AR- 18

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRONICS AND COMMUNICATION ENGINEERING

For

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

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

VISION OF THE INSTITUTE

To evolve into a premier engineering institute in the country by continuously enhancing the range of our competencies, expanding the gamut of our activities and extending the frontiers of our operations.

MISSION OF THE INSTITUTE

Synergizing knowledge, technology and human resource, we impart the best quality education in Technology and Management. In the process, we make education more objective so that efficiency for employability increases on a continued basis.

VISION OF THE DEPARTMENT

Create high-quality engineering professionals through research, innovation and teamwork for a lasting technology development in the area of Electronics and Communication Engineering.

MISSION OF THE DEPARTMENT

M1. Develop accomplished technical personnel with a strong background on fundamental and advanced concepts, have excellent professional conduct.

M2. Enhance overall personality development which includes innovative and group work exercises, entrepreneur skills, communication skills and employability.

M3. Ensuring effective teaching-learning process to provide in-depth knowledge of principles and its applications pertaining to Electronics & Communication Engineering and interdisciplinary areas.

M4. Providing industry and department interactions through consultancy and sponsored research.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS) OF B.TECH. IN ECE

PEO I:The graduates will be employed as a practicing engineer in fields such as design, testing and manufacturing.

PEO II: The graduates will be able to imbibe research, development and entrepreneurship skills.

PEO III: The graduates will be engaged in lifelong self-directed learning to maintain and enhance professional skills.

PEO IV: The graduates will be able to exhibit communication skills, team spirit, leadership skills and ethics with social responsibility.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO-Program Specific Outcomes

PSO1. The Competency in the application of circuit analysis and design.

PSO2. The ability to solve Electronics and Communication Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO3. The ability to pursue higher studies in either India or abroad and also lead a successful career with professional ethics.

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.

5. MOOCs:

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

6. 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.

6.3 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.

6.4 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).

6.5 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

6.6 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.

6.7 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:

$$\text{SGPA} = \frac{\Sigma(\text{CR} \times \text{GP})}{\Sigma\text{CR}}$$ (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:

$$\text{CGPA} = \frac{\Sigma(\text{CR} \times \text{GP})}{\Sigma\text{CR}}$$ (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:

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

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.

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

he 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 %

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 (Autonomous), Tekkali
Electronics and Communication Engineering

COURSE STRUCTURE

I B.TECH **I – SEMESTER**

S. No	Subject Code	SUBJECT	L	T	P	Credits
01	18MCT101	**Induction program**	**3 Weeks**			**0**
02	18BST106	Applied Physics	3	1	0	4.0
03	18BST101	Linear Algebra and Calculus	3	1	0	4.0
04	18EST101	Basic Electrical Engineering	3	1	0	4.0
05	18ECT101	Electronic Devices	2	0	0	2
06	18BSL101	Physics Lab	0	0	3	1.5
07	18ESL101	Basic Electrical Engineering Lab	0	0	3	1.5
08	18ESL103	Workshop and Manufacturing Practices	0	0	3	1.5
TOTAL PERIODS / TOTAL CREDITS			**23**			**18.5**

I B.TECH **II – SEMESTER**

S. No	Subject Code	SUBJECT	L	T	P	Credits
01	18MCT102	Environmental Science	3	0	0	0
02	18HST101	English	2	0	0	2.0
03	18BST108	Chemistry	3	1	0	4.0
04	18BST102	Differential Equations and Transform Theory	3	1	0	4.0
05	18ECT102	Network Theory	3	0	0	3.0
06	18ECT103	Electronic Circuits	2	0	0	2.0
07	18BSL102	Chemistry Lab	0	0	3	1.5
08	18HSL101	Language Proficiency Lab	0	0	3	1.5
09	18ECL101	Electronic Devices & Circuits Lab	0	0	3	1.5
10	18ESL104	Engineering Graphics & Design	0	0	4	2
TOTAL PERIODS / TOTAL CREDITS			**31**			**21.5**

II B.TECH **I – SEMESTER**

S. No.	Subject Code	SUBJECT	L	T	P	Credits
01	18MCT203	Constitution of INDIA	3	0	0	0
02	18BST204	Complex Variables and Statistical Methods	3	0	0	3.0
03	18EST202	Programming for problem solving	3	0	0	3.0
04	18EST203	Engineering Mechanics	3	1	0	4.0
05	18ECT204	Signals & Systems	3	0	0	3.0
06	18ECT205	Electronic Circuits analysis	3	0	0	3.0
07	18ECT206	Probability and Stochastic Processes	3	0	0	3.0
08	18ESL202	Programming for problem solving Lab	0	0	3	1.5
09	18ECL202	Electronic Circuits analysis Lab	0	0	3	1.5
TOTAL PERIODS / TOTAL CREDITS			**28**			**22**

II B.TECH **II – SEMESTER**

S. No.	Subject Code	SUBJECT	L	T	P	Credits
01	18ECT207	Electro Magnetic Waves & Transmission lines	3	1	0	4.0
02	18ECT208	Analog Communications	3	0	0	3.0
03	18ECT209	Digital Electronics	3	0	0	3.0
04	18ECT210	Pulse and Digital Circuits	3	0	0	3.0
05	XXXX	Interdisciplinary Elective I	2	0	0	2.0
06	18ECL203	Analog Communications Lab	0	0	3	1.5
07	18ECL204	Digital Electronics Lab	0	0	3	1.5
08	18ECL205	Pulse and Digital Circuits Lab	0	0	3	1.5
09	18ECP201	Minor Project-1	0	0	4	2
TOTAL PERIODS / TOTAL CREDITS			**28**			**21.5**

***Interdisciplinary Elective – I**

Subject Code	Offered by Dept.	Interdisciplinary Elective I	Offered for Dept.
18IET211	BS&H	Transform Theory	EEE/MECH/CIVIL
18IET212	BS&H	Numerical Methods	ECE
18IET213	BS&H	Introduction to 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	All (Except EEE)
18IET217	MECH	Fundamentals of Material Science	All (Except MECH)
18IET218	MECH	Engineering Optimization Technique	CSE/IT
18IET219	ECE	Introduction to Electronic Measurements	All (Except ECE)
18IET21A	CSE	UNIX Utilities	All (Except CSE)
18IET21B	IT	IT systems Management	All (Except IT)

III B.TECH **I – SEMESTER**

S. No.	Subject Code	SUBJECT	L	T	P	Credits
01	18ECT311	Antennas and Wave Propagation	3	0	0	3.0
02	18ECT312	Control Systems	3	0	0	3.0
03	18ECT313	Digital Communications	3	0	0	3.0
04	18ECT314	Linear and Digital IC Applications	3	0	0	3.0
05	XXXX	Professional Elective I	3	0	0	3.0
06	XXXX	Interdisciplinary Elective-II	2	0	0	2.0
07	18HST302	Human Values	2	0	0	2
08	18ECL306	Digital Communications Lab	0	0	3	1.5
09	18ECL307	IC Applications Lab	0	0	3	1.5
TOTAL PERIODS / TOTAL CREDITS			**25**			**22**

