AR-18

ACADEMIC REGULATIONS

COURSE STRUCTURE

AND

DETAILED SYLLABUS

ELECTRICAL AND ELECTRONICS ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2018-2019)

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AUTONOMOUS)
Approved by AICTE, Accredited by NBA & NAAC,
Recognised under 2(f)12(b) of UGC
Permanently Affiliated to JNTUK, Kakinada
K.Kotturu, Tekkali, Srikakulam-532 201, Andhra Pradesh.

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT (AUTONOMOUS)
Approved by AICTE, Accredited by NBA & NAAC, Recognized under 2(f) and 12(b) of UGC
Permanently Affiliated to JNTUK, Kakinada.
K.Kotturu, Tekkali, Srikakulam-532201, Andhra Pradesh

Academic Regulations 2018 (AR18) for B. Tech.
(Effective for the students admitted into I year from the **Academic Year 2018-2019** and onwards)

1. Award of B.Tech. Degree:

A student will be declared eligible for the award of the B. Tech. Degree if he/she fulfills the following academic regulations.

(i) Pursued a course of study for not less than four academic years and not more than eight academic years.
(ii) Registered for **160** credits and he/she must secure total **160** credits.

Students, who fail to complete their Four years Course of study within **8** years or fail to acquire the 160 Credits for the award of the degree within **8** academic years from the year of their admission, shall forfeit their seat in B. Tech course and their admission shall stand cancelled.

2. Courses of study:

The following courses of study are offered at present with specialization in the B.Tech. Course.

Sl. No.	Branch Code-Abbreviation	Branch
01	01-CE	Civil Engineering
02	02-EEE	Electrical and Electronics Engineering
03	03-ME	Mechanical Engineering
04	04-ECE	Electronics and Communication Engineering
05	05-CSE	Computer Science and Engineering
06	12-IT	Information Technology

And any other course as approved by the authorities of the University from time to time.

3. Credits (Semester system from I year onwards):

Sl. No	Course	Credits
1	Theory Course	2/3/4
2	Interdisciplinary Electives	02
3	Laboratory Course	1.5
4	Internship	1.5
5	Employability skills	1.5
6	Minor Project	2/3
7	Project	07

4. Interdisciplinary Electives:

There is one interdisciplinary elective in each semester from 2-2 Semester to 4-1 semester. The student can choose one interdisciplinary elective of respective semester. The pattern of Midterm examinations and end examinations of these courses is similar to regular theory courses and the valuation is purely internal.

6. MOOCs:

Explore all possibilities to run at least one subject in every semester from 2-1 semester onwards as a MOOCs.

7. Evaluation Methodology:

The performance of a student in each semester shall be evaluated subject wise with a maximum of **100** marks for theory course, laboratory and other courses. The project work shall be evaluated for **200** marks.

6.1 Theory course:

For theory courses the distribution shall be **40** marks for internal midterm evaluation and **60** marks for the External End Examinations. Out of **40** internal midterm marks: **25** marks are allotted for descriptive exam, **10** marks for two assignments or one case study (group wise), and **5** marks for objective test.

Pattern for Internal Midterm Examinations (30 marks):

For theory courses of each semester, there shall be **2** Midterm exams. Each descriptive exam is to be held for **30** marks with the duration of **90** minutes.

For final calculation of internal marks, weightage of **70%** will be given to the student who performed well either in first Midterm or second Midterm and **30%** weightage will be given to other Midterm examinations.

Midterm paper contains three descriptive type questions with internal choice. Each question carries **10** marks (3×10=30M) and scale down to **25** marks. The first Midterm examination to be conducted usually after 8 weeks of instruction or after completion of 50 percent syllabus, the second Midterm examination to be conducted usually at the end of instruction after completion of remaining 50 percent syllabus.

Pattern for External End Examinations (60 marks):

The question paper shall have descriptive type questions for **60** marks. There shall be one question from each unit with internal choice. Each question carries **12** marks. Each course shall consist of five units of syllabus. The student should answer total **5** questions. (5x12M=60M)

6.2 Laboratory Course:

(i) For practical subjects there shall be continuous evaluation during the semester for **40** internal marks and **60** semester end examination marks. Out of the **40** marks for internal: **25** marks for day to day work, **5** marks for record and **10** marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner from outside the college.

(ii) For the course Engineering Graphics and Design, the distribution shall be **40** marks for internal evaluation (**20** marks for day–to–day work, and **20** marks for internal tests) and 60 marks for end examination.

For award of marks for internal tests weightage of **70%** will be given to the student who performed well either in first test or second test and **30%** weightage will be given to other test.

7.3 Minor Project:

Out of a total of **100** marks for the minor project work **40** marks shall be for internal evaluation and **60** marks for end semester examination. The end semester examination (Viva-Voce) shall be conducted by the committee. The committee consists of an external examiner, Head of the department and supervisor of the minor project. The internal evaluation shall be made on the basis of seminar given by each student on the topic of his/her project, which was evaluated by internal committee. Out of **40** internal marks **10** marks allotted for literature survey, **15** marks for results and analysis and **15** marks for seminar.

7.4 Project:

Out of a total of 200 marks for the Project, **80** marks shall be for Project Internal Evaluation and **120** marks for the End Semester Examination. The End Semester Examination (Viva – Voce) shall be conducted by the committee. The committee consists of an external examiner, Head of the Department and Supervisor of the Project. The evaluation of project shall be made at the end of the IV year. The Internal Evaluation shall be made on the basis of two seminars given by each student on the topic of his project which was evaluated by an internal committee. Out of **80** internal marks - **20** marks allotted for literature survey, **30** marks for results and analysis, **15** marks for first seminar (usually after 8 weeks) and **15** marks for second seminar (at the end of semester).

7.5 Mandatory Courses:

Mandatory course is one among the compulsory courses and does not carry any Credits. The list of mandatory courses is shown below:

- Induction Program
- Constitution of India
- Environmental sciences

7.6 Employability Skills:

Employability skills shall be evaluated for **100** marks. **40** marks for day-to-day evaluation and **60** marks on the basis of end (internal) examination. There is no external examination for employability skills. It will be evaluated in IV-I semester.

7.7 Internship:

All the students shall undergo the internship period minimum of **4** weeks and the students have an option of choosing their own industry which may be related to their respective branch. A self study report for the internship shall be submitted and evaluated during the IV year II-Semester and will be evaluated for a total of **100** marks consists of **40** marks for internal assessment and **60** marks for end examination.

Internal assessment for **40** marks shall be done by the internship supervisor. Semester end examination (Viva – Voce) for **60** marks shall be conducted by committee consists of Head of the Department, internal supervisor and an external examiner.

For a few merit students, internship for six months will be allowed based on their performance in academics. Those who want to go for internship for six months are required to intimate the same to the college through proper channel at the end of III-II semester and they require completing all the subjects of IV B.Tech. either in IV-I Semester or IV-II Semester. However, project will be evaluated only in IV-II Semester.

7. Attendance Requirements:

(i) A student shall be eligible to appear for End Semester examinations, if he/she acquires a minimum of **75%** of attendance in aggregate of all the subjects.

(ii) Condonation of shortage of attendance in aggregate up to **10%** (**65%** and above and below **75%**) in each semester with genuine reasons and shall be approved by a committee duly appointed by the college. The condonation approved otherwise it can be reviewed by the College academic committee.

(iii) A Student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.

(iv) Shortage of Attendance below **65%** in aggregate shall in NO case be condoned.

(v) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

(vi) A fee stipulated by the college shall be payable towards condonation of shortage of attendance.

8. Minimum Academic Requirements:

8.1 Conditions for pass and award of credits for a course:

(i) A candidate shall be declared to have passed in individual course if he/she secures a minimum of **40%** aggregate marks i.e **40** out of **100** (Internal & Semester end examination marks put together), subject to a minimum of **35%** marks i.e **21** marks out of **60** in semester end examination.

(ii) On passing a course of a programme, the student shall earn assigned credits in that Course.

8.2 Method of Awarding Letter Grades and Grade Points for a Course:

A letter grade and grade points will be awarded to a student in each course based on his/her performance as per the grading system given below.

Table: Grading System for B.Tech Programme

Percentage	Grade Points	Letter Grade
95-100%	10	O
85-<95%	9	A+
75-<85%	8	A
65-<75%	7	B^+
55-<65%	6	B
45-<55%	5	C
40%-<45%	4	P
< 40%	0	F (Fail)

8.3 Calculation of Semester Grade Points Average (SGPA)* for semester:

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as below:

$$\text{SGPA} = \frac{\Sigma(\text{CR} \times \text{GP})}{\Sigma\text{CR}} \quad \text{(for all courses passed in semester)}$$

Where CR = Credits of a Course
GP = Grade points awarded for a course
*SGPA is calculated for the candidates who passed all the courses in that semester.

8.4 Calculation of Cumulative Grade Points Average (CGPA) and Award of Division for entire programme:

The CGPA is calculated as below:

$$\text{CGPA} = \frac{\Sigma(\text{CR} \times \text{GP})}{\Sigma\text{CR}} \quad \text{(For entire programme)}$$

Where CR = Credits of a course
GP = Grade points awarded for a course

Table: Award of Divisions:

CGPA	DIVISION
≥ 7.5 (with single attempt)	First Class with distinction
≥ 6.5 and < 7.5	First Class
≥ 5.5 and <6.5	Second Class
≥ 4.0 and <5.5	Pass Class
< 4.0	Fail

Equivalence percentage = (CGPA -0.5) × 10 %

8.5 Supplementary Examinations:

Supplementary examinations will be conducted in every semester.

8.6 Conditions for Promotion:

(i) A student will be promoted to second year, if he/she put up the minimum attendance requirement.

(ii) A student shall be promoted from II to III year only if he fulfills the academic requirement of total **50%** credits (if number credits is in fraction, it will be rounded off to lower digit) from regular and supplementary examinations of I year and II year examinations, irrespective of whether the candidate takes the examination or not.

(iii) A student shall be promoted from III year to IV year only if he fulfills the academic requirements of total **50%** credits (if number of credits is in fraction, it will be rounded off to lower digit) from regular and supplementary examinations of I Year, II Year and III Year examinations, irrespective of whether the candidate takes the examinations or not.

9. Course pattern:

(i) The entire course of study is of four academic years and each year will have TWO Semesters (Total EIGHT Semesters).

(ii) A student is eligible to appear for the end examination in a subject, but absent for it or failed in the end examinations may appear for that subject's **supplementary** examinations, when offered.

(iii) When a student is detained due to lack of credits / shortage of attendance, he may be re-admitted when the semester is offered after fulfillment of academic regulations. Whereas the academic regulations hold good with the regulations he/she first admitted.

10. Minimum Instruction Days:

The minimum instruction days for each semester shall be **95** clear instruction days.

11. **There shall be no branch transfer after the completion of admission process**.

12. General:

(i) Where the words "he" "him" "his", occur in the regulations, they include "she", "her", "hers".

(ii) The academic regulation should be read as a whole for the purpose of any interpretation.

(iii) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the principal is final.

(iv) The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT: TEKKALI
SRIKAKULAM-532201, Andhra Pradesh (India)
Academic Regulations 2018 (AR18) for B. Tech. (Lateral Entry Scheme)
(Effective for the students admitted into II year from the **Academic Year 2018-2019** and onwards)

1. Award of B. Tech. Degree:

A student will be declared eligible for the award of the B. Tech. Degree if he/she fulfills the following academic regulations.

(i) Pursued a course of study for not less than three academic years and not more than six academic years.
(ii) Registered for **all** the credits of 2^{nd}, 3^{rd} and 4^{th} year of respective branches and he/she must secure total credits of 2^{nd}, 3^{rd} and 4^{th} year of respective branches.

Students, who fail to complete their three year Course of study within six years or fail to acquire the total credits for the award of the degree within **6** academic years from the year of their admission, shall forfeit their seat in B. Tech course and their admission shall stand cancelled.

2. Promotion Rule:

(i) A lateral entry student will be promoted to II year to III year if he puts up the minimum required attendance in II year.
(ii) A student shall be promoted from III year to IV year only if he fulfills the academic requirements of total **50%** of credits (if number of credits is in fraction, it will be rounded off to lower digit) from the II Year and III Year examinations , whether the candidate takes the examinations or not.

3. Minimum Academic Requirements:

3.1 Conditions for pass and award of credits for a course:

(i) A candidate shall be declared to have passed in individual course if he/she secures a minimum of **40%** aggregate marks i.e **40** out of 100 (Internal & Semester end examination marks put together), subject to a minimum of **35%** marks i.e **21** marks out of **60** in semester end examination.
(ii) On passing a course of a programme, the student shall earn assigned credits in that Course.

3.2 Method of Awarding Letter Grades and Grade Points for a Course:

A letter grade and grade points will be awarded to a student in each course based on his/her performance as per the grading system given below.

Table: Grading System for B.Tech Programme

Percentage	Grade Points	Letter Grade
95-100%	10	O
85-<95%	9	A+
75-<85%	8	A
65-<75%	7	B^+
55-<65%	6	B
45-<55%	5	C
40%-<45%	4	P
< 40%	0	F (Fail)

3.3 Calculation of Semester Grade Points Average (SGPA)* for semester:

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as below:

$$\text{SGPA} = \frac{\Sigma(CR \times GP)}{\Sigma CR} \quad \text{(for all courses passed in semester)}$$

Where CR = Credits of a Course
GP = Grade points awarded for a course
*SGPA is calculated for the candidates who passed all the courses in that semester.

3.4 Calculation of Cumulative Grade Points Average (CGPA) and Award of Division for Entire Programme:

The CGPA is calculated as below:

$$\text{CGPA} = \frac{\Sigma(CR \times GP)}{\Sigma CR} \quad \text{(for entire programme)}$$

Where CR = Credits of a course
GP = Grade points awarded for a course

Table: Award of Divisions

CGPA	DIVISION
≥ 7.5(with single attempt)	First Class with distinction
≥ 6.5 and < 7.5	First Class
≥ 5.5 and < 6.5	Second Class
≥ 4.0 and <5.5	Pass Class
< 4.0	Fail

Equivalence percentage = (CGPA -0.5) × 10 %

4. All other regulations as applicable for B. Tech. Four- year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)

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DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
1	If the student possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the student which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
	If the student gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student or students in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the students involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	If the student has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.
3	If the student impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4	If the student smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all semester end examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
5	If the student uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	If the student refuses to obey the orders of the Chief Superintendent/Assistant -Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

7	If the student leaves the exam hall taking away answer script or intentionally tears off the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	If the student possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college, expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and. a police case will be registered against them.
10	If the student comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the student has appeared including practical examinations and project work of that semester/year examinations.

