTORIAL-08	1	10-4-19		TLM3	CO 1		
71.	Revision	1	11-3-19		TLM1	CO 1		
No. of classes required to complete UNIT-V		10			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
72.	Oscillators Introduction	1	12-4-19		TLM1			
73.	Introduction to Digital Electronics	1	13-4-19		TLM1			

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : JUNCTION DIODE CHARACTERISTICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	17-12-18		TLM2	CO 1		
2.	Course Outcomes	1	18-12-18		TLM2	CO 1		
3.	Introduction to UNIT-I	1	20-12-18		TLM2	CO 1		
4.	Review of Semiconductor Physics	1	21-12-18		TLM1	CO 1		
5.	Review of Semiconductor Physics continued...	1	22-12-18		TLM1	CO 1		
6.	N and P type Semiconductors	1	24-12-18		TLM1	CO 1		
7.	Mass action law and continuity equation	1	27-12-18		TLM1	CO 1		
8.	Hall effect and Fermi level of Semiconductors	1	28-12-18		TLM1	CO 1		
9.	Energy band diagram of PN diode, Forward bias of Diode	1	29-12-18		TLM1	CO 1		
10.	TUTORIAL-1	1	31-12-18		TLM3	CO 1		
11.	Reverse bias and VI characteristics	1	1-1-19		TLM1	CO 1		
12.	Current components, Diode equation, Temperature dependence of V-I characteristics	1	3-1-19		TLM1	CO 1		
13.	Transition and Diffusion capacitances and problems	1	4-1-19		TLM1	CO 1		
14.	Breakdown mechanisms in PN diode	1	5-1-19		TLM1	CO 1		
15.	Zenar diode, Tunnel Diode	1	7-1-19		TLM1	CO 1		
16.	LED, LCD and Photo diode	1	8-1-19		TLM1	CO 1		
17	Numerical Problems	1	10-1-19		TLM1	CO 1		

18	TUTORIAL-2	1	11-1-19		TLM3	CO 1		
No. of classes required to complete UNIT-I		18	12-1-19		No. of classes taken: 18			

UNIT-II : RECTIFIERS AND FILTERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT-II	1	17-1-19		TLM1	CO 2		
18.	Half wave Rectifier	1	18-1-19		TLM1	CO 2		
19.	Full wave Rectifier	1	19-1-19		TLM1	CO 2		
20.	Bridge Rectifier	1	21-1-19		TLM1	CO 2		
21.	TUTORIAL - 03	1	22-1-19		TLM3	CO 2		
22.	Ripple factor, Harmonic components in Rectifiers	1	24-1-19		TLM1	CO 2		
23.	Numerical Problems	1	25-1-19		TLM1	CO 2		
24.	Filters, Inductor filter and capacitor filter	1	28-1-19		TLM1	CO 2		
25.	L-section filter, Π- section filter and multiple L- section filter	1	29-1-19		TLM1	CO 2		
26.	Multiple Π-section filter and comparison of various filter circuits in terms of ripple factors	1	31-1-19		TLM1	CO 2		
27.	Basics of Regulators and problems	2	1-2-19 2-2-19		TLM1	CO 2		
No. of classes required to complete UNIT-II		12			No. of classes taken:			

UNIT-III : TRANSISTOR AND FET CHARACTERISTICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
28.	I Mid Examinations		4-2-19					
29.	I Mid Examinations		5-2-19					
30.	I Mid Examinations		7-2-19					
31.	I Mid Examinations		8-2-19					
32.	Junction Transistor and current components	1	11-2-19		TLM1	CO 1		
33.	Transistor as an amplifier	1	12-2-19		TLM1			
34.	Transistor construction	1	14-2-19		TLM1			
35.	Current components in a Transistor	1	15-2-19		TLM1			
36.	Input and Output characteristics of Transistor in Common Base configurations	1	16-2-19		TLM1			
37.	Common Emitter and common collector configurations	1	18-2-19		TLM1			

38.	Comparison of Transistor Configurations	1	19-2-19		TLM1			
39.	TUTORIAL-04	1	21-2-19		TLM3			
40.	Relation between alpha, beta and gama	1	22-2-19		TLM1			
41.	Small signal model of Transistor	1	23-2-19		TLM1			
42.	JFET and its characteristics	1	25-2-19		TLM3	CO 1		
43.	MOSFET and its characteristics	1	26-2-19		TLM3	CO 1		
44.	MOSFET (enhancement and depletion mode)	1	28-2-19		TLM3	CO 1		
45.	Comparisons of Transistors	1	1-3-19		TLM3	CO 1		
46.	TUTORIAL-04	1	2-3-19		TLM3			
No. of classes required to complete UNIT-III		15			No. of classes taken:			