***Interdisciplinary Elective – II**

Subject Code	Professional Elective I
18ECE301	Electronic Measurements and Instrumentation.
18ECE302	Computer Architecture & Organization
18ECE303	Biomedical Instrumentation

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	All (Except EEE)
18IET325	MECH	Principles of Mechanical Measurements	ECE/EEE/CIVIL
18IET326	MECH	Linear programming and its applications	CSE/IT
18IET327	ECE	Principles of communications	All (Except ECE)
18IET328	CSE	Introduction to JAVA	All (Except CSE & IT)
18IET329	IT	Introduction to PYTHON	All (Except IT)

III B.TECH **II – SEMESTER**

S. No	Subject Code	SUBJECT	L	T	P	Credits
01	18BST309	Biology	3	0	0	3.0
02	18ECT315	Microprocessors &Microcontrollers	3	0	0	3.0
03	18ECT316	Digital Signal Processing	3	0	0	3.0
04	XXXX	Professional Elective II	3	0	0	3.0
05	XXXX	Interdisciplinary Elective-III	2	0	0	2.0
06	18ECL308	Digital Signal Processing Lab	0	0	3	1.5
07	18ECL309	Microprocessors & Microcontrollers Lab	0	0	3	1.5
08	18HSL302	Professional Communication Skills Lab	0	0	3	1.5
09	18ECP302	Minor Project-2	0	0	6	3
TOTAL PERIODS / TOTAL CREDITS			**29**			**21.5**

Subject Code	Professional Elective II
18ECE304	Telecommunication Switching Systems & Networks
18ECE305	Optical Communications
18ECE306	Internet of Things

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	All (Except EEE)
18IET335	MECH	Elements of workshop technology	All (Except MECH)
18IET336	ECE	Introduction to Signal Processing	EEE/MECH/CIVIL
18IET337	ECE	Fundamentals of Signals & Systems	CSE/IT
18IET338	CSE	Simulation and Modeling	All (Except CSE)
18IET339	IT	Fundamentals of Computer Graphics	All (Except IT)

IV B.TECH **I – SEMESTER**

S. No.	Subject Code	SUBJECT	L	T	P	Credits
01	18HST404	Managerial Economics and Management Science	3	0	0	3.0
02	18ECT417	Microwave Engineering	3	0	0	3.0
03	18ECT418	VLSI Design	3	0	0	3.0
04	XXXX	Professional Elective III	3	0	0	3.0
05	XXXX	Interdisciplinary Elective IV	2	0	0	2.0
06	18ECL410	Microwave Engineering Lab	0	0	3	1.5
07	18ECL411	Digital system design Lab	0	0	3	1.5
08	18HSL406	Employability Skills	0	0	3	1.5
TOTAL PERIODS / TOTAL CREDITS			**23**			**18.5**

Subject Code	Professional Elective III
18ECE407	Wireless Communications
18ECE408	Embedded and Real Time Operating systems
18ECE409	DSP Processors

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

IV B.TECH **II – SEMESTER**

S. No.	Subject Code	SUBJECT	L	T	P	Credits
01	XXXX	Professional Elective IV	3	0	0	3.0
02	XXXX	Professional Elective V	3	0	0	3.0
03	18ECP403	Internship	-	-	-	1.5
04	18ECP404	Project	-	-	-	7
TOTAL PERIODS / TOTAL CREDITS			**06**			**14.5**

Subject Code	Professional Elective IV
18ECE410	Radar Engineering
18ECE411	Computer Networks
18ECE412	Global Positioning System
	Professional Elective V
18ECE413	Digital Image processing
18ECE414	Satellite Communication
18ECE415	Software Defined Radio

MC – Mandatory Course
HSMC- Humanities and Social Sciences including Management Courses
BSC- Basic Science Course
ESC-Engineering Science Courses
PC -Professional Core
PE- Professional Elective
IE- Interdisciplinary Elective
Project -Project Work, Seminar, Internship Etc
L - Lecture Hours/Week
T- Tutorial Hours/Week
P- Practical Hours/Week
C- Credits
Int -Internal Marks
Ext - External Ma

Total Credits = 160
Total periods = 193

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem

APPLIED PHYSICS [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

Texts

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

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem

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 - 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. Basic Electrical Engineering - D. C. Kulshreshtha, McGraw Hill, 2009.
3. Basic Electrical Engineering - D. P. Kothari and I. J. Nagrat, Tata McGraw Hill,2010.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ELECTRONIC DEVICES

Subject Code: 18ECT101 **Internal Marks:40**
Credits: 2.0 **External Marks:60**

Course Objectives:

- To understand the structure, properties and importance of materials (conductors, semiconductors and insulators) based on band diagrams and also identify the motion of charged particles in those materials.
- To understand the operation, working, characteristics of semiconductor diode and zener diode.
- To describe the operation, working, characteristics of semiconductor BJT.
- To explain the operation, working, characteristics of JFET and MOSFET.
- To understand the operation, characteristics and applications of special semiconductor devices.

Course Outcomes:

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

CO1: Summarize the characteristics of semiconductor materials.
CO2: Describe the semiconductor diode and zener diode according to working principles and applications.
CO3: Point out the working and behavior of transistor (BJT). in different configurations.
CO4: Point out the working and behavior of JFET and MOSFET.
CO5: Explain the working and applications of special semiconductor devices.

UNIT I

Review of Semi Conductor Physics: Insulators, Semi conductors and conductors classification using Energy Band Diagrams; Mobility and Conductivity; Charge densities in Intrinsic and Extrinsic Semi conductors; Fermi level in Intrinsic and Extrinsic Semiconductors; Effective mass; Mass action law; Drift and Diffusion currents; Total current; Einstein Relationship;

UNIT II

Junction Diode Characteristics: Open circuited P N Junction; Forward and Reverse Bias; Energy Band Diagram of PN Diode; Volt-Ampere Characteristic; Current components in PN Diode; Total diode current; Diode Resistance (Static and Dynamic); Diode capacitance (Transition and Diffusion). Avalanche and Zener Break Down; VI characteristics and applications of Zener diode.

UNIT III

Transistors: Junction transistor; Transistor current components; Characteristics of Transistor in Common Base, Common Emitter and Common Collector configuration; Analytical expressions for Transistor Characteristics; Punch Through/Reach Through; Transistor as an amplifier.

UNIT IV

Field Effect Transistors: Construction of JFET; Comparison between BJT & JFET; JFET characteristics and parameters; Pinch-Off voltage; Construction of MOSFET; MOSFET characteristics (Enhancement and depletion mode).

UNIT V

Special Devices: VI Characteristics and applications of Tunnel Diode, Varactor Diode, LED, Photo Diode, SCR and UJT.