Aditya Institute of Technology and Management, Tekkali

AR 18 – COURSE STRUCTURE

I-I B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
	18MCT101	Induction Program	3 weeks			0
1	18BST101	Linear Algebra & Calculus	3	1	0	4
2	18BST108	Chemistry	3	1	0	4
3	18EST101	Basic Electrical Engineering	3	1	0	4
4	18EET101	Professional Core – 1 (Switching Theory and Logic Design)	2	0	0	2
5	18ESL103	Workshop and Manufacturing practice	0	0	3	1.5
6	18BSL102	Chemistry Lab	0	0	3	1.5
7	18ESL101	Basic Electrical Engineering Lab	0	0	3	1.5
Total			**11**	**3**	**9**	**18.5**

I-II B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
	18MCT102	Environmental Science	3	0	0	0
1	18HST101	English	2	0	0	2
2	18BST102	Differential Equations & Transform Theory	3	1	0	4
3	18BST106	Applied Physics	3	1	0	4
4	18EST102	Programming for problem solving	3	0	0	3
5	18EET102	Professional Core – 2 (Electric Circuit Theory)	2	0	0	2
6	18ESL104	Engineering Graphics & Design	0	0	4	2
7	18HSL101	Language proficiency lab	0	0	3	1.5
8	18BSL101	Physics Lab	0	0	3	1.5
9	18ESL102	Programming for Problem Solving Lab	0	0	3	1.5
Total			**16**	**2**	**13**	**21.5**

II-I B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
	18MCT203	Constitution of India	3	0	0	0
1	18BST204	Complex Variables & Statistical Methods	3	0	0	3
2	18EET203	Professional core – 3 (Electro Magnetic Field Theory)	3	0	0	3
3	18EET204	Professional core – 4 (Network Analysis and Synthesis)	3	1	0	4
4	18EET205	Professional core – 5 (Electronic Devices And Circuits)	3	0	0	3
5	18EET206	Professional core – 6 (Electrical Machines - I)	3	0	0	3
6	18EEL201	Professional Lab – 1 (Electronic Devices and Circuits Lab)	0	0	3	1.5
7	18EEL202	Professional Lab – 2 (Electrical Machines – I Lab)	0	0	3	1.5
Total			**18**	**1**	**6**	**19**

II-II B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
1	18BST209	Biology	3	0	0	3
2	18EST103	Engineering Mechanics	3	1	0	4
3	18EET207	Professional core – 7 (Electrical Machines - II)	3	0	0	3
4	18EET208	Professional core – 8 (Power Systems-I)	3	0	0	3
5	18EET209	Professional core – 9 (Control Systems)	3	0	0	3
6	xxxxxx	Interdisciplinary Elective – I	2	0	0	2
7	18EEL203	Professional Lab – 3 (Electrical Machines –II Lab)	0	0	3	1.5
8	18EEL204	Professional Lab – 4 (Electrical Circuits Lab)	0	0	3	1.5
9	18EEL205	Professional Lab – 5 (Control Systems Lab)	0	0	3	1.5
Total			**17**	**1**	**9**	**22.5**

III-I B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
1	18EET310	Professional core – 10 (Power Electronics)	3	0	0	3
2	18EET311	Professional core – 11 (Programming in C++)	3	0	0	3
3	18EET312	Professional core – 12 (Electrical Measurements)	3	0	0	3
4	18EET313	Professional core – 13 (Power Systems –II)	3	0	0	3
5	xxxxxx	Professional elective – I	3	0	0	3
6	xxxxxx	Interdisciplinary Elective – II	2	0	0	2
7	18EEL306	Professional Lab – 6 (Programming in C++ Lab)	0	0	3	1.5
8	18EEL307	Professional Lab – 7 (Electrical Measurements Lab)	0	0	3	1.5
9	18EEP301	Minor Project-1	0	0	4	2
Total			**17**	**0**	**10**	**22**

III-II B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
1	18EET314	Professional core – 14 (Switchgear and Protection)	3	0	0	3
2	18EET315	Professional core – 15 (Power System Analysis)	3	0	0	3
3	18EET316	Professional core – 16 (PLCs & SCADA Theory)	3	0	0	3
4	xxxxxx	Professional elective – II	3	0	0	3
5	xxxxxx	Interdisciplinary Elective – III	2	0	0	2
6	18EEL308	Professional Lab – 8 (Power Electronics Lab)	0	0	3	1.5
7	18EEL309	Professional Lab – 9 (Industrial Automation Lab)	0	0	3	1.5
8	18HSL302	Professional Communication Skills Lab	0	0	3	1.5
9	18EEP302	Minor Project – 2	0	0	6	3
Total			**14**	**0**	**15**	**21.5**

IV-I B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
1	18HST402	Human Values	2	0	0	2
2	18HST404	Managerial Economics & Management Science	3	0	0	3
3	xxxxxx	Professional elective – III	3	0	0	3
4	xxxxxx	Professional elective – IV	3	0	0	3
5	18EET417	Microprocessor and Micro controller	3	0	0	3
6	xxxxxx	Interdisciplinary Elective – IV	2	0	0	2
7	18HSL406	Employability Skills	0	0	3	1.5
8	18EEL410	Professional Lab – 10 (Microprocessor and Micro controller Lab)	0	0	3	1.5
9	18EEL411	Professional Lab – 11 (Power Systems Lab)	0	0	3	1.5
Total			**16**	**0**	**9**	**20.5**

IV-II B. Tech.

S.No	Subject Code	Theory/Lab	L	T	P	C
1	xxxxxx	Professional elective –V	3	0	0	3
2	xxxxxx	Professional elective –VI	3	0	0	3
3	18EEP403	Internship				1.5
4	18EEP404	Project				7
Total			**6**	**0**	**0**	**14.5**

Total credits: 160

NOTE: L: Lecture T: Tutorial P: Practical

Professional Elective - I

Code	Subject
18EEE311	Integrated Circuits Applications
18EEE312	Principles of Pulse and Digital Circuits
18EEE313	Communication Theory

Professional Elective - II

Code	Subject
18EEE321	Principles of Signals &Systems
18EEE322	Java Programming
18EEE323	Instrumentation

Professional Elective - III

Code	Subject
18EEE431	Fundamentals of Electric Drives
18EEE432	High Voltage DC Transmission
18EEE433	Flexible AC Transmission Systems

Professional Elective - IV

Code	Subject
18EEE441	Power System Operation and Control
18EEE442	High Voltage Engineering
18EEE443	Power Quality Management

Professional Elective - V

Code	Subject
18EEE451	Utilization of Electrical Energy
18EEE452	Advanced Control Systems
18EEE453	Renewable Energy systems

Professional Elective - VI

Code	Subject
18EEE461	Digital Control Systems
18EEE462	Electrical Distribution Systems
18EEE463	Special Electrical Machines

Subject Code	Offered by Dept.	Interdisciplinary Elective I	Offered for Dept.
18IET211	BS&H	Transform Theory	MECH/CIVIL
18IET212	BS&H	Numerical Methods	ECE/EE
18IET213	BS&H	Computational Number Theory	CSE/IT
18IET214	CIVIL	Water Shed Management	MECH
18IET215	CIVIL	Computer aided engineering drawing	ECE/EEE/CSE/IT
18IET216	EEE	Introduction to mathematical simulation and modeling	ECE/MECH/CIVIL/CSE/IT
18IET217	MECH	Fundamentals of Material Science	ECE/EEE/CIVIL
18IET218	MECH	Engineering Optimization Techniques	CSE/IT
18IET219	ECE	Introduction to Electronic Measurements	EEE/MECH/CIVIL/CSE/IT
18IET21A	CSE	UNIX Utilities	ECE/EEE/MECH/CIVIL/IT
18IET21B	IT	IT systems Management	ECE/EEE/MECH/CIVIL/CSE

Subject Code	Offered by Dept.	Interdisciplinary Elective II	Offered for Dept.
18IET321	BS&H	Fundamentals of Fuzzy Logic	All
18IET322	CIVIL	Fundamentals of building planning	MECH
18IET323	CIVIL	Remote Sensing	ECE/EEE/CSE/IT
18IET324	EEE	Renewable energy sources	ECE/MECH/CIVIL/CSE/IT
18IET325	MECH	Principles of Mechanical Measurements	ECE/EEE/CIVIL
18IET326	MECH	Linear programming and its applications	CSE/IT
18IET327	ECE	Principles of communications	EEE/MECH/CIVIL/CSE/IT
18IET328	CSE	Introduction to JAVA	ECE/EEE/MECH/CIVIL
18IET329	IT	Introduction to PYTHON	ECE/EEE/MECH/CIVIL/CSE

Subject Code	Offered by Dept.	Interdisciplinary Elective III	Offered for Dept.
18IET331	MBA	HRD & Organizational behavior	All
18IET332	CIVIL	Environmental impact assessment	ECE/EEE/MECH
18IET333	CIVIL	GPS & Survey Methods	CSE/IT
18IET334	EEE	Energy audit conservation and management	ECE/EEE/MECH/CSE/IT
18IET335	MECH	Elements of workshop technology	ECE/EEE/CIVIL/CSE/IT
18IET336	ECE	Introduction to Signal Processing	EEE/MECH/CIVIL
18IET337	ECE	Fundamentals of Signals & Systems	CSE/IT
18IET338	CSE	Simulation and Modeling	ECE/EEE/MECH/CIVIL/IT
18IET339	IT	Fundamentals of Computer Graphics	ECE/EEE/MECH/CIVIL/CSE

Subject Code	Offered by Dept.	Interdisciplinary Elective IV	Offered for Dept.
18IET441	MBA	Project Management	ECE/EEE/CIVIL/CSE/IT
18IET442	MBA	Industrial Engineering and Management	MECH
18IET443	MBA	Entrepreneurial Development	ECE/EEE/MECH/ CIVIL/CSE/IT
18IET444	CIVIL	Geographical Information Systems	ECE/EEE/MECH/ CSE/IT
18IET445	EEE	Power quality management	ECE/MECH/ CIVIL/CSE/IT
18IET446	MECH	Fundamentals of ROBOTICS	ECE/EEE/ CIVIL/CSE/IT
18IET447	ECE	Basics of Mobile Communications	EEE/MECH/ CIVIL
18IET448	ECE	Introduction to Wireless Networks	CSE/IT
18IET449	CSE	Introduction to Cloud Computing	ECE/EEE/MECH/ CIVIL/IT
18IET44A	IT	Introduction to DBMS	ECE/EEE/MECH/ CIVIL
18IET44B	IT	Embedded Systems	CSE

LINEAR ALGEBRA AND CALCULUS

Subject Code: 18BST101 **Internal Marks: 40**
Credits: 4.0 **External Marks: 60**

Course Objectives:

- The application of the essential tool of matrices and linear algebra including linear transformation, eigen values, diagonalization and orthogonalization.
- The application of Taylor's and Maclaurin's series to calculate maxima and minima of two variable functions.
- The application of integration to length, surface area and volume.
- The mathematical tools needed in evaluating multiple integrals and their usage.
- The essential tool of vector differentiation to calculate gradient, divergence, curl and apply Green's, Stokes and Gauss Divergence theorems in converting one integral form to another.

Course Outcomes:

The student will be able to:

CO1: To calculate rank, eigen values, eigen vectors of matrices, solve linear system of equations including diagonalization and orthogonalization.
CO2: To estimate maxima and minima of functions of two variables
CO3: To apply single integrals to estimate length, surface area and volume.
CO4: To evaluate multiple integral in both Cartesian and polar coordinates and estimate area and volume.
CO5: To calculate gradient, divergence, curl of a scalar and vector point functions; line, surface and volume integrals and apply Green's, Stokes and Gauss Divergence theorems to convert from single to double or double to triple integrals.

UNIT-I: Matrices

Matrices – Rank - Systems of linear equations - linear dependence and independence –Eigen values, eigenvectors, symmetric, skew-symmetric, orthogonal matrices -Diagonalization.
Vector Space – Basis - Dimension, rank and nullity - Inner product spaces- Gram-Schmidt orthogonalization.

UNIT-II: Differential Calculus

Functions of single Variables: Rolle's, Lagrange's, Cauchy's mean value theorems (without proof) - Taylor's and Maclaurin's Series.
Functions of several Variables: Limits and continuity for two variables - Partial derivative - Total derivative- Taylor's and Maclaurin's Series (without proof) - Maxima, minima of functions without constraints and functions with constraints (Lagrange method of undetermined multipliers).

UNIT-III: Single Integrals:

Definite Integrals, Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian and Polar Coordinates.

UNIT-IV: Multiple Integrals :

Double integral (Cartesian and polar form) -Change of order of integration -Change of variables (Cartesian to polar)- area by double integration. Triple integrals – Change of variables (Cartesian to spherical/cylindrical) - Volume by triple integration.

UNIT-V: Vector Calculus:

Scalar and vector point functions- Vector differentiation - Directional derivatives - Gradient, Curl and Divergence –Vector Integration -Line, Surface, Volume Integrals - Green, Stokes and Gauss divergence theorems (without proofs) .

TEXT BOOKS

1.B.V. Ramana, Higher Engineering Mathematics, 44th Edition, Tata McGraw Hill New Delhi, 2014.
2.Dr.B.S.Grewal, Higher Engineering Mathematics, 43nd Edition, Khanna Publishers, 2015.

REFERENCE BOOKS

1.Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2.G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3.Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4.D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5.N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

CHEMISTRY

(Common to All Branches)

Subject Code: 18BST108 **Internal Marks: 40**
Credits: 4.0 **External Marks: 60**

Course Objectives:

The students will become familiar and understand about:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalise reference electrodes and science of corrosion.
- Rationalise organic reactions such as addition, substitution, elimination, rearrangement reactions and polymerization.
- Distinguish Renewable & Non-Renewable energy resources and rationalise about green chemistry, batteries.

Course Outcomes:

The course will enable the student to:

CO1: Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.

CO2: Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques

CO3: Rationalise reference electrodes and science of corrosion.

CO4: Rationalise organic reactions such as addition, substitution, elimination, rearrangement reactions and polymerization.

CO5: Distinguish Renewable & Non-Renewable energy resources and rationalise about green chemistry, batteries.

UNIT-I:Atomic Structure and Chemical Bonding:

Types of Hybridisation-valency shell electron pair repulsion theory (VSEPR) -Molecular orbital theory(MOT) –Energy Level diagrams of diatomic molecules (O_2, CO) - Atomic and ionic sizes - ionization energies - electron affinity and electronegativity – variable oxidation states - coordination numbers and geometries.

UNIT-II: Spectroscopy:

Spectroscopy - Electronic spectroscopy-types of Electronic transitions and selection rules – Definition of Chromophore – Definition of Auxochrome – Absorption and intensity shifts. Principle of Fluorescence and Phosphorescence. Introduction to I.R. Spectroscopy –Fingerprint region–I.R.Values for Functional groups (-Carbonyl, -alcohol, -nitryle, -amino)- Introduction to NMR – Principle - equivalent and non-equivalent protons - Chemical shift& Splitting – Coupling Constant

UNIT-III: Electrochemistry & Corrosion:

Introduction to Electrochemistry - EMF of the cell or Cell potential-Electrochemical series and its importance–Reference electrodes (SHE and Calomel electrode).