UNIT-IV : BIASING AND STABILISATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
47.	Introduction to Biasing	1	5-3-19		TLM1	CO 3		
48.	BJT biasing, DC equivalent model	1	7-3-19		TLM1	CO 3		
49.	Criteria for fixing operating point, Fixed bias	1	8-3-19		TLM1	CO 3		
50.	TUTORIAL-06	1	11-3-19		TLM3	CO 3		
51.	Collector to base bias and self bias	1	12-3-19		TLM1	CO 3		
52.	Stabilisation factors(S,S',S'')	1	14-3-19		TLM1	CO 3		
53.	Compensation techniques against variation in V_{BE}	1	15-3-19		TLM1	CO 3		
54.	Compensation techniques against variation in I_{c0}	1	16-3-19		TLM1	CO 3		
55.	Thermal runaway	1	18-3-19		TLM1	CO 3		
56.	Thermal stability	1	19-3-19		TLM1	CO 3		
57.	TUTORIAL-07	1	22-3-19		TLM3	CO 3		
58.	FET biasing	1	23-3-19		TLM1	CO 3		
59.	Assignment/Quiz-4	1	25-3-19		TLM1	CO 3		
No. of classes required to complete UNIT-IV		12			No. of classes taken:			

UNIT-V : AMPLIFIERS AND SPECIAL SEMICONDUTOR DEVICES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
60.	Introduction to small signal low frequency transistor circuits	1	26-3-19		TLM1			
61.	h-parameters representation of a transistor	1	28-3-19		TLM1			

62.	Analysis o single stage transistor amplifier using h-parameters	1	29-3-19		TLM1			
63.	Voltage gain, Current gain, Input Impedance and Output Impedance	1	30-3-19		TLM1			
64.	Comparisons of transistor parameters A_I,R_i,A_v,R_o	1	1-4-19		TLM1			
65.	FET amplifier CD ,CSconfiguration	1	2-4-19		TLM1			
66.	Introduction to special diodes- PIN diode, Schottky diode,	1	4-4-19		TLM1	CO 1		
67.	Photo diode, Power diode and LCD	1	5-4-19		TLM1	CO 1		
68.	V-I characteristics of SCR, UJT	1	6-4-19		TLM3	CO 1		
69.	IGBT, DIAC and power MOSFET	1	8-4-19		TLM1	CO 1		
70.	TUTORIAL-08	1	9-4-19		TLM3	CO 1		
71.	Revision	1	11-4-19		TLM1	CO 1		
No. of classes required to complete UNIT-V		10			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
72.	Oscillators Introduction	1	12-4-19		TLM1			
73.	Introduction to Digital Electronics	1	13-4-19		TLM1			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	17/12/18	2/2/2019	7 W
I Mid Examinations	4/2/19	8/2/19	1 W
II Phase of Instructions	9/2/19	13/4/19	9 W
II Mid Examinations	15/4/19	19/4/19	1 W
Preparation and Practicals	20/4/19	4/5/19	2 W
Semester End Examinations	6/5/19	18/5/19	2 W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment-1	1	A1=5
Assignment-2	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz Marks-1	1,2	C1=10

Assignment-3	3	A3=5
Assignment-4	4	A4=5
Assignment-5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz Marks-2	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: B=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**A+B+C+D=40**
Semester End Examinations	**1,2,3,4,5**	**E=60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PEOs(Program Educational Objectives):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.
PEO3. Work effectively as individuals and as team members in multidisciplinary projects.
PEO4.Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

POs:(Program Outcomes)
a: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b:. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c: Design/development of solutions: 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.
d: Conduct investigations of complex problems: 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.
e: Modern tool usage: 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.
f: The engineer and society: 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.
g: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable

development.

h: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

k:Project management and finance: Demonstrate knowledge and understanding of the ring 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.

l:Life-long learning: 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.

PSOs(Program Specific Outcomes)

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO b: Design and analyze electrical machines, modern drive and lighting systems

PSO c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO d: Design controllers for electrical and electronic systems to improve their performance

Course Instructor **Course Coordinator** **Module Coordinator** **HOD**