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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

PHYSICS LAB

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

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)

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

WORKSHOP AND MANUFACTURING PRACTICE

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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ENVIRONMENTAL SCIENCE

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

Course Objectives:

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

Course Outcomes:

By Studying this Course Student will

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 pollution problems along with control and their eco-friendly disposal 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 the environmental 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 – case study

Water Resources - Use and over utilization - dams - benefits and problems on Tribes and Environment

Food Resources – Food security concept - changes caused by agriculture and overgrazing - effects of modern agriculture – fertilizer - pesticide problems - water logging - salinity – concept of sustainable agricultural methods - case study

Energy Resources - Non-renewable energy resources – coal – crude oil - natural gas - use of renewable 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 – Nutrient cycles (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 – biomedical wastes - 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 – Global environmental 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 of Pollution) 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 among nations - Population problems - control -Environment and human health - Role of information Technology in Environment and human health

Text Books:

1. Shashi Chawla. 2015, *A Text book of Environmental Studies*, Revised edition, TMH, NewDelhi
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 International edition.
5. Graedel, T.E., Allenby, B.R., *Industrial Ecology and Sustainable Engineering*, Pearson Publications.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

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:

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

CHEMISTRY

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

DIFFERENTIAL EQUATIONS AND TRANSFORM THEORY

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

NETWORK THEORY

Subject Code: 18ECT102 **Internal Marks:40**
Credits: 3.0 **External Marks:60**

Course Objectives:

- 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 introduce the phenomenon Two Port Networks and Ladder Networks.
- To educate on obtaining the transient response of both DC and AC circuits.
- To analyze and synthesis networks.

Course Outcomes:

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

CO1: Knows how to apply theorems to DC circuits.
CO2: Knows how to apply theorems to AC circuits.
CO3: Familiar with Two Port Networks and Ladder Networks.
CO4: Knows how to analyze a given AC or DC transient circuit.
CO5: Gains knowledge how to synthesize a circuit.

UNIT – I

Network Theorems-I:

Kirchhoff's laws, Nodal analysis and Mesh analysis. Superposition, Thevenin's, Norton's , (explanation with relevant theory and problems using AC and DC sources).

UNIT – II

Network Theorems-II:, Milliman's, Reciprocity, Compensation, Substitution, Maximum Power Transfer, Tellegens (explanation with relevant theory and problems using dependent and independent sources).

UNIT – III

Two-port networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, Inverse Transmission line parameters, h-parameters, Inverse h-parameters, relationship between parameter sets, series and parallel connection of two port networks (explanation with relevant theory and problems using dependent and independent sources)

UNIT – IV

Resonance: Introduction, definition of Q, series resonance, bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, bandwidth of parallel resonance (explanation with relevant theory and problems),Locus diagrams.

UNIT – V

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.

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.

Text Books:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 2000, 3/e.
2. Electric Circuit Analysis – Hayt and Kimmarle, TMH.
3. Network Analysis and Filter Design – Chadha, Umesh Publications.

Reference Books:

1. Network lines and Fields – John. D. Ryder, Asia publishing house, 2/e.
2. Schaum's outlines of basic circuit analysis – John O' Malley, McGraw Hill, 2/e.
3. Network Analysis – GK Mithal, Khanna Pub., 1988.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ELECTRONIC CIRCUITS

Subject Code: 18ECT103 **Internal Marks:40**
Credits: 2.0 **External Marks:60**

Course Objectives:

- To Design Half and Full Wave rectifier circuits
- To Design Various Filter and Regulator circuits
- To outline the fundamentals of biasing & Stabilization Techniques and also to understand the concept of Compensation circuits.
- To analyze the small signal model using h-parameters.
- To identify different types of feedback amplifiers.

Course Outcomes:

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

CO1: Recognize function of diode as half wave and full wave rectifier.
CO2: Analyze in terms of ripple factor of various filters and also explain usefulness Regulators
CO3: Estimate operating point of BJT & FET for different regions with stable conditions.
CO4: Describe h-parameter models for BJT and small signal model for JFET.
CO5: Deduce different types of feedback amplifiers.

UNIT – I

Rectifier circuits: Half wave and Full wave rectifier circuits and analysis; Harmonic components in a rectifier circuit, ripple factor of half wave and full wave rectifiers.

UNIT – II

Filters: Inductor filter, Capacitor filter, L – section filter, Π - section filter, Comparison of filter circuits in terms of ripple factor.

Voltage Regulators: Voltage regulation – Line Regulation, Load Regulation, Zener diode as regulator; Transistor Series regulator, Transistor shunt regulator.

UNIT – III

Transistor Biasing and Stabilization: Operating point, fixed bias, collector to base bias, self bias amplifiers; Thermal runaway and Thermal stability; Stabilization against variations in V_{BE} and β (self bias only); Stabilization factors (S, $S^{'}$, $S^{''}$).

Compensation circuits: Introduction to bias compensation, thermistor and sensistor compensation circuits.

UNIT – IV

Low frequency analysis of Transistor: Two port devices and the hybrid model, transistor hybrid model, determination of h-parameters from characteristics, conversion formulas for the parameters of three transistor configurations, analysis of transistor amplifier circuits using h-parameters, comparison of transistor amplifier configurations.

UNIT – V

Feedback Amplifiers: Feedback concept, Transfer Gain with feedback, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output Resistances; Voltage series, voltage shunt, current series and current shunt feedback amplifiers and their analysis.

Text Books:

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 2006, 9/e.
2. Electronic Devices and Circuits – Salivahanan, N.Suresh Kumar, A. Vallavaraj, Tata McGraw Hill, 2/e.

Reference Books:

1. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press, 5/e.
2. Integrated Electronics – J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

CHEMISTRY LAB

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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

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:

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

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ELECTRONIC DEVICES AND CIRCUITS LAB

Subject Code: 18ECL101 **Internal Marks:40**
Credits: 1.5 **External Marks:60**

Course Objectives

- To measure the voltage, time period and phase using CRO.
- To observe experimentally the characteristics of PN junction diode & zener diode.
- To observe experimentally the characteristics of BJT in CB, CE and CC configuration.
- To observe experimentally the characteristics of JFET.
- To find ripple factor of half and full wave rectifiers with and without filter.
- To measure the effect of feedback on voltage and current series feedback amplifiers.

Course Outcomes

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

CO1: Determine the voltage, current and frequency using CRO.
CO2: Draw the characteristics of PN Diode and Zener Diode.
CO3: Explain the characteristics of transistor in CB, CE and CC configurations.
CO4: Compute the characteristics of JFET.
CO5: Find the ripple factor of half and full wave rectifiers with and without filter.
CO6: Measure the effect of feedback on voltage and current series feedback amplifiers.