Corrosion (chemical and electrochemical theory of corrosion) –Galvanic series. Factors effecting the rate of corrosion – Controlling of corrosion (Proper designing, Modifying the environment, Cathodic protections – Sacrificial Anodic and Impressed Current Cathodic Protection).

UNIT-IV:Organic Reactions& Introduction to Polymers:

Types of Organic reactions: Addition - electrophilic, nucleophilic and free radical - Substitution - electrophilic, nucleophilic (SN^1 and SN^2) and free radical – Elimination(E_1 and E_2) (E_{CB}- Examples) – Rearrangement Reactions (Claisen, Pinacol pinacolone rearrangement) – Diels-Alder reaction - Isomerism (Cis- Trans)

Definition of Polymer - Polymerisation(Addition and Condensation) – Functionality – Degree of Polymerisation–Classification of Polymers – Zeiglar Natta Catalysis.

UNIT-V: Green Chemistry & Energy:

Introduction to green chemistry – Definition and 12 principles of green chemistry.

Types of energy sources – Renewable & Non-Renewable - Introduction to solar energy – harnessing of solar energy – photo voltaic cells – Concentrated Solar power plants.

Introduction of Energy storage devices: Principle& mechanism of Batteries&Supercapacitors, Types of Batteries (Alkaline & Lead-Acid) - Difference between Batteries and Supercapacitors.

TEXT BOOKS:

1. University chemistry, by B. H. Mahan
2. Elementary organic spectroscopy: principles and applications, by Y. R. Sharma
3. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
4. "Engineering Chemistry", P. C. Jain and Monica Jain, Dhanpat Rai Publications, Co., New Delhi, 2004, 16th Edition

REFERENCE BOOKS:

1. Fundamentals of Molecular Spectroscopy, by C. N. Banwell
2. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
3. Physical Chemistry, by P. W. Atkins
4. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition.
5. Concise Inorganic Chemistry: Fifth Edition by J.D. Lee

BASIC ELECTRICAL ENGINEERING

Subject Code: 18EST101 **Internal Marks: 40**
Credits: 4.0 **External Marks: 60**

Course objectives:

- To introduce the basic knowledge of electric circuits
- To illustrate knowledge with AC circuits.
- To become familiar with DC Machines.
- To understand the concept of transformers.
- To provide knowledge on three phase induction motors.

Course outcomes:

CO1: Able to summarize different electrical circuits.
CO2: Able to outline the basics of AC circuits.
CO3: Able to examine DC Machines.
CO4: Able to demonstrate working of transformers.
CO5: Able to generalize three phase induction motors.

UNIT –I Introduction to Electric Circuits

Basic definitions, Electrical circuit elements (R, L and C), Ohm's Law, voltage and current sources, Series & Parallel circuits, Kirchhoff's Laws, Star-delta and delta-star transformations, simple problems with dc excitation.

UNIT-II AC Circuits

Representation of sinusoidal waveforms, peak and rms values, phasor representation, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series only), real power, reactive power, apparent power, power factor, sample problems.

UNIT-III DC Machines

Generator-Principle of Operation, construction, EMF equation, Classification, O.C.C, internal and external characteristics of shunt generator. Motor-principle of operation, Torque equation, Speed Control Methods, Operation of 3 point starter.

UNIT-IV Transformers

Operation of a Single Phase Transformer, EMF equation, losses, Regulation and Efficiency of a single phase transformer, O.C and S.C Tests. sample problems.

UNIT-V Three Phase induction Motor

Principle of Operation of 3-Φ induction motor, power and torque equations, Speed-Torque Characteristics of 3- Φ induction Motor.

TEXT BOOKS

1. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand& Co.
2. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

REFERENCE BOOKS .

1. Basic Electrical Engineering Dr.K.B.Madhu Sahu scitech publications (india) pvt.ltd.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.

SWITCHING THEORY AND LOGIC DESIGN

Subject Code: 18EET101 **Internal Marks: 40**
Credits: 2.0 **External Marks: 60**

Course Objectives:

- To classify different number systems and apply to generate various codes.
- To use the concept of Boolean algebra in minimization of switching functions
- To design different types of Adders and Subtractors
- To design different types of decoders, encoders, code converters, multiplexers and comparators
- To apply knowledge of flip-flops in designing of Registers and Counters

Course Outcomes:

At the end of the course the student will be able to:

CO1: Solve typical number base conversions and analyze new coding techniques
CO2: Optimize logic gates for digital circuits design
CO3: Understand concepts of Adders and Subtractors.
CO4: Analyze combinational circuits for various digital design applications.
CO5: Develop sequential circuits

UNIT – I

Number systems: Review of Number systems, complements of numbers- r's, r – 1's compliment, BCD, excess-3, self complement codes, 2421, gray code.

UNIT – II

Logic operations: Logic gates, Boolean theorems, complements and dual of logic expressions, standard SOP and standard POS. Minimization of switching functions using theorems, K – map (up to 5-variables).

UNIT – III

Combinational logic circuits-I: Design of half adder, full adder, half subtractor, full subtractor, 4-bit binary adder, 4-bit binary subtractor, BCD adder, carry look ahead adder.

UNIT – IV

Combinational logic circuits-II: Design of decoder, encoder, multiplexer, de-multiplexer, 2-bit comparator and LED seven segment display.

UNIT – V

Sequential logic circuits: Introduction, flip-flops with truth tables and excitation tables. Design of ripple counters, synchronous counters, Johnson and ring counters, Design of shift registers, universal shift register.

TEXT BOOKS:

1. Switching and Finite automata theory – Zvi Kohavi, Tata Mcgraw – Hill, 1978, 2/e.
2. Digital Systems: Hardware Organization and Design, 3rd Edition -Frederick J. Hill, Gerald R. Peterson

REFERENCE BOOKS:

1. Digital design – Moris Mano, PHI, 2/e.
2. Fundamentals of Logic Design – Charles H.Roth Jr, Jaico Publishers.

WORKSHOP AND MANUFACTURING PRACTICE
(Semester-I/II)

Subject Code: 18ESL103 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

COURSE OBJECTIVES:

- The Engineering Workshop Practice for engineers is a training lab course spread over entire semester. The modules include training on different trades like Fitting, Carpentry, Black smithy etc… which makes the students to learn how various joints are made using wood and other metal pieces.

COURSE OUTCOMES:

CO1: Make half-lap, mortise & tenon, corner dovetail or bridle wooden joints.
CO2: Develop sheet metal into objects like square tray, taper side tray, conical funnel or elbow pipe.
CO3: Forge MS rod from round to square cross-section, or into L- or S- bend.
CO4: Fabricate MS pieces into either a straight, square, dovetail or V-fit.
CO5: Connect a staircase or a tube light house-wiring electrical circuit.

I. Wood Working Technology - Familiarity with different types of wood and tools used in wood Working technology.
Tasks to be performed:
1) Half – Lap joint 2) Mortise and Tenon joint
3) Corner Dovetail joint 4) Briddle joint.

II. Sheet Metal Working – Familiarity with different types of tools used in sheet metal working, developments of sheet metal jobs from GI sheets, knowledge of basic concepts of soldering.
Tasks to be performed:
1) Square Tray 2) Taper side Tray
3) Conical Funnel 4) Elbow Pipe.

III. Forging Technology – Familiarity with different types of tools used in forging technology. Knowledge of different types of furnaces like coal fired, electrical furnaces etc...
Tasks to be performed:
1) round M.S rod to square bar 2) L bend in given M.S. Rod.
3) S bend in given M.S. Rod. 4) heat treatment tests like annealing, normalizing etc...

IV. Fitting Technology – Familiarity with different types of tools used in fitting technology.
Tasks to be performed:
1) "V" – fitting 2) square fitting
3) Dovetail fitting 4) Straight fitting

V.HOUSE WIRING
1) Tube light connection
2) Staircase connection

Note: Any two jobs from each trade must be performed by the student.

CHEMISTRY LAB

(Common to All Branches)

Subject Code: 18BSL102 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objectives:

The students will become familiar and understand about:

- Measure molecular/system properties such as kinematic viscosity, acid number of lubricating oil, etc
- Measure molecular/system properties such as surface tension, viscosity, pH, conductance of solutions, redox potentials, etc
- Measure molecular/system properties such as chloride content, hardness of water, dissolved oxygen, iron by colurimeter etc.
- Synthesize a small polymer molecule and analyze a salt sample.
- Estimate iron (by colurimeter), partition coefficient, adsorption of acetic acid by charcoal etc.

Course Outcomes:

The students will learn to:

CO1: Measure molecular/system properties such as kinematic viscosity, acid number of lubricating oil, etc.

CO2: Measure molecular/system properties such as surface tension, viscosity, pH, conductance of solutions, redox potentials, etc

CO3: Measure molecular/system properties such as chloride content, hardness of water, dissolved oxygen, iron by colurimeter etc.

CO4: Synthesize a small polymer molecule and analyze a salt sample.

CO5: Estimate iron (by colurimeter), partition coefficient, adsorption of acetic acid by charcoal etc.

LIST OF EXPERIMENTS: Choice of 10-12 experiments from the following:

1. Determination of surface tension and viscosity
2. Determination of Hardness of water sample by EDTA Method.
3. Conductometric estimation of Acid by Base.
4. Conductometric estimation of mixture of acids by base.
5. Potentiometric Titrations.
6. Synthesis of a polymer/drug.
7. Determination of acid value of an oil
8. Chemical analysis of a salt
9. Determination of Dissolved Oxygen present in the given water sample by Modern Winkler's Method
10. Colurimetric estimation of iron
11. pH metric titrations
12. Determination of the partition coefficient of a substance between two immiscible liquids
13. Adsorption of acetic acid by charcoal Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg
14. Thin layer chromatography.
15. Determination of Chloride content present in given water sample.
16. Determination of kinematic viscosity of given lubricating oil.

TEXT BOOKS:

1. "Practical Engineering Chemistry" by K.Mukkanti, etal. B.S.Publications, Hyderabad (2011).
2. "Lab Manual on Engineering Chemistry" by Sudharani, Dhanpat Rai Publications, Co., New Delhi., (2009).

REFERENCE BOOKS:

1. "Engineering Chemistry Lab Manual" by Shuchi Tiwari (2010), SCITECH Publications.
2. "Vogel's Text Book of Quantitative Chemical Analysis", 6th Edition by G. J. Jeffery, J. Bassett, J. Mendham, R.C. Denney, Longman Scientific & Technical Publications, New York.
3. "A Text Book of Engineering Chemistry" by R. N. Goyal and H. Goel, Ane Books (P) Ltd.(2009).
4. "A Text Book on experiments and calculations Engineering" by S.S. Dara, S.Chand & Company Ltd. (2003).
5. "Instrumental methods of Chemical Analysis", Gurudeep R, Chatwal Sham, K. Anand, Latest Edition (2015), Himalaya Publications.

BASIC ELECTRICAL ENGINEERING LAB

Subject Code: 18ESL101 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objective:
To introduce the student to study different electrical components and to verify the basic laws related to electrical engineering, Speed control of D.C. motor, testing of transformer, electrical wiring system through study, practice, and experiments.

Course Outcomes:

Students will be able to
CO1: Label various types of electrical components.
CO2: Demonstrate various basic electrical laws.
CO3: Demonstrate speed control DC motor & testing of transformer.
CO4: Experiment with lamps.
CO5: Examine electrical wiring system

List of Experiments:
1. Study of electrical components.
2. To verify Ohm's law.
3. To verify (a) Kirchhoff's current law (b) Kirchhoff's voltage law.
4. To verify the total resistance of the series and parallel connected circuits.
5. Find armature resistance, field resistance and filament Lamp Resistance using V-I method.
6. Speed control of D.C. Shunt motor by a) Armature Voltage control b) Field flux control method
7. OC and SC tests on single phase transformer.
8. Fluorescent tube connection.
9. (a) One way control of lamp
   (b) Two way control of lamp
10. Fan wiring.

Additional Experiments:
11. Soldering and bread board precautions.
12. To find voltage current relationship for series RL circuit and determine power factor.

ENVIRONMENTAL SCIENCE
(Common toall Branches)

Subject Code: 18MCT102 **Internal Marks: 40**
Credits: 0 **External Marks: 60**

Course Objectives:

- Memorize the knowledge of environment andstatus of different resources on earth.
- Identify the significance, arrangement, causes of annihilation and conservation of ecosystems andbiodiversity.
- Discriminate causes, effects of a variety of pollutions and suitable control methods.
- Identify the hurdles of sustainable development; evaluate the different environmental managementand legal issues.
- Describe the population growths, health problems andevaluate the environmental assets.

Course Outcomes:

CO1: Recognize and speaks well again on the general issues of environment and know how to conserve resources for better usage.
CO2: Explain and demonstrate the ecosystems setup,assess the magnitude of diversity to upkeep.
CO3: Examine a range of pollutionproblems along with controland their eco-friendlydisposal methods.
CO4: Translate the sustainable development practice through clean development mechanisms.
CO5: Evaluate the changing trends of world population and compile the information in order to document theenvironmental assets.

UNIT – I

Importance of Environmental Studies and Natural Resources: Definition of Environment – Importance - Need for Public Awareness
Forest Resources - Use and over exploitation - deforestation – consequences – casestudy
Water Resources - Use and over utilization - dams - benefits and problems on Tribes andEnvironment
Food Resources – Food security concept - changes caused by agriculture and overgrazing -effects of modern agriculture – fertilizer - pesticide problems - water logging - salinity – conceptof sustainable agricultural methods - case study
Energy Resources - Non-renewable energy resources – coal – crude oil - natural gas - use ofrenewable and alternate energy sources

UNIT – II

Ecosystems: Definition – Structure of ecosystem: producers - consumers – decomposers.Functions of ecosystem: Food chains - food webs - ecological pyramids - Energy flow – Nutrientcycles (Carbon cycle and Nitrogen cycle). Ecological succession
Biodiversity and its conservation: Definition of Biodiversity - Values of biodiversity - Bio-geographical classification of India - Hot Spots of India - Endangered and endemic species of India –Threats to biodiversity - Conservation of biodiversity

UNIT – III

Environmental Pollution: Definition – causes - effects - control measures of Air pollution -Water pollution - Noise pollution – Marine Pollution - Nuclear hazards.