LIST OF EXPERIMENTS:

1. Measurement of voltage, time period and phase using cathode ray oscilloscope (CRO)
2. PN Junction diode forward and reverse bias characteristics (cut-in voltage, static and dynamic resistance).
3. Zener diode characteristics (breakdown voltage).
4. Transistor CB configuration input and output characteristics (α and input and output resistance).
5. Transistor CE configuration input and output characteristics (β and input and output resistance).
6. Transistor CC configuration input and output characteristics (γ and input and output resistance).
7. UJT characteristics.
8. JFET (g_m, μ and r_d).
9. Rectifier without filter- Half wave & Full wave (ripple factor).
10. Rectifier with Capacitive filter - Half wave & Full wave (ripple factor).
11. Current series (CE amplifier) feedback amplifier – Frequency response (gain, input and output resistance with and without feedback)
12. Voltage series (CC amplifier/Emitter follower) feedback amplifier – Frequency response (gain, input and output resistance with and without feedback)

Aditya Institute of Technology and Management (Autonomous), Tekkali

I Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ENGINEERING GRAPHICS & DESIGN

Subject Code: 18ESL104 **Internal Marks:40**
Credits: 2.0 **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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

CONSTITUTION OF INDIA

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

Course Objectives:

- To help Students regulate their behavior in a social environment as Engineering Professionals.
- To make students aware of the impact of taking social, legal and Administrative decisions about their profession.
- To understand the political and constitutional parameters in work environment.
- 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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

COMPLEX VARIABLES AND STATISTICAL METHODS

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

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

CO1: Construct a harmonic and conjugate harmonic function.
CO2: Evaluate integrals using the Cauchy Integral formulae and identify singular points of a function then calculate residues using Residue Theorem.
CO3: Execute Central limit theorem for Sampling Distributions and perform t –test, z test, Chi-square test.
CO4: Test for sampling distributions of one mean, two means and their difference at α level of significance.
CO5: 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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: 18EST202 **Internal Marks:40**
Credits: 3 **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 3 rd 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

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ENGINEERING MECHANICS

Subject Code: 18EST203 **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:

CO1: Determine the resultant of a planar force system using resolution of force and principle of moments.
CO2: 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.
CO3: 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.
CO4: Calculate cetroid and moment of inertia of plane figures of triangular, rectangular and circular cross sections.
CO5: 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.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

SIGNALS & SYSTEMS

Subject Code: 18ECT204 **Internal Marks:40**
Credits: 3 **External Marks:60**

Course Objectives:

- Describe signals and systems in mathematical framework.
- Discuss the fundamental concepts of signals in Fourier domain.
- Demonstrate an understanding of the fundamental properties of Linear Time Invariant systems.
- Acquire knowledge on need of sampling, convolution and correlation concepts.
- Discuss the importance of Laplace and Z- Transforms.

Course Outcomes:

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

CO1: Classify various types of signals and systems
CO2: Compute the Fourier series and Fourier transform of a set of well-defined continuous time signals.
CO3: Analyze the characteristics of Linear Time Invariant systems
CO4: Explain the need of sampling, convolution and correlation concepts.
CO5: Summarize the concepts of Laplace and Z transforms

UNIT – I

Signal Analysis: Introduction to signals and systems, classification of signals and systems, analogy between vectors and signals, orthogonal signal space, signal approximation using orthogonal functions, mean square error, closed or complete set of orthogonal functions, orthogonality in complex functions, exponential and sinusoidal signals, properties of elementary signals.

UNIT – II

Fourier series: Representation of Fourier series, continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, trigonometric and exponential Fourier series, Complex Fourier spectrum.

Fourier Transform: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signals and standard signals, properties of Fourier transforms, Fourier transform of periodic signals.

UNIT – III

Continuous Time LTI systems: Representation of continuous time signals in terms of impulses, Linear time variant and invariant systems, Unit impulse response and the convolution integral representations of LTI system, transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, signal bandwidth, system bandwidth, ideal LPF, HPF and BPF characteristics, causality and Poly-Wiener criterion for physical realization.

UNIT – IV

Convolution and Correlation of Signals: Concept of convolution and correlation in time domain and frequency domain, cross correlation and auto correlation, energy and power density spectrum, properties of correlation.

Sampling of Signals: Sampling theorem, Impulse sampling, Natural and Flat top sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT – V

Laplace Transform: Review of Laplace transforms, Laplace Transforms of typical signals, properties of LT, relation between LT and FT of a signal. Region of convergence (ROC) and constraints on ROC. Inverse Laplace transforms.

Z – Transform: Introduction to z-transform and its properties, ROC and its properties.

Text Books:

1. Signals, Systems and Communications – B.P. Lathi, BS Publications, 2003.
2. Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2/e.
3. Signals and Systems – K. Dheerga Rao, Publisher: BIRKHAUSER BOSTON INC, 2018

Reference Books:

1. Signals & Systems – Simon Haykin and Van Veen,Wiley, 2/e.
2. Fundamentals of Signals and Systems – Michel J. Robert, MGH International Edition, 2008.
3. Charles L.Phillips, John M. Parr, Eve A. Riskin, "Signals, Systems, and Transforms", Pearson Publications, 4th Edition.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ELECTRONIC CIRCUITS ANALYSIS

Subject Code: 18ECT205 **Internal Marks:40**
Credits: 3 **External Marks:60**

Course Objectives:

- Apply the concept of feed back to the Oscillators
- Introduce concepts of BJT and FET as a single stage amplifier
- Introduce concepts in Cascading in BJT and FET amplifier
- Understand the high frequency Analysis of BJT.
- Understand the design concept of power amplifier and tuned amplifiers

Course Outcomes:

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

CO1: Examine the application of positive feedback as an oscillator
CO2: Extrapolate BJT and FET as an amplifier
CO3: Extrapolate BJT and FET amplifier used for cascading stages.
CO4: Analyze BJT at high frequency model
CO5: Differentiate BJT and FET amplifier as a power amplifier for high voltage applications and Interpret the concepts of tuned amplifiers

UNIT – I

Oscillators: Introduction, Condition for oscillations, Barkhausen Criterion. RC oscillators: RC-phase shift oscillators, Wien bridge oscillator, LC Oscillators: Hartley, Colpitts and Crystal oscillators. (Frequency of oscillation derivation for both RC&LC Oscillators)

UNIT – II

Single stage Amplifiers: Simplified common emitter hybrid model, simplified calculations for common collector configuration and common base amplifier, common emitter amplifier with emitter resistance, Emitter follower, Miller's theorem and dual of Miller's theorem
FET: As voltage variable resistor, Small signal model of FET.

UNIT – III

Multistage Amplifiers: Cascading transistor amplifiers, Coupling Methods, choice of transistor configuration in cascade amplifier, frequency response and analysis of two stage RC coupled Amplifier, Cascade Amplifier, Cascode Amplifier, Darlington pair, JFET amplifiers (only CS).

UNIT – IV

High frequency Analysis: Hybrid- π common emitter transistor model, hybrid π conductance, hybrid π capacitance, validity of hybrid π model, variation of hybrid parameters, CE short circuit

gain, current gain with resistive load, single stage CE transistor amplifier response, gain bandwidth product, Emitter follower at high frequencies.

UNIT – V

Power Amplifiers: Class A large signal Amplifiers, Second harmonic Distortions, Higher order harmonic Distortion, Transformer Coupled Audio power amplifier, Push-pull amplifiers, Class B Amplifiers, Class AB operation, Complementary Symmetry push pull amplifier, MOSFET power amplifier, Thermal stability and Heat sink.

Tuned Amplifiers: Single tuned and staggered tuned amplifiers – analysis, Double Tuned Amplifiers- Band width calculation.