Solid waste Management: Causes - effects - disposal methods of urban waste – biomedicalwastes - case studies

Disaster management: floods – earthquakes – cyclones

UNIT – IV

Social Issues and the Environment: Concept of Unsustainable and Sustainable development – Water conservation: Rain water harvesting- Watershed management - Globalenvironmental challenges: climate change - global warming – acid rains - ozone layer depletion -World summits on environment: Stockholm conference – Rio-earth summit – Kyoto protocol – Environment (Protection) Act - Air (Prevention and Control ofPollution) Act – Water (Prevention and control of Pollution) Act - Wildlife (Protection) Act -Forest (Conservation) Act

UNIT – V

Human Population and the Environment: Population growth patterns - variation amongnations - Population problems - control -Environment and human health - Role of informationTechnology in Environment and human health

TEXT BOOKS:

1. Shashi Chawla. 2015, *A Text book of Environmental Studies*, Revised edition, TMH, New Delhi
2. Bharucha, E. 2005, *Text book of Environmental Studies*, First edition, Universities Press (India) Pvt. Ltd., Hyderabad
3. Suresh K. Dhameja. 2006-07, *Environmental Studies*, Third revised edition, S.K. Kataria & Sons (P) Ltd., New Delhi
4. Benny Joseph. 2015, *Environmental Studies*, Revised edition, TMH, New Delhi

REFERENCE BOOKS:

1. Odum, E.P, *Fundamentals of Ecology*, Third edition, W.B. Saunders & Co (P) Ltd., Philadelphia.
2. P. D. Sharma, *Ecology and Environment*, Revised edition, Rastogi Publications (P) Ltd.
3. Cunningham, W.P., Cunningham, M.A., *Principles of Environmental Science*, TMH, New Delhi.
4. Peavy, Rowe and Tchobanoglous, *Environmental Engineering*, Mc Graw – Hill Internationaledition.
5. Graedel, T.E., Allenby, B.R., *Industrial Ecology and Sustainable Engineering*, PearsonPublications.

ENGLISH

Subject Code: 18HST101 **Internal Marks: 40**
Credits: 2.0 **External Marks: 60**

Course Objectives

- To enable students build vocabulary appropriate to their levels and to make students understand printed texts of different genres
- To enhance basic writing skills of the students in different forms of written communication
- To assist students implicitly synthesize the rules of grammar for the production of accurate sentences
- To aid students acquire appropriate and adequate letter writing skills
- To get students produce written texts using appropriate vocabulary and expression, coherence devices and logical arguments

Course Outcomes

CO1: Students will be able to comprehend printed texts of different genres more easily and they will be able to make appropriate word choice.
CO2: Students will be able to write short texts masterly.
CO3: Students will be able to construct grammatically correct sentences.
CO4: Students will be able to communicate through letters and emails effectively.
CO5: Students will be able to comprehend unfamiliar passages, and will be able to write précis and essays.

Course Syllabus

UNIT–I: *Father's Help* by R K Narayan
Vocabulary Building: Word Formation—Root Words—Prefixes and Suffixes—Synonyms and Antonyms—Idioms —Phrasal Verbs—One-word Substitutes—Standard Abbreviations

UNIT–II: *My Early Days* by A P J Abdul Kalam
Basic Writing Skills: Tense— Voice— Reported Speech—Degrees of Comparison —*If* Clauses— Simple, Compound, Complex Sentences—Punctuation—Correction of Sentences

UNIT–III: *Politics and the English Language* by George Orwell
Identifying Common Errors in Writing: Subject-Verb Agreement—Noun-Pronoun Agreement—Misplaced modifiers—Articles—Prepositions—Redundancies—Clichés

UNIT–IV: *Sacrifice* by Rabindranath Tagore
Writing Practice: Letter Writing—Email Writing

UNIT–V: *Stopping by Woods on a Snowy Evening* by Robert Frost
Writing Practice: Comprehension—*Précis Writing*— Essay Writing

Suggested Readings:

On Writing Well. William Zinsser. Harper Resource Book. 2001
Practical English Usage. Michael Swan. Oxford University Press. 1995.
Remedial English Grammar. F.T. Wood. Macmillan. 2007.
Step by Step. K. Nirupa Rani and others. Pearson. Delhi. 2013.
Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

DIFFERENTIAL EQUATIONS AND TRANSFORM THEORY
(For ECE & EEE)

Subject Code: 18BST102 **Internal Marks: 40**
Credits: 4.0 **External Marks: 60**

Course Objectives:

- The application of the effective mathematical tools for the solutions of differential equations that model physical processes.
- To develop the tool of Fourier series for learning advanced Engineering mathematics.
- The mathematical tool of Fourier transforms their properties and applications.
- The mathematical tool of Laplace transform, their properties and application to solve an ordinary differential equations (I.V.P or B.V.P).
- The mathematical tool of Z- transform, their properties and implementation.

Course Outcomes:

The student will be able to:

CO1: To evaluate higher order homogenous and non-homogeneous linear differential equations using different methods.

CO2: To estimate a Fourier series/ Fourier sine series/ Fourier cosine series expansion of different functions.

CO3: To evaluate Fourier transform/ Fourier sine(cosine) Transform/ inverse Fourier transform/ inverse Fourier sine(cosine) transform of different functions.

CO4: To evaluate Laplace transform and inverse Laplace transform of different functions utilizing different properties.

CO5: To evaluate Z-transform and inverse Z- transform of different functions utilizing different properties.

UNIT-I : Ordinary Differential equations:

Linear - Bernoulli – Exact - Equations reducible to exact.- Higher order homogenous and non-homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type $\sin(ax+b)/\cos(ax+b)$, x^m, e^{ax} , e^{ax} $V(x)$ - Method of variation of parameters

UNIT-II: Fourier Series:

Fourier Series -Even and odd functions– Fourier series of functions defined in the interval $(0, 2\pi)$, $(-\pi, \pi)$, $(0, 2c)$,$(-c,c)$ - Half range Fourier sine and cosine series.

UNIT-III: Fourier Transforms

Fourier Integral Theorem (without proof)- Fourier sine and cosine integrals –complex form of Fourier Integral - Fourier transform – Fourier sine and cosine transforms – properties - Inverse Fourier, sine and cosine transforms - properties – Convolution Theorem.

UNIT-IV: Laplace Transforms

Laplace Transform - Properties - Laplace transform of derivative, integrals, multiplication by t^n and division by t – Unit step and unit impulse function - Inverse Laplace transform – Evaluation by partial fractions, convolution theorem - Applications of Laplace transform's to ordinary differential equations.

UNIT-V: Z- Transforms:

Z-transform – Linear property – Damping rule – Shifting rule – Initial and final value theorems- Z transforms of functions multiplied and divided by n - Inverse Z-Transforms by basic formulae, Partial fractions, Convolution theorem.

TEXT BOOKS

1. B.V.Ramana, Higher Engineering Mathematics, 44th Edition, Tata McGraw Hill New Delhi,2014.
2. Dr.B.S.Grewal, Higher Engineering Mathematics, 43nd Edition, Khanna Publishers, 2015.

REFERENCE BOOKS

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008

APPLIED PHYSICS
(Common for EEE, ECE, CSE & IT)

Subject Code: 18BST106 **Internal Marks: 40**
Credits: 4.0 **External Marks: 60**

COURSE DESCRIPTION:
This course encompass Fundamental Concepts of Physics that include

- Wave Optics
- Fiber Optics
- Modern Physics
- Electro Magnetic Theory
- Semiconductor Physics

that are inevitable for any Engineering student so that these prerequisites aid the student to readily understand Day to Day Engineering Problems with Pragmatic Approach.

COURSE OBJECTIVES

- To realize the principles of optics in designing optical devices
- To comprehend the Principles of Fiber Optics
- To define the shortcoming of classical physics and describe the need for modifications to classical theory
- To analyze the interaction of electromagnetic fields
- To understand the properties and importance of materials based on band diagrams

COURSE OUTCOME

Will be able to

CO1 Apply the principles of optics in designing optical devices
CO2 outline the Principles of Fiber Optics
CO3 resolve the discrepancies in classical estimates through quantum principles
CO4 Analyze the interaction of electromagnetic fields.
CO5 Summarize the characteristics of semiconductor materials.

UNIT- I: WAVE OPTICS

- **Interference** - Introduction, Huygen's Principle, Principle of Superposition of Waves, Interference of Light by Division of Wavefront – Young's Double Slit Experiment, Interference of Light by Division of Amplitude - Newton's Rings under Reflected Light
- **Diffraction** - Introduction, Fraunhofer Diffraction due to Single Slit – Fraunhofer Diffraction due to Double Slit, Diffraction Grating

UNIT-II: Fiber Optics

- **Principles of Optical Fiber** - Introduction, Optical Fiber Construction, Principle of Optical Fiber – Total Internal Reflection, Conditions for Light to Propagate - Numerical Aperture and Acceptance Angle
- **Types of Fibers** - Differences between Step Index Fibers and Graded Index Fibers, Differences between Single Mode Fibers and Multimode Fibers, Fiber Optic Communication System and Applications

UNIT-III: Modern Physics

- **Quantum Mechanics** - Wave Particle Duality, De-Broglie Hypothesis of Matter Waves, Heisenberg's Uncertainty Principle, Physical Significance of Wave Function
- **Review of Quantum Theory:** Planck's Hypothesis**,** Schrödinger Time independent wave equation and Particle in One Dimensional Potential Box

UNIT-IV: Electromagnetic Theory

- **Electromagnetism –** Concept of Electric Field, Point Charge in Electric Field, Gauss Law and it's Applications, Magnetic Field - Magnetic Force on Current Carrying Coil
- **Magnetostatics –** Ampere's Law, Biot-Savart Law, Faraday's Law of Induction, Lenz's Law, Maxwell's Equations and Applications

UNIT-V : Semiconductors Physics

- **Introduction** - Intrinsic and Extrinsic Semiconductors, Dependence of Fermi Level on Carrier Concentration and Temperature, Diffusion and Drift Currents, Direct and indirect Band Gap Semiconductors
- **Applications –** Hall Effect –Mobility, Sign of Charge Carriers, Conductivity, Resistivity and Continuity Equation

TEXT BOOKS

1. A Textbook of Engineering Physics, M N Avadhanulu & P G Kshirsagar, S.Chand Publishers
2. Fundamentals of Physics by Resnick, Halliday and Walker
3. Modern Physics by Arthur Beiser

REFERENCES BOOKS

1. University Physics by Young and Freedman
2. Solid State Physics by S. O. Pillai, New Age International Pubishers
3. Engineering Physics, Volume-I&II, P.K.Palani Swamy, Scitech Publications Hyderabad
4. Engineering Physics Volume I&II Dr.K.Vijaykumar, S.Chand Publishing Company, New Delhi
5. Engineering Physics Dr. S. Mani Naidu, Pearson Publications Chennai

PROGRAMMING FOR PROBLEM SOLVING

(Common to all Branches)

Subject Code: 18EST102 **Internal Marks: 40**
Credits: 3.0 **External Marks: 60**

Course Objective

The course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Outcomes

CO1: Understand the fundamentals of C programming
CO2: Choose the loops and decision making statements to solve the problem
CO3: Make use of pointers to access arrays, strings and implements different operations on arrays, and work with textual information, characters and strings.
CO4: Apply programming to write modular programs, user defined functions to solve real time problems and allocate memory using dynamic memory management functions.
CO5: Create user defined data types including structures and unions to solve problems and implement file operations in C programming for a given application.

UNIT - I

Introduction to Programming : Introduction to components of Computer system, Algorithm, Flow chart, Program development steps, C Tokens, Structure of C program, Basic I/O statements, Operators, Operator precedence.

UNIT - II

Control Structures: Decision statements: if, if-else, nested if and switch, **Iterative statements:** for, while, do while and nested loops **Branching:** Break, continue, goto.

UNIT - III

Arrays: Definition, Types: 1D, Multi Dimensional arrays, declaration, initialization, accessing elements, Matrix operations and String Handling.
Functions: Definitions, Declaration, Types of Functions, Parameter passing, Passing Arrays to functions, Recursion, library functions and Storage classes,

UNIT - IV

Pointers: Definition, Declaration, Initialization, Pointer arithmetic, Pointer to pointer, functions and pointers, arrays and pointers, Dynamic memory allocation

UNIT - V

Structures: Definition, Declaration, Accessing the structure elements, Array of structures, Arrays with in structures, pointer to structure, passing structure to function, nested structures, and unions.
Files: Definition, types of files, Opening modes, file IO Functions, Random access functions, Preprocessor directives.

TEXT BOOKS

1. B. W Kernighan, Dennis M. Ritchie. The C – Programming Language. 2nd Edition, PHI.
2. A Structured Approach Using C by Behrouz A. Forouzan, Richard F. Gilberg 3rd Edition

REFERENCES

1. Yashwant Kantikar. 2012. Let Us C, 8th Ed. PBP Publications.
2. E. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.
3. https://www.tutorialspoint.com › Cprogramming › C – Home
4. https://www.programiz.com/c-programming

ELECTRIC CIRCUIT THEORY

Subject Code: 18EET102 **Internal Marks: 40**
Credits: 2.0 **External Marks: 60**

Course objectives:

- To introduce electric circuits and its analysis
- To become familiar about resonance.
- To impart knowledge on solving circuits using network theorems for D.C circuits.
- To impart knowledge on solving circuits using network theorems for A.C circuits.
- To provide knowledge on three phase circuits.

Course outcomes:

CO1: Able to estimate different electrical circuits.
CO2: Able to summarize resonance.
CO3: Knows how to apply theorems to DC circuits.
CO4: Knows how to apply theorems to AC circuits.
CO5: Able to generalize three phase circuits.

UNIT I:

Circuit Analysis: Basic definitions, voltage and current sources, Independent and dependent sources; **:** Capacitor, Integral Voltage-current relationship, energy stored in a capacitor; The inductor, integral voltage-current relationship, energy stored in an inductor; Inductance and Capacitance combinations-inductors in series and parallel; Capacitors in series and parallel; Source transformations , Nodal Analysis, Super node; Mesh analysis, super mesh-Problems.

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UNIT II:

Resonance: Resonance-series, parallel circuits, concept of band width and Q factor - Locus diagrams - series R-L, R-C, R-L-C and parallel combination with variation of various parameters.

UNIT III:

Network theorems – I: Superposition,Thevenin's, Norton's and Reciprocity Theorems for D.C and sinusoidal excitations(for independent and dependent sources).

UNIT IV:

Network theorems –II: Maximum Power Transfer,Millman's, Tellegen's, and compensation Theorems for D.C and sinusoidal excitations(for independent sources).

UNIT-V:

Three Phase Circuits: Three phase circuits: Phase sequence- Star and delta connection-Relation between line and phase voltages and currents in balanced systems-Analysis of balanced three phase circuits Measurement of Active and Reactive power in balanced three phase systems. Analysis of Three Phase unbalanced circuits-Loop Method- Application of Millman's Theorem.