Text Books:

1. Integrated Electronics – J. Millman and C. Halkias, Mc Graw-Hill, 1972.
2. Electronic Devices and Circuits – Salivahanan, N.Suressh Kumar, A. Vallavaraj, Tata McGraw Hill, 2/e.

Reference Books:

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 2006, 9/e.
2. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press, 5/e.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

PROBABILITY AND STOCHASTIC PROCESSES

Subject Code: 18ECT206 **Internal Marks:40**
Credits: 3 **External Marks:60**

Course Objectives:

- To provide mathematical background of probability to solve probabilistic problems in signal processing and communication.
- To study the concept of random variables and operations on random variable.
- To understand the overview of multiple random variables
- To understand the basic theoretical concepts of random process
- To understand the need of spectral analysis of a random process and application to the signal processing in the communication system.

Course Outcomes:

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

CO1: Recall the mathematical concepts related to probability theory.
CO2: Understand random variable and distribution functions
CO3: Translate one random variable to multiple random variables.
CO4: Understand random process and its temporal characteristics.
CO5: Discriminate the power spectrum estimation in time and frequency

UNIT – I

Probability: Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definition and Axioms, Mathematical Model of Experiments, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

UNIT- II

Random variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables

Operation on One Random Variable Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Characteristic Function, moment generating function

Distribution & Density Functions: Uniform, Gaussian, binomial and Possion density functions.

UNIT-III

Multiple random variables: Vector random variables, joint distribution function, properties of joint distribution, marginal distribution functions, conditional distribution, density functions, statistical independence and sum of two random variables. Central limit theorem

Operations on multiple random variables: Expected value of a function of random variables, joint moments about the origin, joint central moments.

UNIT – IV

Random Processes – Temporal Characteristics: The random process concept, classification of processes, Deterministic and Nondeterministic processes, concept of stationarity and statistical independence. First – order, second – order, wide – sense and strict – sense stationarity. Time average and Ergodicity and mean – Ergodic Processes. Autocorrelation function and its properties,

Unit – V

Random Processes – Spectral Characteristics: Power spectrum Properties, Relationship between power spectrum and autocorrelation function, cross – power density spectrum and its properties.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 2001, 4/e.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PHI, 2002, 4/e.

Reference Books:

1. Probability, Stastistics and Random Processes – K.Murugesan and P.Gurusamy, Anuradha Publications.
2. Probability Methods of Signal and System Analysis - George R. Cooper, Clave D. MC Gillem, Oxford, 1999, 3/e.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

PROGRAMMING FOR PROBLEM SOLVING LAB

Subject Code: 18ESL202 **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 3 rd 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

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 1st Sem.

ELECTRONIC CIRCUITS ANALYSIS LAB

Subject Code: 18ECL202 **Internal Marks:40**
Credits: 1.5 **External Marks:60**

Course Objectives:

- To design RC phase shift oscillator using transistors for different frequencies
- To design Wien Bridge oscillator using transistors for different frequencies
- To obtain frequency response of Single Stage amplifier .
- To obtain frequency response of two stage RC coupled amplifier
- To obtain the conduction angle of Power amplifier and to design single tuned amplifier

Course Outcomes:

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

CO1: Construct the RC phase shift oscillator using transistors for different frequencies
CO2: Design Wien Bridge oscillator using transistors for different frequencies
CO3: Estimate frequency response of Single Stage amplifier
CO4: Estimate frequency response of two stage RC coupled amplifier
CO5: Calculate the conduction angle of Power amplifier and resonant frequency of single tuned amplifier.

Design and Simulation in Simulation Laboratory using Multisim / Pspice / Equivalent Simulation Software & verifying the result by hardware:(Any 6 experiments)

1. RC Phase Shift Oscillator using Transistors - Design for different frequencies
2. Wien Bridge Oscillator using Transistors- Design for different frequencies
3. Two Stage RC Coupled amplifier – Frequency response
4. Series Voltage Regulator
5. Shunt Voltage Regulator
6. Class A Power Amplifier
7. Class B Power Amplifier
8. Class C Power Amplifier
9. Single Tuned Voltage Amplifier

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ELECTRO MAGNETIC WAVES & TRANSMISSION LINES

Subject Code: 18ECT207 **Internal Marks:40**
Credits:4 **External Marks:60**

Course Objectives:

- To apply differential equations, vector algebra, integral multivariate calculus and complex calculus to solve for basic electrostatic, magneto static and electromagnetic field problems.
- To analyze the interaction of electromagnetic fields in different media.
- To demonstrate the completeness of Maxwell‘s relations for describing electromagnetic fields.
- To describe the propagation of plane electromagnetic waves in lossless and lossy media.
- To solve for the reflection and transmission of uniform plane waves at planar interfaces
- To learn overall concepts of Transmission line theory.

Course Outcomes:

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

CO1: Apply differential equations, vector algebra, integral multivariate calculus and complex calculus to solve for basic electrostatic, magneto static and electromagnetic field problems.
CO2: Analyze the interaction of electromagnetic fields in different media.
CO3: Describe electromagnetic fields using Maxwell‘s relations.
CO4: Solve the reflection and transmission of uniform plane waves at planar interfaces.
CO5: Learn about Transmission line theory.

UNIT – I

Review of Coordinate Systems, Vector Calculus. Electrostatics : Coulomb‘s Law, Electric Field Intensity, Charge Distributions, Electric Flux Density, Gauss Law, Electric Potential, Maxwell‘s Two Equations for Electrostatic Fields, Dielectric Constant, Continuity Equation, Poisson‘s and Laplace‘s Equations.

UNIT – II

Magneto Statics : Biot-Savart Law, Ampere‘s Circuital Law and Applications, Magnetic Flux Density, Maxwell‘s Two Equations for Magneto static Fields, Forces due to Magnetic Fields.

UNIT – III

Maxwell’s Equations for Time Varying fields : Faraday‘s Law and emf, Inconsistency of Ampere‘s Law and Displacement Current Density, Maxwell‘s Equations in
Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric - Dielectric and Dielectric-Conductor Interfaces.

UNIT – IV

Time Varying EM Waves : Medium Characterization ,Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations between E & H. Wave Propagation in Lossless ,Conducting Media, Good Conductors and Good Dielectrics. Poynting Theorem, Polarization.

UNIT – V

Transmission Lines: Types, Parameters, Line Equations, Primary & Secondary Constants, Phase and Group Velocities, Infinite Line Concepts, Loss less/Low Loss Characterization, Condition for Distortion. Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. λ/8, λ/4, λ /2 Lines, introduction to Smith Chart & stub matching.

Text Books:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 2001, 3/e.
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 2006, 7/e.
3. Electromagnetic Field Theory and Transmission Lines – Gottapu SashibhushanaRao Wiley India PVT.LTD. New Delhi, 1/e.
4. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001

Reference Books:

1. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2000, 2/e.
2. Schaums Outline Series – Electromagnetics – Joseph A Edminister, Tata Mcgraw Hill, 3/e.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

ANALOG COMMUNICATIONS

Subject Code: 18ECT208 **Internal Marks:40**
Credits:3 **External Marks:60**

Course Objectives:

- Discuss the basic elements of a communication system and amplitude modulation.
- Explain the representation, generation and demodulation of various forms of amplitude modulation.
- Describe the concepts, generation and detection of frequency and phase modulation schemes.
- Describe various issues in radio transmitters and receivers
- Explain pulse modulation schemes and compare various analog modulation schemes w.r.t noise

Course Outcomes:

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

CO1: Explain the basic elements of communication system, need for modulation and elaborately about amplitude modulation.
CO2: Describe the time and frequency domain representation, generation and demodulation of DSBSC, SSB and VSB modulation schemes.
CO3: Discuss the concepts of angle modulation.
CO4: Explain various issues in radio transmitters and receivers
CO5: Describe pulse modulation schemes and estimate the noise in analog modulation schemes

UNIT – I

Introduction: Introduction to communication system, need for modulation, classification of modulation techniques.

Amplitude Modulation: Time domain and frequency domain description; Single tone and multi tone AM modulation; Power relations in AM wave; Generation of AM Waves – Square Law Modulator, Switching Modulator. Detection of AM wave: Square Law Detector, Envelope Detector.

UNIT – II

DSBSC Modulation: Time domain and frequency domain description, Generation of DSBSC Wave - Balanced Modulators, Ring Modulator. Coherent detection of DSBSC Modulated wave, COSTAS Loop.

SSB Modulation: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated wave, Time domain description, Phase discrimination method for generating AM SSB Modulated wave. Demodulation of SSB wave, VSB Modulation, Comparison of AM Techniques.

UNIT – III

Angle Modulation: Introduction, Spectral Analysis of Sinusoidal FM and PM signals, Differences between FM and PM signals, Narrow band FM, Wide band FM, Generation of FM and PM Signals - Direct and indirect methods. Detection of FM wave - Balanced Frequency discriminator, phase discriminator, Phase locked loop, Comparison of FM & AM.

Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Comparison between TDM and FDM.

UNIT – IV

Radio Transmitters: Classification of Transmitters, AM Transmitter-low level and high level modulation, FM Transmitters – Variable reactance and phase modulated types.

Radio Receivers: Classification of Receivers - Tuned radio frequency receiver, super heterodyne receiver, FM Receiver, Comparison with AM Receiver.

UNIT – V

Pulse Modulation: Types of Pulse modulation, Generation and demodulation of PAM; Generation and demodulation of PWM; Generation and demodulation of PPM.

Noise in analog modulation: Signal-to-Noise ratios, AM receiver model, SNR for coherent reception, noise in AM receivers in using envelope detection, FM receiver model, FM Threshold effect, Pre-emphasis & de-emphasis.

Text Books:

1. An Introduction to Analog and Digital Communications - Simon Haykin, John Wiley, 2/e.
2. Principles of Communication Systems – H Taub and D. Schilling, TMH, 2007, 3/e.

Reference Books:

1. Electronics & Communication System – George Kennedy and Bernard Davis, TMH, 2004.
2. R.P. Singh, S.D Sapre, "Communication Systems", 2nd Edition, TMH, 2007.
3. Communication Systems – B.P. Lathi, BS Publication, 2006.

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

DIGITAL ELECTRONICS

Subject Code: 18ECT209 **Internal Marks:40**
Credits:3 **External Marks:60**

Course Objectives:

- To solve a typical number base conversions and analyze new error coding techniques
- To optimize logic gates for digital circuits using various techniques
- To understand concepts of Adders and Subtractors.
- To analyze different types of decoders, encoders, code converters, multiplexers and comparators
- To develop advanced sequential circuits

Course Outcomes:

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

CO1: Classify different number systems and apply to generate various codes.

CO2: Use the concept of Boolean algebra in minimization of switching functions

CO3: Design different types of Adders and Subtractors

CO4: Design different types of decoders, encoders, code converters, multiplexers and comparators

CO5: Apply knowledge of flip-flops in designing of Registers and Counters

UNIT – I

Review of Number systems: Number systems base conversion methods, complements of numbers, r's, r – 1's compliment subtraction, BCD, excess-3, alphanumeric code, self complement codes, 2421, gray code, error detection and correction codes, Parity checking codes, Hamming codes.

UNIT – II

Logic operations: Logic gates, Boolean theorems, complements and dual of logic expressions, standard SOP and standard POS. Minimization of logic functions using theorems. Multi level NAND – NAND, NOR – NOR realizations.

Minimization of switching functions: Minimization of switching functions using K – map up to 5-variables and, tabular minimization, code converters.

UNIT – III

Combinational logic circuits-I: Design of half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary adder, 4-bit binary subtractor, BCD adder, excess – 3 adder, carry look ahead adder.

UNIT – IV

Combinational logic circuits-II: Design of decoder, encoder, multiplexer, de-multiplexer, priority encoder, comparators and LED seven segment display.

UNIT – V

Sequential logic circuits: Classification of sequential circuits, flip-flops with truth tables and excitation tables. Conversion of flip-flops. Design of ripple counters, synchronous counters, Design of shift registers, buffer shift register, bi – directional shift register and universal shift register. Johnson and ring counters.

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, John Wiley & Sons; 3 edition (June 19, 1987)

Reference Books:

1. Digital design – Moris Mano, PHI, 2/e., Pearson publication, 4th Edition , 2009.
2. Fundamentals of Logic Design – Charles H.Roth Jr, Jaico Publishing House; First edition (28 September 1992).

Aditya Institute of Technology and Management (Autonomous), Tekkali

II Year B.Tech (Electronics and Communication Engineering) – 2nd Sem.

PULSE AND DIGITAL CIRCUITS

Subject Code: 18ECT210 **Internal Marks:40**
Credits:3 **External Marks:60**

Course Objectives:

- To introduce Wave shaping concepts of both linear and non linear circuits
- To study about switching characteristics of devices
- To study about the analysis and designing of multivibrators
- To Know the basic operating principles of sampling gates and their applications
- To learn about the time base generators and blocking oscillators

Course Outcomes:

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

CO1: Construct different linear networks like low pass and high pass circuits and determine their response to different signals
CO2: Determine the transfer characteristics of clippers and clamper circuits
CO3: Determine the switching characteristics of semiconductor devices and analysis of binary
CO4: Design of multivibrators and analysis of time base generators
CO5: Analysis of blocking oscillators and sampling gates

UNIT – I

Linear wave shaping: High pass, low pass RC circuits; response of high pass and low pass RC circuit for sinusoidal, step, pulse, square and ramp inputs; RC circuit as differentiator, integrator and attenuator; RL and RLC circuits and their response for step input.

UNIT – II

Non – Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem.

UNIT – III

Switching Characteristics of Devices: Diode and transistor as switches, Design of transistor switch, transistor-switching times.

Bistable Multivibrators: Design and Analysis of Bistable Multivibrators; Fixed bias and self biased transistor binary circuits, commutating capacitors, triggering in binary, Schmitt trigger.