TEXT BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,Mc Graw Hill Company,6 th edition
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd.
3. Fundamentals of Electrical circuits by Charles K.Alexander , Matthew N.O Sadiku.

REFERENCE BOOKS:

1. Circuit theory Analysis & Synthesis by Chakrabarti, Dhanpat Rai Publishing Company (P) Ltd.
2. Network Analysis by N.C.Jagan, C.Lakshmi Narayana BS publications 2nd edition.
3. Electric circuits in SI units by Joseph A Edminister, MSE, 1st Edition
4. Electrical Circuits by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill

ENGINEERING GRAPHICS AND DESIGN

(Semester I/II)

Subject Code: 18ESL104 **Internal Marks: 40**
Credits: 02 **External Marks: 60**

COURSE OBJECTIVES:

- Able to develop drawing skills.
- To draw orthographic views from the given isometric view and vice verse
- To understand the fundamentals of computer aided design and drafting

COURSE OUTCOMES:

CO1: Draw projection of points and straight lines in first angle projection.
CO2: Project plane surfaces and simple solids inclined to one reference plane.
CO3: Convert orthographic views into isometric projections and vice-versa.
CO4: Draw basic lines and profiles with commonly used operations in drafting software.
CO5: Generate 2D drawings along with dimensioning in drafting software.

LIST OF EXERCISES:

PART-A: Conventional Engineering drawing

1 Projections of points
2 Projections of straight lines inclined to one reference plane only.
3 Projections of planes inclined to one reference plane only.
4 Projections of simple solids inclined to one reference plane only.
5 Conversion of isometric views into orthographic views
6 Conversion of orthographic views into isometric views.

PART-B: Basic Computer aided engineering drawing (2-D drawings)

1. Commands – Axes, Coordinate points, Creation of lines, Polylines, Square, Rectangle, Polygons, Spines, Circles, Ellipse, Text.
2. Move, Copy, Offset, Mirror, Rotate, Trim, Extend, Break, Chamfer, Fillet, Curves.

Note: Six Exercises are to be completed by using AutoCAD software

TEXT BOOKS:

1. Engineering Drawing, N. D. Bhatt, V. M. Panchal, Charotar Pub.
2. Engineering Drawing, K. L .Narayana, P.Kanniah, Scitech Pub.

REFERENCE BOOKS:

1. Engineering Drawing and Graphics, 2nd ed., K. Venugopal, New Age International Pub.
2. Fundamentals of Engineering Drawing, 11th ed., Luzadder, J. Warren, D.M. Jon, Prentice Hall India Pub.

LANGUAGE PROFICIENCY LAB

Subject Code: 18HSL101 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objectives

- To enable students develop neutralized accent
- To assist students utter words intelligibly
- To help students converse aptly as the context demands
- To get students acquire perceptive abilities in professional conversations
- To aid students grasp and interpret information provided in graphs and tables

Course Outcomes

CO1: Students will be able to recognize differences among various accents and speak with neutralized accent.
CO2: Students will be able to pronounce words accurately with the knowledge of speech sounds and use appropriate rhythm and intonation patterns in speech.
CO3: Students will be able to generate dialogues for various situations.
CO4: Students will be able to communicate perceptively and concisely.
CO5: Students will be able to comprehend and interpret data provided in graphs and tables.

Course Syllabus

Unit I: Listening Comprehension of Audio and Video clips of different accents
Unit II: Pronunciation—Intonation—Stress—Rhythm
Unit III: Situational Dialogues
Unit IV: Poster Presentation
Unit V: Interpretation of Data in Graphs and Tables

Suggested Readings:

Communication Skills. Sanjay Kumar and Pushpa Lata. OUP. 2011.
Practical English Usage. Michael Swan. OUP. 1995.
Speak Well. K. Nirupa Rani. Orient Blackswan, Hyderabad. 2012.
Strengthen Your Communication Skills. M. Hari Prasad. Maruthi Publications, Hyd. 2014.
Strengthen Your Steps. M. Hari Prasad. Maruthi Publications, Hyderabad. 2012.
Technical Communication. Meenakshi and Sangeetha. OUP. New Delhi. 2013.

PHYSICS LAB
(Common for all Branches)

Subject Code: 18BSL101 **External Marks: 60**
Credits: 1.5 **Internal Marks: 40**

Course Description:

This Laboratory course is intended to apply the scientific method to expedite experiments the include

- Error analysis
- Waves Fundamentals
- Wave Optics
- Lasers and Fiber Optics
- Semiconductor devices

So that student can verify theoretical ideas and concepts covered in lecture through host of analytical techniques, statistical analysis and graphical analysis.

Course Objectives:

- To operate optical systems and design Instrumentation with precision measurements to estimate error for targeted accuracy
- To Interpret the results of mechanical parameters such as modulus of elasticity and acceleration due to gravity through simple oscillatory experiments using torsional pendulum or physical pendulum
- To understand the phenomenon of Interference and Diffraction using Travelling Microscope and Spectrometer.
- To attain ability to use Techniques and Skills associated with Modern Engineering Tools such as Lasers and Fiber Optics
- To characterize semiconducting material devices.

Course Outcomes:

Will be able to

CO1 demonstrate the ability to measure properties of optical systems and design instrumentation with precision measurements to estimate error for targeted accuracy

CO2 infer the results of mechanical parameters such as modulus of elasticity and acceleration due to gravity through simple oscillatory experiments using torsional pendulum or physical pendulum

CO3 Apply the knowledge of Optics to calculate geometrical parameters of thickness of thin object and radius of curvature of a lens

CO4 illustrate techniques and skills associated with Modern Engineering Tools such as Lasers and Fiber Optics

CO5 evaluate characteristics of semiconducting material devices.

LIST OF EXPERIMENTS

1. Precision Measurements and Instruments
2. Error Analysis and Graph Drawing
3. Determination of Rigidity Modulus of the Material of Wire using Torsional Pendulum
4. Determination of Acceleration due to Gravity (g) using Compound Pendulum
5. Newton's Rings – Determination of the Radius of Curvature of a given Plano Convex Lens
6. Determination of Thickness of Thin Object using Wedge Method
7. Determination of Wavelength of Monochromatic Source using LASER Diffraction
8. Determination of width of a single slit using LASER
9. Determination of Numerical Aperture and Bending Loss of an Optical Fiber
10. Determination of Energy Band Gap using the given Semiconductor

Manual / Record Book

1. Manual cum Record for Engineering Physics Lab, by Prof. M. Rama Rao, Acme Learning.

2. Lab Manual of Engineering Physics by Dr.Y. Aparna and Dr. K. Venkateswara Rao (VGS books links, Vijayawada)

PROGRAMMING FOR PROBLEM SOLVING LAB
(Common to all branches)

Subject Code: 18ESL102 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objectives:
- To gain experience about structured programming
- To help students to understand the implementation of C language
- To understand various features in C

Course Outcomes:
At the end of the course students will be able to

CO1: Solve the given problem using the syntactical structures of C language.
CO2: Design programs involving decision structures and loops.
CO3: Apply programming to solve different operations on arrays and strings.
CO4: Develop modularity concept using functions and write programs for allocating memory dynamically.
CO5: Construct C program that uses structures and unions and implement file operations on given application.

List of Experiments

1. Write the C programs to calculate the following
   a) Area of triangle when sides are given.
   b) Program for Type Casting.
   c) Interchanging values of two variables.

2. Write the C programs to perform the following
   a) Read lower case character and convert into upper case.
   b) Find maximum of 3 values using conditional operator.
   c) Calculate area and perimeter of circle.

3. Write C programs for the following using decision making statements
   a) Program to find roots of quadratic equation.
   b) Find the Largest among 3 values.
   c) Calculate the grades of a student.

4.
   a) Arithmetical operations using switch-case.
   b) Read a number and display in reverse.
   c) Check for Armstrong number property

5.
   a) Check for strong number property
   b) Generate Fibonacci series.
   c) Generate Prime numbers between two numbers.

6. Implement the following using arrays
   a) Largest and smallest from a list of elements.
   b) Program for Linear Search.
   c) Program for Bubble Sort.

7. Implement the following using arrays
   a) Matrix addition.
   b) Matrix Multiplication.
   c) Program using string handling functions.

8. Implement C Program using any Numerical methods

9. a) Factorial using recursion and non recursion.
   b) GCD using recursion and non recursion.

10. a) Find the sum and average of list of elements using DMA Functions
    b) Implementation of call by reference and call by valve.

11. a) Implementation of array of structure.
    b) Demonstration of Union.

12. a) Copy the contents of one file into another.
    b) Count the number of characters, words and lines in a file.

TEXT BOOKS

1. B. W Kernighan, Dennis M. Ritchie. The C – Programming Language. 2nd Edition, PHI.
2. A Structured Approach Using C by Behrouz A. Forouzan, Richard F. Gilberg 3rd Edition

REFERENCES

1. Yashwant Kantikar. 2012. Let Us C, 8th Ed.. PBP Publications.
2. E. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.
3. https://www.tutorialspoint.com › Cprogramming › C – Home
4. https://www.programiz.com/c-programming

CONSTITUTION OF INDIA

Subject Code: 18MCT203 **Internal Marks: 0**
Credits: 0 **External Marks: 0**

Course Objectives:

1. To help Students regulate their behavior in a social environment as Engineering Professionals.
2. To make students aware of the impact of taking social, legal and Administrative decisions about their profession.
3. To understand the political and constitutional parameters in work environment.
4. To understand the need and strengths of our nation and adopt their knowledge for future career.

Course Outcomes: By the end of this course the student will be able to:

CO 1: Realize the rigidness of our Indian Politics and Administrative aspects.
CO 2: A Student can understand our nation federalism.
CO 3: Can assess different types of risks involved in misadministration.
CO 4: Can create competitive advantage.
CO 5: Summarizes the legal, Administrative, Political and Financial aspects for betterment of the National building.

Unit – I

INTRODUCTION:

Historical perspective of the constitution of India - Salient features of The Indian Constitution - Amendment Procedure of The Indian Constitution.42nd amendment (Mini Constitution) - 44th amendment (1978 – Janatha Govt.)

Unit – II

IMPORTANT FEATURES OF CONSTITUTION:

Fundamental Rights(Article 12 to 35), Duties (51 A – 1976 emergency) and Directive principles (Article 36 to 51) of State Policy - Articles 14 to 18 - Articles 19 - Article 21

Unit – III

PARLIMENTARY FORM OF GOVT. IN INDIA:

President of India - Emergency provisions -National Emergency – Article 352 President Rules – Article 356 - Financial Emergency – Article 360 Prime Minister and Cabinet - Supreme Court of India (Indian Judiciary).

Unit – IV

INDIAN FEDERALISM:

Union – State relations; - Legislative , Administrative and Financial relations. Local self Govt. – Constitutional Schemes in India (73 & 74 Constitutional amendments)

Unit – V

PARLIMENTARY COMMITTEES:

Public Accounts Committee - Estimates Committee - Committee on Public Undertakings. - Election commission of India (Article -324) - Comptrollar and Auditor General (CAG) of India (Article – 148 to 150) - Finance Commission (Article – 280) - Neethi Aayog (Planning Commission) and - Political Parties.

Text Books: 1) D.D Basu – Indian Constitution.
2) Dr. D. Surannaidu – Indian Political System.
3) Madhav Khosla – The Indian Constitution.

COMPLEX VARIABLES AND STATISTICAL METHODS

Subject Code: 18BST204 **External Marks: 60**
Credits: 3 **Internal Marks: 40**

COURSE OBJECTIVES

- Test if a function is analytic, harmonic and then construct a harmonic conjugate function.
- Evaluate integrals using the Cauchy Integral theorem and identify singular points of a function then calculate residues using Residue Theorem.
- Understand the concept of sampling theory and perform t –test, z test, Chi-square test.
- Analyze the testing of hypothesis by t-test, z-test, Chi-square test. .
- Understand curve fitting and calculations of correlation coefficients and regression coefficients

COURSE OUTCOMES

On completion of this course, students will be able to

- Construct a harmonic and conjugate harmonic function.
- Evaluate integrals using the Cauchy Integral formulae and identify singular points of a function then calculate residues using Residue Theorem.
- Execute Central limit theorem for Sampling Distributions and perform t –test, z test, Chi-square test.
- Test for sampling distributions of one mean, two means and their difference at α level of significance.
- Estimate a curve for the give data, calculate correlation coefficients and regression coefficients.

UNIT-I
Complex Functions
Functions of a complex variable- analyticity and its properties -Cauchy-Reimann equations in Cartesian and polar coordinates (without proof). Harmonic and conjugate harmonic functions-Milne-Thompson method.

UNIT-II
Complex Integral formula and Residues
Cauchy's integral theorem (without proof)-Cauchy's integral formula (without proof)-Generalized Cauchy's integral formula (without proof).
Laurent's Theorem (without proof), Singularity-types of singularity (isolated, essential, removable pole) – residue –calculation of residues – residue theorem (without proof) and its applications.

UNIT-III
Sampling Theory
*Discrete Random Variables- *Binomial –Possion's distributions – Continuous random variable – Normal distribution.
Introduction to Sampling Theory -Population and Samples –Sampling distribution of means (σ known and σ unknown)- central limit theorem- t –test, z-test, Chi-square test.

* Not to be examined

UNIT-IV

Tests of Hypothesis

Hypothesis-null and alternative hypothesis – type-I and type-II error –level of significance –one tail and two tail test – testing concerning one mean, two means, their differences.

UNIT-V

Curve fitting and Correlation

Curve fitting: Straight line, 2^{nd} degree parabola, power curve ($y=ax^b$), exponential curves($y= ab^x$, $y = ae^{bx}$). Concept of correlation–types of correlation-Karl-Pearson correlation coefficient method and its properties-Rank Correlation coefficient. Regression-Linear regression and its properties

Text Books:

1. Complex Analysis And Statistical Methods, T.K.V.Iyengar, B.Krishna Gandhi and Others, S.Chand & Company.
2. Probability and Statistics for Engineers, Miller and John E.Freund, Prentice Hall of India
3. Higher Engineering Mathematics B.S.Grewel.

Reference Books:

1. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt.Ltd.
2. Probability and Statistics , Athanasios-Papoulis-Pearson education.

ELECTROMAGNETIC FIELD THEORY

Subject Code: 18EET203 **Internal Marks: 40**
Credits: 3 **External Marks: 60**

Course Objective:

- Will be able to state and apply the Coulombs Law and Gauss's law to find the Electric filed intensity.
- Will compute capacitance of different configurations and to analyze the behavior of dielectrics at different boundary conditions.
- Will have ability to state and apply the Biot-Savart law and Ampere's circuit law to find the Magnetic field intensity.
- Will gains the knowledge on applying Lorenz force equation and determination of self inductance and mutual inductances for different configurations.
- Will list the Faraday's laws and to Modify the Maxwell's equations for time varying fields.