UNIT – IV

Monostable Multivibrators : Design and Analysis of monostable multivibrator, triggering in monostable multivibrator.

Astable Multivibrators: Design and Analysis of astable multivibrator using transistors ,Astable multivibrator as voltage to time converter.

UNIT – V

Time Base Generators:Methods of generating time base waveform; Miller and Bootstrap time base generators – basic principles; Transistor miller time base generator; Transistor Bootstrap time base generator.

Sampling Gates:

Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, reduction of pedestal in Gate circuits, four diode sampling gates, Applications sampling gates

Text Books:

1. Pulse, Digital and Switching Waveforms – J. Millman and H. Taub, McGraw-Hill, 1991.

Reference Books:

1. Pulse and Digital Circuits – Venkata Rao K., Ramasuda K., Manmadharao G., Pearson Education, 2010.
2. Pulse and Digital Circuits – MS Prakash Rao, Tata McGrawHill.

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TRANSFORM THEORY

(Interdisciplinary Elective - I)

Subject Code: 18IET211 **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Objectives:

- To study the Laplace transform of different basic functions and its properties.
- To apply Inverse Laplace transforms to solve differential equations.
- To expand a function in Fourier series/ half range series valid for different intervals.
- To acquire knowledge of Fourier transform and its properties.
- To evaluate a partial differential equations.

Course Outcomes:

The student will be able to:

CO1: Evaluate the Laplace transform of different functions utilizing different properties.
CO2: Apply Laplace transforms to solve differential equations.
CO3: Expand a function in Fourier series/ half range series valid for different intervals.
CO4: Evaluate Fourier transform of different functions using its properties.
CO5: Solve 1-D wave equation and 1-D Heat equation by method of separation of Variables.

UNIT-I

Laplace Transforms:

Laplace Transform - Properties - Laplace transform of derivative, integrals, multiplication by t^n and division by t.

UNIT-II

Inverse Laplace Transforms:

Inverse Laplace Transform –Evaluation by partial fractions, convolution theorem, applications to ordinary differential equations.

UNIT-III

Fourier Series :

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

UNIT-IV

Fourier Transforms :

Fourier Integral Theorem (without proof)- Fourier sine and cosine integrals –Fourier transform – Fourier sine and cosine transforms – Inverse Fourier, sine and cosine transforms.

UNIT-V
Applications of Partial Differential Equations:

Method of Separation of variables –One dimensional wave equation - one dimensional heat equation.

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

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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

CO1: Solve the algebraic and transcendental equations by identifying suitable numerical methods.
CO2: Estimate a linear and non-linear curve to the given data by the method of least squares.
CO3: 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.
CO4: Estimate the value of derivatives and evaluate the definite integrals using different numerical methods and evaluate an IVP.
CO5: 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.

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INTRODUCTION TO NUMBER THEORY

(Interdisciplinary Elective - I)

Subject Code: 18IET213 **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Objectives:

- Identify importance of divisibility, prime and composite numbers in engineering field.
- Understand the process of congruence and solve linear congruence using their properties.
- Gain knowledge and importance of Euler-Fermat Theorem, Wilson Theorem, Chinese Remainder Theorem.
- Know the application of Mobious function and Euler totient function in their relevant problems.
- Calculate Quadratic Residues and use Quadratic reciprocity law in engineering subjects.

Course Outcomes:

Student is able to

CO1: Solve the divisibility problems, GCD, LCM, Bracket function.
CO2: Solve congruence problems, solutions of linear congruence equations.
CO3: Apply Euler-Fermat Theorem, Wilson and Chinese Remainder Theorems in engineering problems
CO4: Apply Euler-totient function and solve engineering relevant problems.
CO5: Estimate the reciprocity of a number.

UNIT-I:

Divisibility

Divisibility, Statement of Division Algorithm, GCD, Prime, Composite numbers, Statement of Fundamental theorem of Arithmetic, LCM, Bracket function, Properties.

UNIT-II :

Congruence

Congruence, linear congruence, properties and their solutions

UNIT-III:

Euler-Fermat Theorem, Wilson Theorem, The Chinese Remainder Theorem

Statement of Euler's Theorem, Fermat Theorem, Wilson Theorem, the Chinese Remainder Theorem, properties and problem.

UNIT-IV:

Euler's Function

Mobius function $\mu(n)$, Euler's totient function $\emptyset(n)$, product formula.

UNIT-V

Quadratic Residues and the Quadratic Reciprocity Law

Quadratic residues, Legendre's symbol and its properties, Evolution of (-1/p) and (2/p), Gauss' lemma, the Quadratic Reciprocity law, application of the reciprocity law, the Jacobi symbol.

Text books:

1. Tom M, Apostol: Introduction to Analytic Number theory (Springer International Student Edition). Naroda Publishing House, Springer Publisher -8th reprint.ISBN: 81-85015-12-0.
2. Abhijit das: Computational number theory, CRC Press, A Chapman & Hall Book.(Online edition)

References

1. Theory of Numbers by Prakash Om, Laxmi Publications (p) LTD, New Delhi.

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WATER SHED MANAGEMENT

(Interdisciplinary Elective - I)

Subject Code: 18IET214 **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Objectives:

- to study the concept, objectives, need &Integrated and multidisciplinary approach of watershed development, characteristics of watershed
- to study the principles of erosion which include Types ,factors affecting, Effects, estimation of soil loss of erosion etc., and measures to control erosion which include contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rock fill dams, brushwood dam, Gabion.
- to study the water harvesting which include Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks
- to study the Land management which include Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.
- to study the Ecosystem management which include Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

Course Outcomes:

CO1: Describe concepts and characteristics of watershed management .
CO2: Explain principles of erosion and various measures to control erosion.
CO3: Describe about rain water harvesting and its structures.
CO4: Describe about land management.
CO5: Describe about ecosystem management.

UNIT-I

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

Characteristics of watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds. study of SOI toposheet and corresponding satellite picture

UNIT-II

Principles of erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

Measures to control erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-III

Water harvesting: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-IV

Land management: Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

UNIT-V

Ecosystem management: Role of Ecosystem, soil enrichment, cropping pattern, sustainable agriculture, dry land agriculture, social forestry and afforestation.

Text books:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

Reference:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

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COMPUTER AIDED ENGINEERING DRAWING

(Interdisciplinary Elective - I)

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

Course Objectives:

Students will have

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

Course Outcomes:

Students will get ability

CO1: Draw points, lines, curves, polygons, dimensioning etc., using Drawing tools by AutoCAD.
CO1: Draw object by using object selection commands to edit the drawing, 2D wire framing in AutoCAD.
CO1: Draw the object applying utility and modified commands by AutoCAD.
CO1: Draw isometric projections, Orthographic projections and solids using AutoCAD.
CO1: 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.

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INTRODUCTION TO MATHEMATICAL SIMULATION AND MODELING

(Interdisciplinary Elective - I)

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

Course Objectives:

- To understand the basic principles of MATLAB programming.
- Implementation of mathematical concepts in MATLAB.
- To develop numerical algorithms using MATLAB.
- Evaluate the computational results using graphical representations.