Course Outcomes:

CO1: Able to state and apply the Coulombs Law and Gauss's law to find the Electric filed intensity.
CO2: To compute capacitance of different configurations and to analyze the behavior of dielectrics at different boundary conditions.
CO3: ability to state and apply the Biot-Savart law and Ampere's circuit law to find the Magnetic field intensity.
CO4: Gains the knowledge on applying Lorenz force equation and determination of self inductance and mutual inductances for different configurations.
CO5: To list Faraday's laws and to Modify the Maxwell's equations for time varying fields.

UNIT I:
Fundamentals of electrostatics and its applications: Co-ordinate system-Cartesian, cylindrical, spherical-differential length-area -volume in these co-ordinate systems-importance of divergence, curl, grad and Laplacian. Electrostatic fields- coulomb's law-Electric field intensity- electric field intensity due to a line and a surface charge- Gauss law in integral and point form- applications of Gauss law- Maxwell's first law-work done in moving a point charge in an electric field- potential gradient.

UNIT II:
Conductors, Dielectrics and Capacitors: Current density- conduction and convention current density- ohm's law in point form-current continuity equation-conductors and dielectric material- behavior of conductors in an electric field- boundary conditions- -Electric dipole- Dipole moment- capacitance- capacitance of parallel plate, spherical and co-axial capacitors - Laplace and Poisson's equations.

UNIT III:

Magnetostatics: Static magnetic fields- Biot-savart's law- Oersted' experiment-magnetic field intensity(MFI)- MFI due to a straight current carrying filament- MFI due to circular - Maxwell's second equation div(B)=0- Ampere's circuital law and its applications- MFI due to infinite sheet of current and a long current carrying filament- point form of Ampere's circuital law- Maxwell's third equation curl(H)=J.

UNIT IV:

Magnetic materials and Inductance: Magnetic force- moving charges in a Magnetic field- Lorentz force equation- force on straight and long current carrying conductor in a magnetic field- force between two straight, long and parallel current carrying conductors- magnetic dipole and dipole moment-torque on current loop placed in a magnetic field- self inductance of a solenoid, toroid and co-axial cable.

UNIT V:

Electromagnetic waves and Time varying fields: Time varying fields- Faraday's laws of electromagnetic induction- Its integral and point forms- Maxwells fourth equation–statically and dynamically induced EMF'S- simple problems- modification of Maxwell's equation for time varying fields-Displacement current-poynthing theorem and pointing vector.

TEXT BOOKS:

1. Engineering Electromagnetics, W.H. Hayt Jr. McGraw Hill – New York .
2. Elements of Electromagnetics, M.N.O. Sadiku, Oxford press, 2002.

REFERENCE BOOKS:

1. EM Waves and Radiating Systems, E.C. Jordan, PHI, 1997.
2. Electromagnetics with applications, Kraus and Fleisch, McGraw Hill, 1999.
3. Introduction to Electro-dynamics, David J.Griffiths, PHI.

NETWORK ANALYSIS AND SYNTHESIS

Subject Code: 18EET204 **Internal Marks: 40**
Credits: 4 **External Marks: 60**

Course Objective:

- To impart knowledge on two port networks.
- To analyze D.C transient analysis.
- To analyze A.C transient analysis.
- To outline Causality, stability, Hurwitz and Routh's criterion.
- To design Foster forms, Cauer forms.

Course Outcomes:

CO1: Able to describe Two Port Networks and Ladder Networks.
CO2: Knows how to analyze a given DC transient circuits
CO3: Knows how to analyze a given AC transient circuits.
CO4: Gains knowledge on causality, stability, Hurwitz and Routh's criterion.
CO5: Knows how to synthesis networks.

UNIT I:

Two Port Networks: Two port network parameters – Z, Y, ABCD (transmission) and hybrid parameters and their relations, inverse of transmission & Hybrid parameters, Series and parallel two-Port Networks.

UNIT II:

D.C Transient Analysis: Transient response of R-L, R-C & R-L-C series circuits for D.C excitation-Initial conditions-solution method using differential equation and Laplace transforms, Response of R-L & R-C & R-L-C networks to pulse excitation.

UNIT III:

A.C Transient Analysis: Transient response of R-L, R-C & R-L-C series circuits for sinusoidal excitations-Initial conditions-Solution method using differential equations and Laplace transforms.

UNIT IV:

Synthesis-I: Introduction,Causality and stability, Hurwitz polynomial,Routh's criterion,Positive real functions,Sturm's theorem,Elementary synthesis procedures.

UNIT V:

Synthesis-II: L-C Immittance functions(Foster form-1,Fosterform-2 , First Cauer form, Second Cauer form), R-C Impedance functions(Cauer forms of RC networks), R-L Impedance or R-C Admittance functions(Cauer forms of R-L Impedance or R-C Admittance), Problems.

TEXT BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,Mc Graw Hill Company,6 th edition .
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd.
3. Circuit theory Analysis & Synthesis by Chakrabarti, Dhanpat Rai Publishing Company (P) Ltd.

REFERENCE BOOKS:

1. Network Analysis by N.C.Jagan, C.Lakshmi Narayana BS publications 2nd edition.
2. Electric circuits in SI units by Joseph A Edminister, MSE, 1st Edition.
3. Electrical Circuits by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill.
4. Electrical Circuits by Sreenivasulu.N, Reem Publications.

ELECTRONIC DEVICES AND CIRCUITS

Subject Code : 18EET205 **Internal Marks:40**
Credits:3 **External Marks:60**

Course Objectives:

- To study semiconductor physics, junction diode characteristics, special diodes,
- To design of rectifiers, filters
- To learn about transistors, FETs, transistor biasing, application of transistors.
- To know the concepts of oscillator circuits.

Course Outcomes:

CO1: Ability to analyze the structure of different types of semiconductor devices and ability to design rectifiers and filters.
CO2: Ability to understand the operation of transistor and their characteristics for different configurations, characteristics of JFET, MOSFET.
CO3: Ability to understanding biasing techniques.
CO4: Ability to analyze transistor amplifiers.
CO5: Ability to analyze the operation of oscillators

UNIT I:

Diode Characteristics: Formation of PN junction diode, V-I Characteristics of Diode, Diode current equation, Diode as a switch, Zener Diode Characteristics, Zener Diode as Voltage Regulator, Tunnel diode, LED.

UNIT II:

Rectifiers and Filters: Half wave rectifier, Full wave rectifier, Ripple factor, Efficiency, TUF Advantages of full wave rectifier over Half Wave rectifier, Rectifiers with C- Filter, Inductor filter, LC- Filter.

UNIT III:

Transistor Characteristics: Bipolar Junction Transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between α,β,γ. Characteristics of JFET, MOSFET (Enhancement and depletion),Characteristics of UJT

UNIT IV:

Transistor Biasing and Stability: Need for biasing, DC & AC load line, criteria for fixing the operating point, thermal run away, Types of biasing and its stability, Thermal stability, stabilization techniques.

UNIT V:

Application of transistors: Transistor as a Switch, as a Amplifier .features of CE, CB, CC amplifiers.
Oscillators: Condition for oscillations, RC Phase shift oscillator with Transistor, Wien bridge oscillator, Hartley and Colpitt's oscillator

Text Books:

1. Integrated Electronics – Jacob Millman, Chritos C. Halkies, Tata Mc-Graw Hill, 2009.
2. Electronic Devices - FLOYD 5th Edition, Pearson Education.

Reference Books:

1 Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill.
2 Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9thEdition, 2006.

ELECTRICAL MACHINES-I

Subject Code: 18EET206 **Internal Marks: 40**
Credits: 3 **External Marks: 60**

Course objective

- To analyze the performance of different types of DC machines & Transformers.
- To appreciate the applications of DC machines & Transformers

Course outcomes

CO1: Identify and Define different types of dc generators, interpret their performance under different load conditions.
CO2: Describe the construction and performance of various types of DC motors.
CO3: Determine the performance of DC machines by conducting different tests.
CO4: Distinguish between different types of transformers and compute their equivalent circuit parameters.
CO5: Determine the performance of transformer by conducting different tests.

UNIT I:

D.C generators: Constructional details Principle of operation, Armature winding Lap & Wave, Emf equation, Methods of excitation, Armature Reaction, Commutation.

UNIT II:

Characteristics of D.C. generators: O.C.C, internal-external characteristics, losses-power flow, efficiency calculation
DC Motors: Principle of operation of DC motors, Back EMF, Torque equation, Types of DC motors, Speed-Torque characteristics of DC motors.

UNIT III:

Speed Control & Testing of DC Machines: Starting of DC motors: 3 point starter, 4 point starter, Losses and efficiency, Condition for maximum efficiency, Speed control methods, Brake test, Swinburne's test, Retardation test, Hopkinson's test, fields test.

UNIT IV:

Transformers –I: Constructional features, Principle of operation, , EMF equation, Transformer on No load and Load Phasor diagram, equivalent circuit, Regulation, losses and efficiency, All day efficiency.

UNIT V:

Transformers –II: Open circuit and short circuit test, Sumpner's test, parallel operation, separation of core losses test, auto transformers, 3-Ø transformer connections, Scott connection.

TEXT BOOKS:

1. I.J. Nagrath & D.P.Kothari, " Electrical Machines", Tata McGrawHill .
3. P.S.Bimbhra, "Electrical Machinery", Khanna Publisher.

REFERENCE BOOKS:

1. Irving L.Kosow, "Electric Machine and Tranformers", Prentice Hall of India.
2. M.G. Say, "The Performance and Design of AC machines", Pit man & Sons.
3. Husain Ashfaq , " Electrical Machines", Dhanpat Rai & Sons.
4. Electric Machinery. A.E. Fitzgerald, Charles Kingsley, JR., Stephen D. Umans 6th Edition.

ELECTRONIC DEVICES AND CIRCUITS LAB

Subject Code: 18EEL201 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course objective

- The main objective of this curriculum/course is to make the students well versed with basic electronics components and circuits
- The students can understand the nature and scope of modern electronics.
- Describe physical models of basics components.
- Understand their capabilities and limitations and make decisions regarding their best utilization in a specific situation

Course Outcomes:

Students will be able to
CO1: Measure the frequency of a given waveform using CRO.
CO2: Draw the corresponding V-I characteristics of P-N semiconductor diode, Zener diode and examine its cut-in voltage.
CO3: Draw the V-I characteristics of Bipolar Junction Transistor (BJT) in various configurations, Field Effect Transistor (FET) and Uni Junction Transistor (UJT).
CO4: Determine the response of half wave and full wave rectifiers with and without Filters
CO5: Point out different types of amplifiers.

List of Experiments:

1. Frequency measurement using Lissajous figures.
2. P-N Junction diode characteristics A. Forward bias B. Reverse bias.(cut-in voltage & Resistance calculations)
3. Zener diode characteristics and Zener as a regulator.
4. Transistor CB characteristics (Input and Output) & h Parameter calculations.
5. Transistor CE characteristics (Input and Output) & h Parameter calculations.
6. Rectifier without filters (Full wave & half wave).
7. Rectifier with filters (Full wave & half wave).
8. FET characteristics.
9. CE Amplifier.
10. CC Amplifier (Emitter Follower).

Additional Experiments:

11. UJT Characteristics
12. RC Phase Shift Oscillator

ELECTRICAL MACHINES – I LAB

Subject Code: 18EEL202 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objective

- This lab aims to understand the characteristics and performance of DC machines through the conduction of experiments.

Course Outcomes

CO1: Analyze the performance of DC motor under loaded and unloaded conditions.
CO2: Analyze the characteristics of DC generator
CO3: Determine the critical field resistance and critical speed of DC Generator
CO4: Determine the efficiencies of DC Series and Shunt generators
CO5: Examine various speed control methods of DC shunt motor.

LIST OF EXPERIMENTS:

1. Magnetization characteristics of DC shunt generator.
2. Load test on DC shunt generator.
3. Brake test on DC shunt motor.
4. Load test on DC compound generator.
5. Hopkinson's test on DC shunts machines.
6. Fields test on DC series machines.
7. Swinburne's test on D.C shunt machine.
8. Speed control of DC shunt motor by Field and armature Control.
9. Retardation test on DC shunt motor.
10. Load test on DC series generator.

Additional Experiments:

11. Brake test on DC compound motor.
12. Separation of losses in a DC shunt motor.

BIOLOGY

Subject Code: 18BST209 **Internal Marks: 40**
Credits: 3 **External Marks: 60**

Course Outcomes

After studying the course, the student will be able to:

- Describe how biological observations of 18thCentury lead to major discoveries in the contemporary world.
- Convey the classification of biology with respect to morphological, biochemical and ecological aspects, Identify and classify microorganisms.
- Highlight the basic principles of Mendel's experiments during the passage of genetic material, convey that all forms of life have the same building blocks though the manifestations are diverse and Identify DNA as a genetic material in the molecular basis of information transfer.
- Classify enzymes and differentiate different mechanisms of enzyme action, Analyze biological processes at the simpler level.
- Apply thermodynamic principles to biological systems.

Unit-I

Introduction

Fundamental differences between science and engineering using live examples (Eye and Camera, Bird fly and Air craft etc.). Excitingand contemporary aspects of biology as an independent scientific discipline. Why we need to study biology?Discuss how biological observations of 18th Century that lead to major discoveries.Examples of Brownian motion and the origin of thermodynamics.

Unit-II

Classificationof organisms and Microbiology

Introduction-Discuss classification based on (a) Cellularity- Unicellular or multicellular (b)Ultra structure- prokaryotes or eukaryotes (c) Energy and Carbon utilization - Autotrophs,heterotrophs, litho tropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e)Habitat- aquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

Concept of single celled organisms, Concept of species and strains, Identification and classification of microorganisms, Ecological aspects of single celled organisms, Sterilization and media compositions, Growth kinetics.

Unit-III

Genetics, Bio-molecules and Information Transfer

Mendel's Laws-Concept of segregation and independent Assortment-Concept of Allele-Gene Interaction-Epistasis,Concepts of Recessiveness and Dominance of genes, Meiosis and Mitosis, Discuss about the single gene disorders in humans.

Molecules of life-monomeric units and polymeric structures, Discuss about sugars-starch and cellulose, Amino acids- Proteins and lipids, Nucleotides and DNA/RNA.

Molecular basis of information transfer-DNA as a genetic material, Hierarchy of DNA structure- from single stranded to double helix to nucleosomes, Concept of genetic code,Genetic recombination.

Unit-IV

Enzymes and Macromolecular analysis

Enzymology-Enzyme classification, General properties of Enzymes, Mechanism of enzyme action-examples, Enzyme kinetics and kinetic parameters

Protein Functions, Hierarchy in protein Structure-Primary, Secondary, Tertiary andQuaternary, Proteins as enzymes-transporters-receptors and structural elements

Unit-V

Metabolism

Thermodynamics as applied to biological systems. Exothermic and Endothermic versusEndergonic and Exergoinc reactions, ATP as an energy currency-breakdown of glucose toCO_2+ H_2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO_2 and H_2O (Photosynthesis),Energy yielding and Energy consuming reactions

Text Books:

1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd.
2) Cell Biology, Genetics, Molecular Biology, Evolution and Ecology: P. S. Verma; V. K. Agarwal, S Chand and CO. Ltd, New Delhi-55.
3) A Text Book of Animal Physiology: A. K. Berry, EMKAY Publications, New Delhi-51.

References:

1) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wileyand Sons.
2) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freemanand Company.
3) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman andcompany, Distributed by Satish Kumar Jain for CBS Publisher.
4) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C.Brown Publishers.

ENGINEERING MECHANICS

Subject Code: 18EST103 **Internal Marks: 40**
Credits: 4 **External Marks: 60**

COURSE OBJECTIVES:

- To develop an understanding of the principles of statics and the ability to analyze problems using static equilibrium equations.
- To introduce the basic principles of mechanics applicable to rigid bodies in equilibrium.
- To develop the fundamentals of engineering mechanics and problem solving skills essential for mechanical engineering
- To teach the basic principles of mechanics applicable to the motion of particles and rigid bodies. .

COURSE OUTCOMES:

CO 1. Determine the resultant of a planar force system using resolution of force and principle of moments.
CO 2. Draw free-body diagrams of given rigid bodies and compute unknown forces using equations of equilibrium of a planar force system by graphical and analytical methods.
CO 3. Comprehend the effect of friction on equilibrium of rigid bodies. Analyze the plane trusses by calculating axial forces in the members using method of joints.
CO 4. Calculate cetroid and moment of inertia of plane figures of triangular, rectangular and circular cross sections.
CO 5. Demonstrate an understanding of the principles of kinematics and kinetics of particles and planar rigid bodies.

UNIT- I

Systems of forces: Introduction – parallelogram law – Forces and components - Resultant of coplanar concurrent forces - vector notation – moment of force – principle of moments – couples - Resultant of planar force systems.

UNIT II

Equilibrium of force systems: Equilibrium – free body diagrams – Equations of equilibrium – equilibrium of planar systems – graphical methods and analytical methods for equilibrium of planar systems – Moment of a Force and its applications, Varignon's theorem

UNIT- III

Friction: Introduction, limiting friction – types of friction and friction laws – application of friction - Inclined plane, wedge friction. TRUSSES: Analysis of Plane trusses using method of joints.

UNIT- IV

Centroids and centre of gravity: Centre of gravity – centroids of area and lines – determination of centroids by integration – centroids of composite figures – theorems of Pappus.

Area moment of inertia : Moment of inertia – polar moment of Inertia – Radius of gyration - Transfer theorem for moment of Inertia – Moment of inertia of composite areas. Concept of mass moment of inertia.

UNIT- V

Kinematics: Rectilinear motion-curvilinear motion – Rectangular components of curvilinear motion - Normal and Tangential components of acceleration, Kinematics of rigid bodies - angular motion – fixed axis rotation – Definition and analysis of plane motion.

Kinetics: Kinetics of rigid bodies – equation of plane motion – fixed axis rotation – rolling bodies (simple examples) - general plane motion (Simple examples).

TEXT BOOKS:

1. I.B. Prasad: Applied Mechanics, Khanna Publishers, 19th Edition, 2009.
2. Ferdinand L. Singer: Engineering Mechanics, Harper Collins Publishers India, 3rd Edition, 2008.
3. A.K. Tayal: Engineering Mechanics, Umesh Publishers, 13th Edition, 2008.

REFERENCES BOOKS:

1. Irving. H. Shames: Engineering Mechanics, PHI Publishers, 4th Edition, 2008.
2. Timoshenko & Young: Engineering Mechanics, MGH Publishers, 4th Edition, 2010.
3. K.L. Kumar, Engineering Mechanics, TMH Publishers, 3rd Edition, 2009.
4. Engineering Mechanics by S. Timoshenko and D.H.Young, McGraw-Hill.
5. Engg. Mechanics / S.S. Bhavikati & J.G. Rajasekharappa.

ELECTRICAL MACHINES-II

Subject Code: 18EET207 **Internal Marks: 40**
Credits: 3 **External Marks: 60**

Course objective:

- Ability to understand the principle of operation, construction and characteristics of three phase induction motor and its application.
- Describe the methods to analyze the construction and performance of synchronous machines and its applications

Course outcomes:

CO1: Acquire knowledge about the working principle and Performance of 3- phase induction motor.
CO2: Summarize different techniques related to speed control and starting of 3-phase induction motor.
CO3: Outline different types of Alternators and their performance criteria**.**
CO4: Identify different types of synchronous motors; interpret their performance under different load conditions.
CO5: Recognize areas of application of synchronous and induction machines

UNIT I:

Three phase Induction Machine – I: Constructional features, salient pole, non salient pole, Rotating magnetic field, Principle of operation, Torque and power equations, Torque- slip characteristics, Equivalent circuit.

UNIT II:

Three phase Induction Machine- II: No load & blocked rotor tests-circle diagram, Starting methods, Speed control methods, Induction generator, Applications.

UNIT III:

Synchronous Machine –I: Constructional features, Armature winding, EMF Equation, Winding Coefficients, Equivalent circuit and phasor diagram, Armature reaction.

UNIT IV:

Synchronous Machine II: O. C. & S. C. tests, Voltage regulation using Synchronous Impedance method, MMF method, Potier's Triangle method, Parallel operation of synchronous generators, Two reaction theory, Applications.

UNIT V:

Synchronous Motor: Principle of operation, Starting methods, Effect of varying field current at different loads, V and Λ curves, Synchronous condenser, Applications.

TEXT BOOKS:

1. I.J. Nagrath & D.P.Kothari, " Electrical Machines", Tata McGrawHill .
3. P.S.Bimbhra, "Electrical Machinery", Khanna Publisher.

REFERENCE BOOKS:

1. Irving L.Kosow, "Electric Machine and Tranformers", Prentice Hall of India.
2. M.G. Say, "The Performance and Design of AC machines", Pit man & Sons.
3. Husain Ashfaq , " Electrical Machines", Dhanpat Rai & Sons.
4. Electric Machinery. A.E. Fitzgerald, Charles Kingsley, JR., Stephen D. Umans 6th Edition.

POWER SYSTEMS-I

Subject Code: 18EET208 **Internal Marks: 40**
Credits: 3 **External Marks: 60**

Course objective:

- To impart knowledge about the generation of electrical power to meet the ever increasing demand of electrical power and operation of conventional power plants.
- To impart knowledge about the various aspects and methods of improving Voltage and power factor in distribution system.

Course outcomes:

CO1: Students are able to draw the line diagrams and identify different components in thermal & hydel power generating stations.
CO2: Students can able to understand the operation of Gas, Solar and Nuclear power generation.
CO3: Students can summarize different distribution systems.
CO4: Students can understand the operation of Substations.
CO5: Students can analyze the economic aspects of power generation and different tariff methods.

UNIT I:

Thermal & Hydel Power Stations: Site selection, Line diagram of Thermal Power Station showing paths of coal, steam, water, air, ash and flue gasses- Brief description of TPS components: Boilers, Super heaters, Economizers, Turbines, Condensers, Cooling towers, and Chimney, Electro Static Precipitator, Hydro power plants.

UNIT II:

Gas, Solar and Nuclear power generation: Gas Power station: Principle of operation and component (block diagram approach only). Solar Power generation: Line diagram of solar energy storage, solar energy collector, point focusing collector, solar power generation.
Nuclear Power Stations: Working principle, Nuclear fuels. Nuclear reactor Components: Moderators, Control roads, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR. Radiation: Radiation hazards and Shielding.

UNIT III:

Distribution Systems: Classification of distribution systems, design features of distribution systems, radial distribution, ring main distribution, voltage drop calculations: DC distributors for following cases: radial DC distributor fed at one end and at ends (equal / unequal voltages), ring main distributor, stepped distributor and AC distribution. Comparison of DC and AC distribution.

UNIT IV:

Substations: Classification of substations: Air insulated substations - Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment.
33/11 KV substation line diagram.
Gas insulated substations (GIS): Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations.

UNIT V:

Economic Aspects of Power Generation: Load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, capacity factor, utilization factor, capacity, utilization and plant use factors- Numerical Problems.

Tariff Methods: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method, Tariff Methods: Simple rate, Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakrabarti, Dhanpat Rai & Co. Pvt. Ltd., 1999.
2. Electrical Power sytem by S.L.Uppal.

REFERENCE BOOKS:

1. Generation,Distribution and Utilization of Electric Energy by C.L.Wadhawa New age

CONTROL SYSTEMS

Subject Code: 18EET209 **Internal Marks: 40**
Credits: 3 **External Marks: 60**

Course objective:

- To describe the feedback controls with basic components of control systems.
- To formulate mathematical models of physical systems and block diagram representation.
- To analyze stability of the system from transfer function approach.
- To describe and analyze various time domain and frequency domain tools for analysis and design of linear control systems.
- To Represent physical systems in state space form and analyze them.

Course outcomes:

CO1: Able to understand basic components of feedback control systems; formulate mathematical models of physical systems and represent them in block diagrams and signal flow graphs.
CO2: Able to understand the time- domain specifications; Analyze first and second order control systems in time domain;
CO3: Able to understand the concepts of stability; Analyze stability of the system from transfer functions approach and graphical methods.
CO4: Able to Design controllers, compensators for improve the performance specifications.
CO5: Able to Represent physical systems in state space form and analyze them.

UNIT I:

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems- examples- Classification of control systems- Feedback characteristics- Effects of feedback characteristic.
Mathematical models of physical systems: Differential equations- transfer functions and block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula - Translational and Rotational mechanical systems.

UNIT II:

Transfer function of elements of control systems: Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver,
Time response analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems, and proportional integral derivative systems.

UNIT III:

Concept of stability: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT IV:

Frequency response analysis: Introduction, Frequency domain specifications-Bode plots-Determination of Frequency domain specifications and transfer function from the Bode plot-Phase margin and Gain margin-Stability Analysis from Bode Plots.Polar Plots- Nyquist Plots-Stability Analysis.

UNIT V:

Design and Compensation techniques: Introduction and preliminary design considerations-Lag, Lead, Lead-Lag compensation based on frequency response approach.

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix.

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International Limited Publishers, 2nd edition.

2. Automatic Control Systems by Farid Golnaraghi, Benjamin C. KUO, Wiley india Pvt. Ltd, Ninth Edition.

REFERENCE BOOKS:

1. Control Systems by A.Anand Kumar, PHI Publications,4th edition.

2. Control Systems Engineering by S.Palani,Tata Mc Graw Hill Publications.

3. Modern Control Engineering, Fifth edition, Kotsuhiko Ogata, Prentice Hall of India Pvt. Ltd.

NUMERICAL METHODS

(Interdisciplinary Elective – I)

Subject Code: 18IET212 **Internal Marks: 40**
Credits: 2 **External Marks: 60**

COURSE OBJECTIVES

- To Solve the algebraic and transcendental equations, using different numerical method.
- Calculate the value of dependent variable for a particular x by deducing the unknown function y=f(x) for an evenly or unevenly spaced points.
- To estimate the value of derivatives using different numerical methods.
- To evaluate the definite integrals using different numerical methods.
- To calculate the numerical solution of an ordinary differential equation i.e IVP .

COURSE OUTCOMES

On completion of this course, students should be able to

- Solve the algebraic and transcendental equations by identifying suitable numerical methods.
- Estimate a linear and non-linear curve to the given data by the method of least squares.
- Calculate the value of dependent variable for a particular x by deducing the unknown function y = f(x) for an evenly or unevenly spaced points.
- Estimate the value of derivatives and evaluate the definite integrals using different numerical methods and evaluate an IVP.
- Calculate the numerical solution of an ordinary differential equation i.e IVP .

Unit – I

Algebraic and Transcendental Equations:

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The
Method of False Position – The Iteration Method – Newton-Raphson Method.

Unit-II

Interpolation:

Interpolation**:** Introduction – Finite differences- Forward Differences – Backward differences – Newton's formulae for interpolation – Interpolation with unevenly spaced points – Lagrange's Interpolation formula.

Unit-III

Numerical Differentiation:
Numerical Differentiation– Differentiation using finite differences- Newton's Forward – Backward- Lagrange's.

UNIT-IV
Numerical Integration:
Numerical Integration using Trapezoidal rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule- Numerical double Integration using Trapezoidal rule, Simpson's 1/3 Rule.

Unit-V
Numerical solution of Ordinary Differential equations:
Solution by Taylor's series – Picard's Method of successive Approximations – Euler's Method – Runge – Kutta Method(4^{th} order).

Text Books:

1. Higher Engineering Mathematics, 43^{nd} edition, 2012 - B. S. Grewal, Khanna Publishers, New Delhi.
2. Ravindranath, V. and Vijayalaxmi, A., 2^{nd} edition, 2012, A Text Book on Mathematical Methods, Himalaya Publishing House, Bombay.
3. Introductory methods of Numerical analysis by S.S. Sastry.

Reference Books:

1. Mathematical Methods, 6^{th} edition, 2011, Dr. T. K.V.Iyengar & others S. Chand Publications.
2. Engineering Mathematics, 4^{th} edition, 2009 - B. V. Ramana, Tata McGraw Hill, New Delhi.
3. Engineering Mathematics Volume-II, 6^{th} edition, 2012, T.K.V Iyengar, &others, S.Chand Co. New Delhi.

COMPUTER AIDED ENGINEERING DRAWING

(Interdisciplinary Elective – I)

Subject Code: 18IET215 **Internal Marks: 40**
Credits: 2 **External Marks: 60**

COURSE OBJECTIVES:

Students will have

1. To practice the computer aided drafting which include points, lines, curves, polygons and dimensioning
2. To practice the types modeling which include object selection commands – edit, zoom, cross hatching, pattern filling, utility commands
3. To practice computer aided solid modeling which include Isometric projections, orthographic projections of isometric projections
4. To practice isometric projections, Orthographic projections and solids using AutoCAD.
5. To practice computer aided solid modeling in 3D learn about 3D wireframe by using AutoCAD

COURSE OUTCOMES:

Students will get ability

1. Draw points, lines, curves, polygons, dimensioning etc., using Drawing tools by AutoCAD.
2. Draw object by using object selection commands to edit the drawing, 2D wire framing in AutoCAD.
3. Draw the object applying utility and modified commands by AutoCAD.
4. Draw isometric projections, Orthographic projections and solids using AutoCAD.
5. Draw simple solids in 3D learn about 3D wireframe by using AutoCAD.

UNIT – I

INTRODUCTION TO COMPUTER AIDED DRAFTING: Generation of points, lines, curves, polygons, Dimensioning.

UNIT – II

TYPES OF MODELING: Object selection commands – edit, zoom, cross hatching, pattern filling. Rotate, text, Mtext and 2D wire frame modeling.

UNIT-III

COMMANDS: Utility commands- limits and shortcuts all commands, and modified commands – join, break, break point, trim, move, extend, mirror, offset, array, and stretch.

UNIT-IV

COMPUTER AIDED SOLID MODELING: Isometric projections, orthographic projections of isometric projections.

UNIT-V

3D MODELING: 3D wire frame modeling, modeling of simple solids.

TEXT BOOKS:

1. Text book of Engineering Graphics, K.C. john, PHI Publications
2. Machine Drawing, K.L.Narayana ,P. Kannaiah and K.Venkata reddy, fourth edition / New age International publishers.

References:

1. Engineering Graphics with Auto CAD, Revised edition,Text Book by D.M.Kulkarni, A.P.Rastogi, A.K.Sarkar PHI learing Pvt.Limited NewDelhi
2. Text book of Engineering Drawing with Auto-CAD, second edition, K.venkata reddy/B.S. Publications.
3. Engineering drawing by N.D Bhatt , Charotar publications.

INTRODUCTION TO MATHEMATICAL SIMULATION AND MODELING

(Interdisciplinary Elective – I)
(Except EEE)

Subject Code: 18IET216 **Internal Marks: 40**
Credits: 2 **External Marks: 60**

Course Objectives:

By the end of this course, students in this class will understand the basic principles of programming and implementing mathematical concepts in MATLAB. Specifically, they will be able to write numerical algorithms and evaluate the computational results using graphical representations. The ultimate goal is to motivate the students for their profession and for future courses in curriculum.

Course Outcomes:

CO1: Translate mathematical methods to MATLAB code.

CO2: Generalize results and represent data visually.

CO3: Apply computer methods for solving a wide range of engineering problems.

CO4: Utilize computer skills to enhance learning and performance in other engineering and science courses.

CO5: Demonstrate professionalism in interactions with industry.

UNIT I
INTRODUCTION TO MATLAB

Historical Background, Applications, Scope of MATLAB, Importance of MATLAB for Engineers, Features, MATLAB Windows (Editor, Work Space, Command History, Command Window). Operations with Variables, Clearing Operations, Commands, Data types, Operators.

UNIT II
DATA AND DATA FLOW IN MATLAB

Vectors, Matrix Operations & Operators, Reshaping Matrices, Arrays, Colon Notations, Functions.

UNIT III
MATLAB PROGRAMMING

Conditional Statements, Loops, Writing Script Files, Error Correction, Saving Files, Worked out Examples.

UNIT IV
MATLAB ADVANCED

Plotting graphs, Creating Plot & Editing Plot, MATLAB-Algebra, Calculus, Differential, Integration, Polynomials, solving a system of linear equations.

UNITV
SIMULINK

Introduction, Importance, Model Based Design, Tools, Mathematical Modeling, Converting Mathematical Model into Simulink Model, Running Simulink Models, Introduction to scilab.

Text Books:

1. Getting Started With Matlab: A Quick Introduction for Scientists and Engineers (English) by Rudra Pratap, OXFORD University Press.
2. Matlab Programming by Y. Kirani Singh, B.B. Chaudhuri, PHI Publication

Reference Books:

1. MATLAB® Programming For Engineers Fourth edition by Stephen J. Chapman
2. Applied Numerical Methods Using MATLAB 1st Edition by Won Y. Yang , Wenwu Cao, Tae- Sang Chung, John Morris.

FUNDAMENTALS OF MATERIAL SCIENCE

(Interdisciplinary Elective – I)

Subject Code: 18IET217 **Internal Marks: 40**
Credits: 2 **External Marks: 60**

COURSE OBJECTIVES:

- To understand different engineering materials and their structures.

COURSE OUTCOMES:

On completion of this course, students should be able

CO 1. To gain thorough knowledge in engineering materials and their structures.
CO 2. To gain thorough knowledge in deformation in different engineering materials.
CO 3. Understand necessity of hot and cold working methods.
CO 4. Understand thoroughly mechanical properties.
CO 5. Describe different types material failures.

UNIT-I

Introduction: Introduction, classification of materials, crystal defects.

UNIT-II

Plastic deformation of single crystals: Plastic deformation of single crystals. Deformation by slip,. Deformation of single crystal. Deformation by twinning.

UNIT-III

hot working, cold working. Recovery, recrystallization and grain growth. Solidification mechanism.

UNIT-IV

Mechanical properties: Mechanical properties. Tensile stress-strain diagrams, proof stress, yield stress diagrams, modules of elasticity. Hardness Testing: -Rockwell, Brinell and Vickers.

UNIT-V

Impact toughness, Charpy V-Notch, fracture, ductile, brittle, Griffith criteria for brittle failure, creep, creep mechanisms, fatigue-mechanism-factors to improve fatigue resistance

TEXT BOOKS:

1. An introduction to material Science – V Raghavan.
2. Mechanical Metallurgy – GE Dieter.

REFERENCE BOOKS:

1. Material Science for Engineers – Vanvlack.
2. Material Science for Engineers – Schakleford.
3. Material Science – Callister.

INTRODUCTION TO ELECTRONIC MEASUREMENTS

(Interdisciplinary Elective – I)

Subject Code:18IET219 **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Objectives:

- Study of performance characteristics of different electronic measuring instruments.
- Subject introduces Signal Generator and Wave Analyzers for analysis of EM spectrum.
- Deals about Oscilloscopes and internal circuitry for measurement of electronic parameters.
- Brief discussion about all AC bridges, design methods and its applications.
- This subject includes transducers for the measurement of non electrical parameters and its signal conditioning techniques using electronic circuitry

Course Outcomes:

CO1: Identify electronic instruments, their Characteristics and use.
CO2: Describe various signal generators, wave analyzers for distortion measurements.
CO3: Measure Amplitude, Frequency and Phase of various signals using different types of CRO's.
CO4: Design the AC bridges for measurement of resistance, inductance, capacitance for frequency changes.
CO5: Explain various types of transducers and their applications for measuring non- electrical parameters.

UNIT I

Performance characteristics of instruments: Static characteristics, accuracy, resolution, precision, expected value, error and sensitivity. Errors in measurement and dynamic characteristics: speed of response, fidelity, lag and dynamic error., **Voltmeters:** Multirange, range extension. **Ammeters:** Shunt and thermocouple type ammeter. **Ohmmeters**: Series type and shunt type.

UNIT II

Signal Generators - standard and AF sine and square wave signal generators, function Generators, Wave Analyzers, Harmonic distortion analyzers .

UNIT III

Cathode Ray Oscilloscopes: CRT features, Block Diagram of CRO, Dual beam CRO, measurement of amplitude and frequency, Dual trace oscilloscope, Digital storage oscilloscope.

UNIT IV

AC Bridges:

Measurement of inductance: Maxwell's bridge, Anderson bridge., Measurement of capacitance: Schearing bridge. Wheatstone bridge and Wien Bridge

UNIT V

Transducers: Classification of Transducers**,** Linear Variable Differential Transformer, Thermocouples, thermistors, sensistors, Digital Data acquisition systems.

Text Books:

1. Electronic instrumentation – H.S.Kalsi, Tata McGraw Hill, 2004, 2/e.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 2002, 5/e.

Reference Books:

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2003, 2/e.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2004, 2/e.

UNIX UTILITIES

(Interdisciplinary Elective – I)

Subject Code:18IET21A **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Outcomes

1. Understands UNIX Architecture and Functions of OS
2. Effectively use the UNIX system to accomplish typical personal, office, technical, and software development tasks.
3. Effectively use software development tools including libraries, pre-processors, compilers, linkers, and make files.
4. Prepare simple readable user documentation using shell scripts.
5. Develop shell scripts to perform more complex tasks.

Unit – I

History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel: Architecture of the UNIX operating system – Introduction to system concepts – Kernel data structures – System administration.

Unit – II

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Command - man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

Unit – III

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, Text processing utilities and backup utilities , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, comm, cmp, diff, tr.

Unit – IV

Introduction to Shells: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Unit – V

Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Text Books

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.
3. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Beginning shell scripting, E. Foster – Johnson & other, Wile Y- India.

IT SYSTEMS MANAGEMENT

(Interdisciplinary Elective – I)

Subject Code:18IET21B **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Objectives:

- Provides extensive theoretical knowledge of IT infrastructure.
- Enhances the student's computing environment knowledge.
- Provides broad based knowledge of IT System management.
- Develops management skills required for an business environment.
- Builds upon the essential core Network Security and storage management with greater emphasis.

Course Outcomes:

1. Describe the business value and processes of ICT services in an organization and apply that knowledge and skill with initiative to a workplace scenario.
2. Analyze and evaluate the impact of new and current ICT services to an organization.
3. Describe how effective IT Infrastructure Management requires strategic planning with alignment from both the IT and business perspectives in an organization.
4. Characteristics of the network Security that affect user operations.
5. Define, track, and maintain data and data resources and recent trends in IT.

Unit I

IT Infrastructure: Overview

Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems) and their Management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment.

Unit II

Software Management

SDLC, The Waterfall Model, Advantages, Disadvantages, Conventional Software Management performance, Software Economics.

Unit III

Current computing environment

Complexity of current computing, multiple technologies.

IT system Management: Common tasks in IT system management, approaches for organization IT management systems context diagram, patterns for IT system Management, Service level management, Financial Management, Capacity Management, availability management.

Unit IV

Security Management

Computer Security , Internet Security , Physical Security , Identity Management , Access control System, Intrusion Detection. Emerging trends in IT: E-commerce, GSM.

Unit V

Storage Management

Types of Storage management, Benefits of storage management, backups, Archive, Recovery, Disaster recovery. Space management, Hierarchical storage management.

Text Books:

1. IT Infrastructure & Its Management, By Phalguni Gupta, Tata McGraw-Hill Education. (Unit 1,3,4,5)
2. Software Project Management , Walker Royce: pearson Education,2005.(Unit 2)

References:

1.Ivanka Menken, ITIL V3 Foundation Certification Exam Preparation Course in a Book for Passing the ITIL V3 Foundation Exam, Second Edition (The Art of Service), 2009.
2.Van Haren, Passing the ITIL Foundation, Van Haren Publishing, 2011.

ELECTRICAL MACHINES-II LAB

Subject Code: 18EEL203 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course objective:
To develop on hand experience with Transformers, Induction motors, Synchronous generators and motor by allowing them to conduct various experiments.

Course outcomes:
CO1: Explain testing and experimental procedures on different types of electrical machines.
CO2: Prepare laboratory setup (circuits) with proper connections on electrical Transformers and AC-machines
CO3: Analyze the performance of induction motors and synchronous machines
CO4: Summarize experiment results in a written report
CO5: Analyze possible causes of discrepancy in comparison to theory

LIST OF EXPERIMENTS:
1. O.C. &S.C. Tests on single phase transformer.
2. Sumpner's test on a pair of single phase transformers.
3. Brake test on three phase squirrel cage induction motor.
4. No-load& blocked rotor tests on three phase Slip ring Induction motor.
5. Regulation of a three phase alternator by synchronous impedance method.
6. V and inverted V curves of a three –phase Synchronous motor.
7. No-load& blocked rotor tests on single phase induction motor.
8. Determination of Xd and Xq of a salient pole synchronous machine.
9. Parallel Operation of Single Phase Transformers.
10. Separation of core losses of a single phase transformer.

Additional Experiments:
11. Scott connection of Transformers.
12. Regulation of a three phase alternator by ZPF method.

ELECTRICAL CIRCUITS LAB

Subject Code: 18EEL204 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objective:

- To understood and analyze the network theorems
- To understand other network concepts through the conduction of experiments

Course Outcomes:
CO1: Can Understand and verify the network theorems.
CO2: Understood the Locus diagram of RL &RC circuits.
CO3: Understood the Series & Parallel resonance, importance of Quality of factor.
CO4: Know the Calculation of two port network parameters for a given network.
CO5: Able to measure active power for Star & Delta connected loads.

Any 10 of the following experiments are to be conducted:
1) Verification of Thevenin's Theorem

2) Verification of Norton's Theorem

3) Verification of Superposition theorem

4) Verification of Compensation Theorem and Maximum Power Transfer Theorem

5) Verification of Reciprocity, Millmann's Theorems

6) Locus Diagrams of RL and RC Series Circuits

7) Frequency response of Series and Parallel RLC circuit.

8) Determination of Self, Mutual Inductances and Coefficient of coupling of aTransformer.

9) Determination of Z and Y Parameters of Two-Port network.

10) Determination of Transmission and hybrid parameters of Two-Port network.

Additional Experiments:
11) Measurement of Active Power for Star and Delta connected balanced loads

12) Measurement of 3-phase Power by 2 Wattmeter Method for balanced loads

CONTROL SYSTEMS LAB

Subject Code: 18EEL205 **Internal Marks: 40**
Credits: 1.5 **External Marks: 60**

Course Objective:

- To understand the modeling, simulation, transfer function and implementation of a physical dynamical system by a linear time invariant ordinary differential equation.
- To examine electrical modeling of a second order system and analyze the under-damped, over-damped and critically damped cases
- To interpret the effects of poles and zeros location in the s-plane on the transient and steady state behavior.
- To Measure the characteristics of Servo-Motor.
- To Design Lead, Lag and Lag-Lead series compensator on a second order system.

Course Outcomes:

CO1: Students can predict transfer function and implementation of a physical dynamical system by a linear time invariant ordinary differential equation.
CO2: Students can examine electrical modeling of a second order system and analyze the under-damped, over-damped and critically damped cases.
CO3: Students can interpret the effects of poles and zeros location in the s-plane on the transient and steady state behavior.
CO4: Students can measure the characteristics of Servo-Motor.
CO5: Students can design Lead, Lag and Lag-Lead series compensator on a second order system.

ANY TEN OF THE FOLLOWING EXPERIMENTS ARE TO BE CONDUCTED:

1. Time response of Second order system
2. Characteristics of Synchros
3. Effect of feedback on DC servo motor
4. Transfer function of DC motor
5. Effect of P, PD, PI, PID Controller on a second order systems
6. Lag and lead compensation – Magnitude and phase plot
7. Transfer function of DC generator
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers

10. Characteristics of AC servo motor

11. Root locus and bode plot from MATLAB

12. State space model for classical transfer function using MATLAB-verification.

13. Simulation of transfer function using operational amplifiers.

REFERENCE BOOKS:

1. Simulation of Electrical and electronics Circuits using PSPICE – by M.H.Rashid, PHI Publications.

2. MATLAB and its Tool box user's manual and – Math works, USA.