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.

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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

CO1: To gain thorough knowledge in engineering materials and their structures.
CO2: To gain thorough knowledge in deformation in different engineering materials.
CO3: Understand necessity of hot and cold working methods.
CO4: Understand thoroughly mechanical properties.
CO5: 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.

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ENGINEERING OPTIMIZATION TECHNIQUES

(Interdisciplinary Elective - I)

Subject Code: 18IET218 **Internal Marks:40**
Credits: 2 **External Marks:60**

Course Objectives:

- To formulate linear programming problem and solve linear programming problem by using graphical procedure.
- To understand computational procedure of simplex method and artificial variable technique.
- To understand the step wise procedure in obtaining optimum solution to transportation problem and Hungarian method for assignment problem.

Course Outcomes:

On completion of this course, students should be able to

CO1: Formulate and solve linear programming problem by using graphical method.
CO2: Solve the linear programming problem using simplex method and artificial variable technique.
CO3: Solve both balanced and unbalanced transportation problem.
CO4: Solve both balanced and unbalanced assignment problems.
CO5: Solve single variable and multi variable optimization problems using classical optimization techniques.

UNIT-I

Linear programming: Formation of linear programming problem, Graphical solution to linear programming problem, simplex method, Big-M method.

UNIT-II

Transportation Problem: Formulation, Optimal solution, unbalanced transportation problems

UNIT-III

Assignment Problem: Formulation, Optimal solution, Traveling salesman problem.

UNIT-IV

Network Models: Project network, CPM and PERT, Critical path scheduling, Cost considerations in project scheduling.

UNIT-V

One dimensional Optimization methods: Fibonacci, Golden Section methods, Gradient of a function, steepest descent method

Genetic algorithm: working principle, reproduction, crossover, mutation, draw backs of GA.

TEXT BOOKS:

1. Introduction to Operations Research by V. K. Kapoor, S. Chand Publishers
2. Operations Research, S.D. Sharma, Kedarnath Ramanadh Pub.
3. Optimization for Engineering Design by K.Deb, PHI

REFERENCES BOOKS:

1. Operations Research, J.K. Sharma, MacMilan Pub.
2. Operations Research by P. Rama Murthy, New Age Pub.
3. CPM & PERT, L.S. Srinath, Affiliated East West Press

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UNIX UTILITIES

(Interdisciplinary Elective - I)

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

Course Objectives:

Course Outcomes:

CO1: Understands UNIX Architecture and Functions of OS
CO2: Effectively use the UNIX system to accomplish typical personal, office, technical, and software development tasks.
CO3: Effectively use software development tools including libraries, pre-processors, compilers, linkers, and make files.
CO4: Prepare simple readable user documentation using shell scripts.
CO5: 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.

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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 a business environment.
- Builds upon the essential core Network Security and storage management with greater emphasis.

Course Outcomes:

CO1: Describe the business value and processes of ICT services in an organization and apply that knowledge and skill with initiative to a workplace scenario.
CO2: Analyze and evaluate the impact of new and current ICT services to an organization.
CO3: Describe how effective IT Infrastructure Management requires strategic planning with alignment from both the IT and business perspectives in an organization.
CO4: Characteristics of the network Security that affect user operations.
CO5: 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.

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ANALOG COMMUNICATIONS LAB

Subject Code: 18ECL203 **Internal Marks:40**
Credits:1.5 **External Marks:60**

Course Objectives:

To make the students exposed on

- Various analog modulation and demodulation schemes
- Verify sampling theorem
- Analyze various modulated schemes by using spectrum analyzer
- Various associated circuits of analog modulation schemes
- Demonstrate the action of PLL

Course Outcomes:

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

CO1: Integrate and test AM and FM modulators and demodulators
CO2: Illustrate sampling theorem in different conditions
CO3: Analyze AM and FM signals using Spectrum analyzer
CO4: Test associated circuits such as AGC, pre-emphasis and de-emphasis
CO5: Integrate and test various pulse modulation and demodulation schemes
CO6: Estimate lock range and capture range of PLL

List of Experiments (At least ten experiments are to be done) :

1. AM – Modulation and Demodulation.
2. AM - DSB SC - Modulation and Demodulation.
3. FM - Modulation and Demodulation.
4. Spectrum Analysis of Modulated signal using Spectrum Analyzer
5. Diode Detector
6. Pre-emphasis & De-emphasis
7. AGC Circuits
8. PLL & FM Demodulation using PLL.
9. Sampling Theorem
10. PAM - Modulation and Demodulation.
11. PWM - Modulation and Demodulation.
12. PPM - Modulation and Demodulation.

Note: **Any five experiments are to be completed by using MATLAB**

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DIGITAL ELECTRONICS LAB

Subject Code: 18ECL204 **Internal Marks:40**
Credits:1.5 **External Marks:60**

Course Objectives:

- Verify the truth tables of logic gates
- Design and verify the operation of combinational circuits.
- Design and verify the operation of sequential circuits
- Verify the operation of Johnson/ring counter

Course Outcomes:

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

CO1 : Distinguish logic gates for design of digital circuits
CO2 : Design different types of Combinational logic circuits
CO3 : Design different types of code converters
CO4 : Analyze the operation of flip-flops
CO5 : Apply knowledge of flip-flops in designing of Registers and Counters

List of Experiments (At least ten experiments are to be done) :

1. Verification of logic Gates
2. Half/Full Adder/Subtractor
3. Parallel Adder/Subtractor
4. Excess-3 to BCD & Vice Versa
5. Binary-Gray & Gray-Binary Converter
6. MUX/DEMUX
7. MUX/DEMUX using NAND Gates only
8. Comparators
9. Encoder/Decoder
10. Flip-Flops
11. Counters
12. Shift Registers
13. Johnson/Ring Counters

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PULSE AND DIGITAL CIRCUITS LAB

Subject Code: 18ECL205 **Internal Marks:40**
Credits:1.5 **External Marks:60**

Course Objectives:

- Design of low pass and high pass filter for different time constants.
- Examine the operation of clippers and clampers.
- Analysis of logic gates and sampling gates.
- Generation of different types of waveforms using transistor circuits.
- Evaluation of UTP and LTP using Schmitt Trigger.
- Design of switch using transistor.

Course Outcomes:

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

CO1: Design linear and non linear wave shaping circuits.

CO2: Demonstrate the operation of logic gates and sampling gates.

CO3: Analyze multivibrators and its applications.

CO4: Generate Oscillations and sweep signals using UJT and Boot strap circuits.

CO5: Test and explain the operation of Transistor as a switch.

List of Experiments (at least ten experiments are to be done) :

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Sampling Gates.
6. Astable Multivibrator.
7. Monostable Multivibrator.
8. Bistable Multivibrator.
9. Schmitt Trigger.
10. UJT Relaxation Oscillator.
11. Bootstrap sweep circuit.

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MINOR PROJECT-1

Subject Code: 18ECP201 **Internal Marks:**
Credits:2 **External Marks:**

Course Objectives:

Course Outcomes: