SRINIVASA EDUCATIONAL SOCIETY'S

PACE INSTITUTE OF TECHNOLOGY & SCIENCES

(AUTONOMOUS)

Approved by AICTE, UGC, New Delhi & Govt. of Andhra Pradesh | Permanently Affiliated to JNTUK, Kakinada, A.P.

ACCREDITED BY **NAAC** WITH **'A'** GRADE | ACCREDITED BY **NBA**

An ISO 9001 : 2008 Certified Institution |'A' Grade Engineering College by Government of A.P.

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DEPARTMENT OF

ELECTRICAL & ELECTRONICS ENGINEERING

ACADEMIC REGULATIONS
AND
COURSE STRUCTURE & SYLLABI

(For the students admitted to

B.Tech Regular Four Years Programme from the Academic Year 2018-19

and

B.Tech Lateral Entry Scheme from the Academic Year 2019-20)

ACADEMIC REGULATIONS R-18 FOR B.Tech (REGULAR)

(CHOICE BASED CREDIT SYSTEM)

Applicable for the students of B.Tech (Regular) from the Academic Year 2018-19
&
B.Tech Lateral Entry Scheme from the Academic Year 2019-20

1. ELIGIBILITY CRITERIA FOR ADMISSION

The eligibility criteria for admission into B.Tech programme shall be as per the guidelines issued by the Andhra Pradesh State Council of Higher Education (APSCHE) and/or by any other competent authority.

2. PROGRAMMES OFFERED (UNDER GRADUATE)

A student shall be offered admission into any one AICTE-approved programme as given below:

S.No	PROGRAMME
01	Civil Engineering (CE)
02	Electrical and Electronics Engineering (EEE)
03	Mechanical Engineering (ME)
04	Electronics and Communication Engineering (ECE)
05	Computer Science and Engineering (CSE)
06	Information Technology (IT)
07	Automobile Engineering (AME)

3. AWARD OF DEGREE

A student will be declared eligible for the award of B. Tech. degree, if he/she fulfils the following academic requirements:

i. 4 Year B.Tech Programme:

- The Student shall study a course for not less than four academic years and not more than eight academic years.
- The student shall register for 160 credits and secure all the 160 credits.
- The students, who fail to fulfil all the academic requirements for the award of degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech Programme.

- Students shall secure a satisfactory grade (SA) in all Mandatory Courses (Non Credit Courses/Activities).
- No disciplinary action pending against the student by the time of the completion of his/her course. If any disciplinary action is pending against any student, he/she should not be awarded with the degree.

ii. 3 Year B.Tech Programme under Lateral Entry Scheme (LES):

- The Student shall study a course for not less than three academic years and not more than six academic years.
- The student shall register for 120 credits and secure all the 120 credits.
- The students, who fail to fulfil all the academic requirements for the award of degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech programme.
- Students shall secure a satisfactory grade (SA) in all non-credit courses/ activities. (Non Credit Courses/Activities).
- No disciplinary action pending against the student by the time of the completion of his/her course. If any disciplinary action is pending against the student, he/she should not be awarded with the degree.

4. MEDIUM OF INSTRUCTION

The medium of instruction shall be English in all academic activities.

5. MINIMUM INSTRUCTION DAYS

The minimum instruction days for each Semester shall be 90.

6. CATEGORIZATION OF COURSES

6.1 Choice Based Credit System (CBCS)

The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses). The CBCS provides a 'cafeteria' type approach in which students can take courses of their choice, learn at their own pace and adopt an interdisciplinary approach to learning.

6.2 The curriculum of each programme shall contain various courses indicated in the following categories to train the students for employment, higher learning & research and entrepreneurship.

i. **Humanities and Social Sciences (HS):** These courses include Technical English, Environmental Science and Engineering, Industrial Management, Managerial Economics & Financial Accountancy, Communication skills etc.

ii. **Basic Sciences (BS):** These courses include Mathematics, Physics, Chemistry, Biology etc.

iii. **Engineering Sciences (ES):** These courses include Workshop, Drawing, Basic Electrical/Mechanical/Computer etc.

iv. **Professional Core (PC):** These courses are the core courses that provide the requisite foundation in the chosen Branch of Engineering.

v. **Professional Elective (PE):** These courses are the elective courses opted by the students relevant to the chosen branch of engineering that provides the requisite foundation in a specific area of specialization.

vi. **Open Elective (OE):** These courses are inter-disciplinary in nature offered by other departments and/or any emerging subjects.

The department offers an elective course (PE/OE), if the number of students registered in such a course is a minimum of 20.

vii. **Add-on Courses:** Add-on courses are Skill enhancement courses for the students in the respective branch of engineering.

viii. **MOOCS/Self Study Courses:** An opportunity is given to the students to choose one online course offered by SWAYAM-NPTEL / Foreign institutions/ reputed universities to enhance the learning skills or a self-study course under the guidance of the faculty advisor to enhance the self-learning capabilities which are having Global acceptance.

ix. **Personality Development (PD):** These courses include Integrated Learning Practices (ILPs), Mandatory Courses (MCs) & Extra-curricular/Co-curricular activities and help the students into a well-trained professionals and good human beings with a high employability potential, good communication skills, soft skills, good engineering practices, personality transformation, professional presentation skills and networking skills.

x. **Mandatory Courses (MC):** The Professional Ethics & Human Values, Employability Enhancement Skills. Environmental Sciences, Indian Constitution, Essence of Indian Traditional Knowledge, Problem-assisted learning and Problem-based learning are non-credit courses relevant to the value education and also for enhancing employability skills.

- In addition to the above courses to enhance the overall personality & character of students and make them aware of social needs, the extra-curricular/co-curricular activities are included, which do not carry any credits. These activities include National Service Scheme (NSS), National Cadet Corps (NCC), Yoga & Meditation, Sports & Games and Professional Club Activities.
- The Students shall undergo Industrial /In-house training to expose them to the practical environment.
- A faculty advisor or counselor shall be assigned to a group of 20 students, and he/she will advise the students about the under graduate programme, its course structure and curriculum, choice/option for course based on their competence, progress, pre-requisites and interest.

xi. **Mini-Project:** A student is required to undergo a mini project of his/her choice by applying theoretical concepts to develop a practical component /element/system that includes design/ testing/ analysis.

xii. **Summer School Practices:**

Industry Internship: Internship must involve practical work related to systems engineering, industry practices etc. The internship can be carried out at premier institutions/ research laboratories/industries.

7. CREDIT ASSIGNMENT

Each course is assigned a certain number of credits based on the following criteria.

Contact hours per week			Credits
L	**T**	**P**	
1	0	0	1
0	1	0	1
0	0	2	1

8. REGISTRATION OF COURSES

The entire programme of study is for four academic years (three academic years in case of LES), all the years are on semester pattern. As per the curriculum the student shall register for 160 credits from all the courses as specified for the programme of study under regular four years. As per the

curriculum the student shall register for 120 credits from all the courses as specified for the programme of study under regular four years.

9. ASSESSMENT AND EVALUATION

The performance of a student in each course shall be evaluated based on Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) or only Continuous Internal Evaluation.

S.No	Category of Course	Marks	
		CIE	SEE
1	Theory Courses	40	60
2	Laboratory Courses	40	60
3	Mandatory Courses	100	-
4	Mini Project	100	-
5	Seminar	100	-
6	Internship	100	-
7	Project Work	80	120

9.1 THEORY COURSES

9.1.1 Continuous Internal Evaluation (CIE):

The CIE of a theory course consists of four components as indicated in the following table.

S.No	Component	Marks
1	Mid-Term- Descriptive Examinations	20
2	Online Quiz Examinations	10
3	Assignments with Viva Voce	05
4	Class Room Test	05
	Total	**40**

a) Mid Term Descriptive Examinations (20 Marks):

There shall be two mid-term descriptive examinations of 120 minutes each. The mid-term examinations shall be conducted with syllabi from units I,II & first half of III for the first mid and second half of III, IV & V units for the second mid. In each theory course, the question paper for the mid-term descriptive examination consists of four questions. A student is required to answer all four questions for maximum 20 marks.

b) Online Quiz Examinations (10 marks):

Two online quiz examinations of 20 minutes each shall be conducted with syllabi from units I,II & first half of III for the first mid and second half of III, IV & V units for the second mid. The online quiz examination shall have 20 multiple choice questions for maximum 10 marks.

c) Assignments with Viva Voce (5 Marks):

A Student shall submit five Assignments with Viva Voce to the concerned faculty from all five units. The Assignment shall be evaluated by the concerned faculty. The average of best four assignment marks shall be considered for awarding 05 marks.

d) Class Room Test (5 Marks):

There shall be conducted 5 Class Room Tests from 5 units. The tests shall be conducted and evaluated by the concerned faculty. The average of best four class room tests considered for awarding 05 marks.

Assignment with Viva Voce and Class Room Tests marks will be evaluated at the end of the Semester.

CIE is Computed as following: Finalized internal marks can be calculated with 80% weightage for the better of the two mid-term examinations and 20% for the other shall be considered for marks of 30 and is added to Assignment with Viva Voce 05 marks, Class Room Tests 05 marks for awarding total 40 marks.

There shall be no Assignment with Viva Voce and Class Room Tests for Applied/Engineering Physics Course. Finalized internal marks for Applied/Engineering Physics Course can be calculated with 80% weightage for the better of the two mid-term examinations and 20% for the other shall be considered for marks of 30 and is added to Virtual Lab-Assignments 10 marks for awarding total 40 marks.

For the courses like Engineering Graphics, Machine Drawing and Design courses the CIE shall be 40 marks (20 marks for day-to-day work, 20 marks for two mid-term examinations) and 60 marks for SEE. A student is required to answer all 4 questions for maximum 20 marks. The final assessment of mid-term examinations is based on 80% weightage for the better and 20% for the other.

9.1.2 Semester End Examinations (SEE)

The semester end examinations for theory courses (including Engineering Graphics and Engineering Drawing) will be conducted covering all the units for 60 Marks. The question paper consists of two parts. In Part-A There shall be compulsory first question containing 5 two marks questions and these are to be set from the entire syllabus. In Part-B There shall be one question from each unit with internal choice. Each question carries 10 marks. Each theory course shall consist of five units of syllabus. Part-A and Part-B put together are given for 60 Marks.

Special Subjects: The SEE question paper for Design courses like Building Planning & Drawing, Design & Drawing of Steel Structures, and Design & Drawing of Steel Structures Reinforced Concrete Structures consists of two parts. In Part-A there shall be one question out of 2 questions is to be answered for 24 marks and in Part-B 3 Questions out of 5 Questions are to be answered of which each carries 12 Marks in 3 hours time. Part-A and Part-B put together are given for 60 Marks.

9.2 LABORATORY COURSES

9.2.1 Continuous Internal Evaluation (CIE)

The continuous internal evaluation for laboratory courses is based on the following parameters:

Parameter	Marks
Day-to-day work	20
Internal test	10
Record	05
Viva voce	05
Total	40

9.2.2 Semester End Examinations (SEE)

The performance of the student in laboratory courses shall be evaluated jointly by internal and external examiners for 3 hours duration as per the parameters indicated below:

Parameter	Marks
Procedure/Algorithm	10
Experimentation/Program Execution	15
Observations/Calculations/Testing	15
Result/Inference	10
Viva Voce	10
Total	**60**

9.3 MANDATORY COURSES (NON CREDIT COURSES)

Mandatory courses are evaluated by the mode of a Presentation/ Comprehensive-Viva Voce/ Evaluation of Assignments. A student shall secure a minimum 40% of marks to get a satisfactory grade (SA). Otherwise unsatisfactory grade (US) will be indicated. However, a student who secures "US" grade /abstains shall reappear in the subsequent semester(s).

9.4 MINI-PROJECT

A student is required to undergo a mini project of his/her choice by applying theoretical concepts to develop a practical component /element/system that includes design/ testing/ analysis. The performance of a student in the mini project shall be evaluated by a three-member committee constituted by the HoD as per the following parameters:

Parameter	Marks
Mini project Report	30
Innovation	25
Presentation	25
Viva Voce	20
Total	**100**

The performance of a student in mini project shall be evaluated based on two reviews, each carries 100 marks. The average marks of these two reviews will be awarded. However, a student who fails to secure minimum

40% marks or abstains will be permitted to reappear in the subsequent semester(s). There shall be no semester end examination.

9.5 SEMINAR

A student shall deliver a seminar on any emerging topic of his/her choice from the core technical domain. The student shall submit a duly-certified seminar report. A three-member committee constituted by the HoD will finalize the CIE marks based on the following parameters:

Parameter	Marks
Seminar report	30
Innovation	20
Presentation	30
Viva Voce	20
Total	**100**

A student who fails to secure minimum 40% marks or abstains will be permitted to reappear in the subsequent semester(s). There shall be no semester end examination.

9.6 INTERNSHIP

Internship must involve practical work related to industry practices. The students shall undergo internship for a period of minimum 4 weeks continuously at the end of VI semester and shall be evaluated in VII semester. The internship can be carried out at premier institutions/ research laboratories/industries.

A student shall submit a report on the training undergone, along with a certificate from the organization. A three-member committee constituted by the HoD shall finalize the CIE marks based on the following parameters:

Parameter	Marks
Internship Report	50
Presentation	30
Viva Voce	20
Total	**100**

The Internal guide shall monitor the work progress and regularity of the students in periodic intervals. No financial support shall be provided by the Institute for Internship.

A student, who fails to secure minimum 40% marks or abstains, will be permitted to reappear in the subsequent semester(s). There shall be no semester end examination.

9.7 Project Work

A student is required to undertake a project work by using the knowledge acquired by him/her during the course of study. The student is expected to design and build a complete system or subsystem on an area of interest. The project work consists of two parts namely, project literature review and project implementation. A project work shall be carried out by a batch minimum of 4 Student members under a faculty supervisor.

i. Continuous Internal Evaluation:

The CIE for project work shall be based on project survey and project implementation and is evaluated by a three-member committee consisting of two senior faculties and a project supervisor constituted by the HoD.

- **Project Literature Review:**

The performance of a student in project survey shall be evaluated based on the following parameters:

Parameter	Marks
Literature Review	15
Presentation	15
Viva Voce	10
Total	40

- **Project Implementation:**

The performance of a student in project implementation shall be evaluated based on two reviews, each carries 40 marks. The average marks of these two reviews will be considered. The evaluation criterion of each review is based on the following parameters:

Parameter	Marks
Contribution	10
Innovation	10
Presentation	10
Viva Voce	10
Total	**40**

The marks secured by a student in project literature review and project implementation shall be awarded cumulatively as CIE of the project work in VIII semester.

ii. Semester End Examination:

A batch of students shall submit a duly-certified project report to the department in a specified time. They shall make a presentation on the project work before a three-member committee consisting of external examiner, internal examiner (HoD) and a project supervisor. The performance of each student is evaluated as per the following parameters:

Parameter	Marks
Project report	40
Innovation	30
Presentation	20
Viva Voce	15
Research Publication (Seminar/Conference/Symposium/Journal)	10
Scope of Implementation	05
Total	**120**

A student who fails to secure minimum 40% marks or abstains is permitted to re-appear in the advanced supplementary examinations or when offered next.

9.8 OTHER COURSES

a. Online (MOOCS) / Self Study Course:

Institute encourages the students to register and satisfy for MOOCs Certificate. A student is awarded certificates for 4 weeks programme – 1 credit, 8 weeks programme – 2 credits and 12 weeks programme – 4 credits.

b. Add-On Courses:

ADD-ON Courses are provided by the Institution with Industry Interaction to enhance skills in the domain of the study.

c. Extra-Curricular / Co-Curricular Activities:

The participation of a student is compulsory in any one of the extra-curricular/co-curricular activities (non-credit) such as NSS, NCC,

Yoga & Meditation, Sports & Games, Professional club activities during the semesters I to VII for award a Satisfactory grade (SA). The performance of a student in the extra-curricular/co-curricular activities is evaluated during VII semester by a three member committee constituted by HoD.

For physically disabled students, the satisfactory grade (SA) will be awarded, if he/she obtains certificate in co-curricular activities such as essay writing, debate competitions, technical & general quizzes, symposium etc.

However, a student who secures unsatisfactory grade (US) shall reappear in the subsequent semester(s).

10. ATTENDANCE REQUIREMENTS

a. A student is eligible to write the Semester End Examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
b. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in two times upto III Year II Semester and once in IV Year may be granted by the College Academic Committee on medical grounds.
c. A stipulated fee shall be payable towards condonation of shortage of attendance.
d. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
e. Shortage of Attendance below 65% in aggregate shall not be condoned.
f. A student who is shortage of attendance in semester may seek re-admission into that semester when offered within one week from the date of the commencement of class work.
g. Students whose shortage of attendance is not condoned in any semester are not eligible to write their Semester End Examination of that class.

11. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.10.

a. A student shall be deemed to have satisfied the minimum academic requirements, if he/she gains the credits allotted to each course and secures not less than a minimum 35% of marks exclusively at the Semester End Examination. However, the student should secure minimum 40% of marks in both CIE and SEE put together to be eligible for passing the course.

b. A student shall be promoted from II Semester to III Semester if he/she fulfills the minimum attendance requirement.

c. A student will be promoted from IV Semester to V Semester if he/she fulfills the academic requirement of 50% of the credits up to either III Semester or IV Semester from all the examinations, whether the candidate appears or not for the examinations and secures prescribed minimum attendance in IV Semester.

   The students admitted under Lateral Entry Scheme shall be promoted to the V semester, if he/she fulfills the minimum attendance requirement in IV Semester.

d. A student will be promoted from VI Semester to VII Semester if he/she fulfills the academic requirement of 50% of the credits up to either V Semester or VI Semester from all the examinations, whether the candidate appears or not for the examinations and secures prescribed minimum attendance in VI Semester.

   The students admitted under Lateral Entry Scheme shall be promoted to the VII semester, if he/she fulfills the academic requirement of 50% of the credits up to either V Semester or VI Semester from all the examinations, whether the candidate appears or not for the examinations and secures prescribed minimum attendance in VI Semester.

e. The Students who fail to earn 160 credits as indicated in the course structure within 8 academic years from the year of admission shall forfeit their seat in B.Tech programme and admission stands cancelled.

f. The students admitted under Lateral Entry Scheme, who fail to earn 120 credits as indicated in the course structure within 6 academic years from the year of admission, shall forfeit their seat in B.Tech programme and admission stands cancelled.

12. PROCEDURES FOR SEMESTER END EXAMINATIONS

i. **Supplementary examinations:** There shall be supplementary examinations along with regular semester end examinations for a student to reappear in the course(s) he/she failed or not attempted.

ii. **Advanced supplementary examinations:** Students who fail in the courses in VIII semester (theory/project work) can reappear for advanced supplementary examinations within one month after the declaration of the revaluation results. However, the students who fail in advanced supplementary examinations shall reappear when offered next along with regular students.

iii. **Recounting:** A student, who wishes to verify the total marks obtained by him/her in any theory course in SEE can apply for recounting in response to the notification along with the prescribed fee. The outcome of the recounting gets reflected in the results sheet and grade card.

iv. **Revaluation:** A student who wishes to apply for revaluation of a theory course in SEE can submit an application along with the prescribed fee as per the notification issued.

a. If the variation in marks of the first valuation and revaluation is ≤ 15% of the total marks, then the better of the two evaluations shall be considered as final marks.

b. If the variation of marks between the first valuation and revaluation is >15% of the total marks, there shall be a third evaluation by another examiner. The average marks of two nearer evaluations shall be taken into consideration. In case of any fractional value of marks, it can be rounded off to the next integer value.

c. If a student secures a higher grade in the revaluation, that grade will be declared as the final grade. Otherwise, the original grade will remain valid.

13. AWARD OF LETTER GRADES

A letter grade and grade points shall be awarded to a student in each course based on his/her performance as per the 10-point grading system given below.

Marks (Max:100)	Letter Grade	Grade Point	Level
≥ 90	O	10	Outstanding

80 to <90	S	9	Excellent
70 to <80	A	8	Very Good
60 to <70	B	7	Good
50 to <60	C	6	Fair
40 to <50	P	5	Pass
<40	F	0	Fail
--	Ab	0	Absent

Marks (Max:100)	Letter Grade	Grade Point	Level
≥ 40	SA	-	Satisfactory
< 40	US	-	Unsatisfactory
--	Ab	-	Absent

a. A student who secures from 'O' to 'D' grades in a course is declared to have successfully completed the course, and is deemed to have secured the credits assigned to that course.

b. A student who secures "F" grade in any course shall be considered "Failed" and is required to reappear as "Supplementary student" in SEE, as and when offered. In such cases, his/her CIE marks in those courses will remain same as obtained earlier.

c. A student, who is absent from any examination shall be treated as "Failed".

d. In general, a student shall not be permitted to repeat any course (s) for the sake of "Grade improvement" or "SGPA/CGPA improvement".

e. As per AICTE guide lines, If a student acquires additional 20 credits through online Certification (approved MOOCs), he/she will be awarded Graduate degree with Honours with subjected to JNTUK instructions.

If a Student from CE,EEE,ME,ECE & AME secures 20 credits from MOOCs courses (apart from Courses mentioned in Course Structure) in Computer Science & Engineering related courses is he/she will be awarded with additional Minor Engineering with Computer Science & Engineering with subjected to JNTUK instructions.

14. COMPUTATION OF SGPA & CGPA

a. Semester Grade Point Average (SGPA)

The performance of each student at the end of each semester is indicated in terms of SGPA. The SGPA is the ratio of sum of the product of the

number of credits and the grade points scored by a student in all the courses to the sum of the number of credits of all the courses.

SGPA (S_i) = Σ (C_i x G_i) / ΣC_i

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

b. Cumulative Grade Point Average (CGPA)

The CGPA is a measure of the overall cumulative performance of a student. The CGPA is calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme.

CGPA = Σ (C_i x S_i) / ΣC_i

Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

c. The SGPA and CGPA are rounded off to 2 decimal points and reported in grade cards.

15. AWARD OF CLASS

A student, who satisfies the minimum requirements prescribed for the completion of a programme, is eligible for the award of B.Tech degree and he/she shall be placed in one of the following four classes on a 10 point scale.

Class Awarded	**CGPA to be secured**	From the CGPA secured from 160 Credits
First Class with Distinction	≥ 7.75 with no subject failures	
First Class	≥ 6.75 with subject failures	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

Equivalent percentage = (CGPA – 0.75) x 10

16. GAP YEAR

a. A student is permitted to make use of the gap year facility at the beginning of V / VII semester of the programme and undergo training programs at premier institutions / research laboratories/ industries for a

maximum period of one year (two consecutive semesters of academic year), if he/she secures a CGPA of 7.75 and above with no backlog of courses.

b. A student is permitted to avail the gap year facility only once during the entire course of study.

c. The students are permitted to re-join the programme after availing gap year facility. However, their re-joining is subject to the regulations prevailing at that time.

d. The total period for completion of the programme reckoned from, the commencement of the first semester to which the student is admitted shall not exceed the maximum period in order that the student is eligible for the award of the degree.

e. If a student fails to report to the department after the expiry of 2 semesters, his/her readmission will be subject to the decision of competent authority.

f. A student seeking a gap year needs to apply in the prescribed format before the last working day of the running semester. The application submitted by the student shall be evaluated by Department Academic Committee and forwarded to the head of the institution for approval.

g. The duration of the gap year shall be reflected in the consolidated grade card.

17. DISCIPLINE

a. A student is required to observe discipline and decorum both inside and outside the college and not to indulge in any activity that may tarnish the prestige of the college. The head of the institution shall constitute a disciplinary committee to enquire into acts of indiscipline and notify the college about the disciplinary action taken. In case of any serious disciplinary action, which leads to suspension or dismissal, a committee shall be constituted by head of the institution for taking final decision.

b. Those students who indulge in examination related malpractices shall be punished as per the scale of punishment notified in Annexure-I.

c. Those students involved in the illegal acts of ragging shall be punished as per the provisions of Act 26, 1997 of Govt. of Andhra Pradesh (Annexure-II).

18. REVISION OF REGULATIONS, CURRICULUM AND SYLLABI

The college may revise, amend or change the regulations, curriculum, syllabus and scheme of examinations from time to time subject to decisions/recommendations of Board of Studies and the College Academic Council.

19. WITHHOLDING OF RESULTS

If a student fails to clear dues, if any, payable to the institution or any case of indiscipline is pending against him, the result of the student will be withheld, and also the award of his/her degree shall be withheld in such cases.

20.TRANSITORY REGULATIONS

a. A student, who is detained or discontinued in the semester, on readmission shall be required to do all the courses in the curriculum prescribed for the batch of students in which the student joins subsequently. However, exemption will be given to those students who have already passed the courses in the earlier semester(s) he/she is originally admitted into and substitute courses/additional courses are offered in place of them as approved by the Board of Studies.

b. In general, after transition, there will be a fitment formula approved by the competent authority in order to balance course composition and the number of credits.

c. Students admitted by transfer from other institutions shall follow transitory regulations with suitable fitment formulae approved by the competent authority.

d. A student who is seeking readmission shall apply in the prescribed format within one week after the commencement of the class work. However, the readmission of a student shall be approved by the competent authority.

21.COURSE CODE

The Course Codes will be given by the departments concerned to the course. Each course code contains 8 characters. The 8 characters for each subject will be filled as per the following description.

1	2	3	4	5	6	7	8

1 Character : Institute Name as '**P**'

2,3 Characters: Year of Commencement of Regulations as '**18**'

4,5 Characters: Subject/Branch Category such as

HS for Humanities and Social Science Courses

BS for Basic Science Courses

ES for Engineering Science Courses

CE for Civil Engineering Courses

EE for Electrical & Electronics Engineering Courses

ME for Mechanical Engineering Courses

EC for Electronics & Communication Engineering Courses

CS for Computer Science & Engineering Courses

IT for Information Technology Courses

AE for Automobile Engineering Courses

MC for Mandatory Courses

PD for Personality Development

6 Character: Mode of Subject Learning and Evaluation such as

T for Theory Courses

L for Laboratory Courses

S for Seminar

P for Project

M for Mini Project

V for Viva Voce

E for Professional Elective Courses

O for Open Elective Courses

I for Internship

7,8 Characters: Serial number of the course taught by the department in that Semester such 01, 02, 03,..... etc

22. GENERAL

- Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- The academic regulations should be read as a whole for the purpose of any interpretation.

- In case of any doubt or ambiguity in the interpretation of the above rules, decision of the competent authority is final and binding.
- The college may change or amend academic regulations or syllabi at any time subject to approval of the competent authority and the changes or may be apply the amendments made to all students with effect from the dates notified.

23. STATUTORY DECLARATION

In case the regulations do not specify application of an appropriate rule in a unique case, the decision of the competent authority of the college shall be final.

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ANNEXURE-I

MALPRACTICE RULES

DISCIPLINARY ACTION FOR MALPRACTICE/IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper Conduct	Punishment
1 (a)	If a student possesses or tries to access 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 candidate 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.
(b)	If a student gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons 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 candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	If a student is found to have 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 candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate 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. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, 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. The candidate is also debarred for two consecutive semesters from class work and all Semester End Examinations. The

		continuation of the course by the candidate 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 to be registered against him.
4.	If a student smuggles inside the exam hall an Answer book or additional sheet or takes out or Arranges to send out the question paper 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 candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all Semester End Examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	If a 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 the subject.
6.	If a student refuses to obey the orders of the Chief Superintendent/Controller of Examinations / 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.	Such a student(s) 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. The candidates also are to be debarred and forfeited their seats. In case of outsiders, they will be handed over to the police and a police case is to be registered against them.

7.	If a student leaves the exam hall taking away answer script or intentionally tears 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 candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and Semester End Examinations. The continuation of the course by the candidate is subjected to the academic regulations in connection with forfeiture of the seat .
8.	If a 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 candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also to be debarred and forfeited the seat.
9.	If a 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 shall be expelled from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also to be debarred and forfeited the seat. Person(s) who do not belong to the College will be handed over to police and, a police case shall be registered against them.
10.	If a 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 candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester.
11.	If 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 candidate has appeared including practical examinations and project work of that semester examinations.

Malpractices identified by squad or special invigilators

- Punishments to the candidates are as per the above guidelines.
- Punishment to institutions : (if the squad reports that the college is also involved in encouraging malpractices)
    i. A show cause notice shall be issued to the college.
    ii. Impose a suitable fine on the college.
    iii. Shifting the examination centre from the college to another college for a specific period of not less than one year.

ANNEXURE-II


Ragging
Prohibition of ragging in educational institutions Act 26 of 1997
Salient Features
Ragging within or outside any educational institution is prohibited.
Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student
Imprisonment upto
Fine Upto
Teasing, Embarrassing and Humiliation
6 Months
+
Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation
1 Year
+
Rs. 2,000/-
Wrongfully restraining or confining or causing hurt
2 Years
+
Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence
5 Years
+
Rs. 10,000/-
Causing death or abetting suicide
10 Years
+
Rs. 50,000/-
In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288
ABSOLUTELY NO TO RAGGING
1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Cards and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

B.TECH COURSE STRUCTURE

R-18 REGULATIONS

I Year - I Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18MCT01	Induction Program	3 Weeks			-	-	-
2	P18HST01	English-I	3	0	0	3	40	60
3	P18BST01	Mathematics-I	3	0	0	3	40	60
4	P18BST05	Applied Chemistry	3	0	0	3	40	60
5	P18EST02	C - Programming for Problem Solving	3	0	0	3	40	60
6	P18EST03	Engineering Graphics	1	0	3	2.5	40	60
7	P18HSL01	English Language Communication Skills Lab	0	0	3	1.5	40	60
8	P18BSL03	Applied Chemistry Lab	0	0	3	1.5	40	60
9	P18ESL02	Engineering Workshop	0	0	3	1.5	40	60
10	P18ESL03	C - Programming For Problem Solving Lab	0	0	3	1.5	40	60
Total			13	0	15	20.5	360	540

I Year - II Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18HST02	English-II	3	0	0	3	40	60
2	P18BST02	Mathematics-II	3	0	0	3	40	60
3	P18BST03	Applied Physics	3	0	0	3	40	60
4	P18EST01	Python Programming	3	0	0	3	40	60
5	P18EST04	Basic Electrical and Electronics Engineering	3	0	0	3	40	60
6	P18MCT02	Environmental Science	3	0	0	0	-	-
7	P18ESL01	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	40	60
8	P18BSL01	Applied Physics Lab	0	0	3	1.5	40	60
9	P18ESL04	Python Programming Lab	0	0	3	1.5	40	60
Total			18	0	9	19.5	320	480

II Year - I Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET01	Electrical Circuit Analysis	3	1	0	4	40	60
2	P18EET02	Electromagnetic Fields	3	0	0	3	40	60
3	P18EET03	Electrical Machines - I	3	0	0	3	40	60
4	P18ECT01	Semiconductor Devices and Circuits	3	0	0	3	40	60
5	P18BST03	Mathematics-III	3	0	0	3	40	60
6	P18MET09	Thermal and Hydraulic Prime Movers	3	0	0	3	40	60
7	P18EEL01	Electrical Circuits Lab	0	0	3	1.5	40	60
8	P18EEL02	Electrical Machines – I Lab	0	0	3	1.5	40	60
Total			18	1	6	22	320	480

II Year - II Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET04	Electrical Machines - II	3	1	0	4	40	60
2	P18EET05	Control Systems	3	1	0	4	40	60
3	P18EET06	Power Systems -I	3	0	0	3	40	60
4	P18CST02	Data Structures	3	0	0	3	40	60
5	P18ECT03	Switching Theory and Logic Design	3	0	0	3	40	60
6	P18BST04	Mathematics - IV	3	0	0	3	40	60
7	P18ECL01	Semi Conductor Devices and Circuits Lab	0	0	3	1.5	40	60
8	P18EEL03	Electrical Machines – II Lab	0	0	3	1.5	40	60
9	P18CSL01	Data Structures Lab	0	0	3	1.5	40	60
Total			18	2	9	24.5	360	540

III Year - I Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET07	Electrical Measurements and Instrumentation	3	0	0	3	40	60
2	P18EET08	Power Systems -II	3	1	0	4	40	60
3	P18EET09	Power Electronics	3	1	0	4	40	60
4	P18ECT07	Pulse and Digital Circuits	3	0	0	3	40	60
5	P18HST04	Managerial Economics & Financial Analysis	2	0	0	2	40	60
6	P18MCT03	Biology	3	0	0	0	-	-
7		**Professional Elective - I**	2	0	0	2	40	60
8	P18EEL04	Power Electronics Lab	0	0	3	1.5	40	60
9	P18EEL05	Control Systems Lab	0	0	3	1.5	40	60
Total			19	2	6	21	320	480

Professional Elective – I		
S.No	Course Code	Course
1	P18EEE01	Renewable Energy Sources
2	P18ECT02	Signals & Systems
3	P18EEE02	Power Plant Engineering
4	P18EEE03	Advanced Control Systems

III Year - II Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET10	Power System Analysis	3	1	0	4	40	60
2	P18EET11	Power Semiconductor Drives	3	0	0	3	40	60
3	P18ECT14	Micro Processors and Micro Controllers	3	0	0	3	40	60
4	P18ECT08	Linear and Digital IC Applications	3	0	0	3	40	60
5		**Open Elective-I**	2	0	0	2	40	60
6		**Open Elective-I Lab**	0	0	3	1.5	40	60
7	P18EEL06	Electrical Measurements Lab	0	0	3	1.5	40	60
8	P18ECL07	Micro Processors and Micro Controllers Lab	0	0	3	1.5	40	60
9	P18EEM01	Mini Project	0	0	2	1	100	0
Total			14	1	11	20.5	420	480

S.No	Course Code	Offered By Dept.	Open Elective – I
1	P18EEO01	CSE	JAVA Programming
2	P18EEO02	CSE	Database Management Systems
3	P18EEO03	ECE	Digital Signal Processing
4	P18EEO04	CSE	Web Technologies

S.No	Course Code	Offered By Dept	Open Elective – I Lab
1	P18EEO51	CSE	JAVA Programming Lab
2	P18EEO52	CSE	Database Management Systems Lab
3	P18EEO53	ECE	Digital Signal Processing Lab
4	P18EEO54	CSE	Web Technologies Lab

IV Year - I Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET12	Power System Operation and Control	3	0	0	3	40	60
2	P18EET13	Utilization of Electrical Energy	3	0	0	3	40	60
3	P18HST03	Management Science	2	0	0	2	40	60
4	P18EET14	Switch Gear and Protection	3	0	0	3	40	60
5		**Professional Elective-II**	2	0	0	2	40	60
6		**Professional Elective-III**	2	0	0	2	40	60
7	P18MCT03	Employability Skills	2	0	0	0	-	-
8	P18EEL07	Power Systems Lab	0	0	3	1.5	40	60
9	P18EEL08	Electrical Simulation Lab	0	0	3	1.5	40	60
10	P18EEI01	Internship	0	0	0	2	100	0
Total			17	0	6	20	420	480

Professional Elective – II		
S.No	Course Code	Course
1	P18EEE04	Neural Networks & Fuzzy Logic
2	P18EEE05	IOT and its Applications
3	P18ECT12	VLSI Design
4	P18EEE06	Optimization Techniques

Professional Elective – III		
S.No	Course Code	Course
1	P18EEE07	High Voltage Engineering
2	P18EEE08	Electrical Distribution Systems
3	P18EEE09	Electrical Machine Design
4	P18EEE10	Power System Reforms

IV Year - II Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET15	HVDC Transmission	3	0	0	3	40	60
2		**Professional Elective-III**	2	0	0	2	40	60
3	P18EEP01	Project	0	0	10	6	80	120
4	P18EES01	Seminar	0	0	6	1	100	-
Total			5	0	16	12	260	240

Professional Elective – III		
S.No	Course Code	Course
1	P18EEE11	Flexible AC Transmission Systems
2	P18EEE12	Smart Grid
3	P18EEE13	Power Quality
4	P18EEE13	Electric and Hybrid Vehicles

B.Tech. I Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

English-I

(Common to all Branches)

Internal Marks: 40

Course Code: P18HST01 **External Marks: 60**

Course Prerequisite: The students should have basic knowledge of English grammar and LSRW skills.

Course Objectives:

1. To enable the engineering students to develop their basic communication skills in English for academic and social purposes.
2. To equip the students with appropriate oral and written communication skills.
3. To inculcate the skills of listening, reading and critical thinking.
4. To integrate English Language learning with employability skills and training.
5. To enhance the students' proficiency in reading skills enabling them meet the academic demands of their course.

Course Outcomes:

On completion of this course, the student is able to:

1. Use English Language effectively in spoken and written forms
2. Interpret the contextual meaning of words
3. Comprehend the given texts and respond appropriately
4. Recall and reproduce the theme in a given context
5. Communicate confidently in formal and informal contexts

UNIT-I: (9 Lectures)

The Happy Prince – Oscar Wilde

a. Vocabulary: Synonyms and Antonyms
(http://www.magickeys.com/books/riddles/words.html)

b. Grammar: Prepositions, Sentence structure & Types of sentences

c. Writing: Note Making and Note Taking

UNIT-II: (8 Lectures)

Technology With a Human Face – E.F.Schumacher

a. Vocabulary: One word substitutes & Idioms

b. Grammar: Subject–verb Agreement (Concord), Question tags and Modal Auxiliaries

c. Writing: Information Transfer

UNIT-III: (9 Lectures)

Presidential Address – APJ Abdul Kalam

a. Vocabulary: Word formation, Root Words
(www.englishhints.com,www.enchantedlearning.com,
www.learnenglish.de/grammar/prefixtext.html)

b. Grammar: Parts of Speech, Punctuation

c. Writing: Paragraph Writing

UNIT- IV (9 Lectures)

The Road Not Taken – Robert Frost

a. Vocabulary: Prefixes, Suffixes and Affixes
(http://www.magickeys.com/books/riddles/words.html)

b. Grammar: Articles

c. Writing: Letter Writing

UNIT – V (10 Lectures)

Good Manners – J.C Hill

a. Vocabulary: Homonyms, Homophones and Homographs
(http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf)

b. Grammar: Tenses

c. Writing: E- mail Writing

Text books:

1. New Horizons – Pearson Publishers
2. Fluency in English", A Course Book for Engg. Students, Published by Orient Black Swan, Hyderabad, 2016 print.
3. "Technical Communication- Principles and Practice", Third Edition. New Delhi: Oxford University press.

Reference Books:

1. Meenakshi raman, Sangeetha, Sharma Fundamentals of technical communication, Pg: 119-153 Oxford University press, 2015
2. Rutherford, Andhrea. J, Communication skills for technology. Pearson, New Delhi.2001
3. Raymond Murphy, Murphy's English Grammar, Cambridge University Press 2004
4. Meenakshi raman, Sangeetha, Sharma,Technical communication: English Skills for
   Engineers, Oxford University press, 2009
5. Michael Swan, Practical English Usage, Oxford University press, 1996

Web References:

1. www.englishhints.com
2. www.enchantedlearning.com
3. www.learnenglish.de/grammar/prefixtext.html
4. http://www.magickeys.com/books/riddles/words.html
5. http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf
6. http://www.yourdictionary.com
7. http://www.learnenglish.com
8. http://www.cambridge.org
9. http://www.eslcafe.com
10. http://www.eslgames.com
11. http://www.penguin.co.uk
12. http://www.edufind.com/english/practice

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B. Tech- I Year I Semester **Course structure**

L	T	P	C
3	0	0	3

MATHEMATICS-I
(Differential equations and Laplace Transforms)

(Common to All Branches)

Internal Marks: 40

Course code: P18BST01 **External marks: 60**

Course Prerequisite: The basic knowledge of Matrices, Trigonometry, Differentiation and Integration.

Course Objectives:

1. To learn the solving methods of the differential equations of first order with their applications.
2. To learn the solving methods of differential equations of second and higher order with their applications.
3. To learn to find the Laplace transform of different functions and obtained the solution of Design.
4. To understand the concepts Partial Differential.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Solve first order differential equations and their applications.
2. Usage of higher order differential equations that are applied to real world problems.
3. Find the Laplace transform of derivatives, integrals and periodic functions.
4. Use the method of Laplace transforms to solve systems of linear first-order differential equations.
5. Calculate total derivative, Jacobian, Maxima and minima of functions of two variables.

UNIT-I: (11 Lectures)

Differential equations of first order and first degree:

Linear-Bernoulli-Exact-Reducible to exact.

Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.

UNIT-II: (9 Lectures)

Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax},sin ax, cos ax, polynomials in x, e^{ax}V(x), xV(x)- Method of Variation of parameters.

Applications: LCR circuit.

UNIT-III: (10 Lectures)

Laplace Transforms:

Laplace transforms of standard functions– First shifting Theorem, Change of scale property, Multiplication by t^n, division by t, Transforms of derivatives and integrals – Second shifting theorem– Laplace transform of Periodic functions.

UNIT- IV: (8 Lectures)

Inverse Laplace Transforms:

Inverse Laplace transforms – Convolution theorem.

Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT -V: (10 Lectures)

Partial Differentiation:

Introduction- Homogeneous function-Euler's theorem-Total derivative-Chain rule-Generalized Mean value theorem for single variable (without proof)-Taylor's and Mc Laurent's series expansion of functions of two variables– Functional dependence-Jacobian.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

Web References:

1. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
2. http://mathworld.wolfram.com/topics
3. http://www.nptel.ac.in/course.php

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B.Tech I Year - I Semester

Course structure

L	T	P	C
3	0	0	3

C - Programming for Problem Solving

(Common to all Branches)

Course Code: P18EST03 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: NIL

Course Objectives:

1. To impart adequate knowledge on the need of programming languages and problem solving techniques.
2. To impart problem solving skills.
3. To enable student to write programs in C and to solve the problems.

Course Outcomes:

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

1. Design algorithms and flowchart / Pseudo code for a given problem.
2. Design programs involving decision structures and loops.
3. Implement different operations on arrays and solve problems using functions.
4. Understand pointers and strings.
5. Implement structures, unions and file operations in C programming for a given application problem.

Unit-I: (8 Lectures)

Introduction to Programming: Computer hardware, Bits and Bytes, programming languages, application and system software, the software development process.

Idea of algorithm: steps to solve logical and numerical problems. Representation of algorithm: flowchart/pseudo code with examples, from algorithms to programs.

Unit-II: (9 Lectures)

Introduction to C: Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing Input and Output. Decision Making - Branching and Looping. Enumerated Data type, Renaming Data type with typedef, Type Casting.

UNIT-III (12 Lectures)

Arrays: Definition, Declaration, Initialization, Assignment, Processing array, Passing array to a function, Two and multi dimensional array.

Functions: Defining a function, Accessing a function, Passing argument to functions, Function prototypes, Nested function call, Storage classes.

UNIT-IV (10 Lectures)

Pointers: Definition, initialization, operations on pointers, functions and pointers, arrays and pointers, pointers to pointers, dynamic memory allocation.

Strings: C Strings, String Input / Output functions, arrays of strings, string manipulation functions.

UNIT-V (9 Lectures)

Structures: Definition, declaration, initialization, accessing members, array of structures, arrays within structure, functions and structures, pointers to structures, nested structures, unions.

File Handling: Types, operations on files, modes, file I/O functions, Random Access Functions.

Text Books:

1. Byron S Gottfried, —Programming with C, Schaums Outlines, Second Edition, Tata McGraw-Hill, 2006.
2. Problem Solving and Program Design in C, 4th edition, by jeri R. Hanly and Elli B.Koffman.
3. Balagurusamy. 2011. C Programming. Tata Mc Graw Hills, New Delhi, India.

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. Yashavant P. Kanetkar. —Let Us C, BPB Publications, 2011.

Web References:

1. https://www.studytonight.com/c/
2. https://www.cprogramming.com/tutorial/c-tutorial.html
3. https://www.javatpoint.com/c-programming-language-tutorial
   https://www.tutorialspoint.com/cprogramming

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B.Tech I Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

APPLIED CHEMISTRY
(for EEE Branch)

Internal Marks: 40

Course Code: P18BST05 **External Marks: 60**

Course Prerequisite:

Basic Chemistry at Intermediate or equivalent level.

Course Objectives

1. In this course. Student will learn the concepts and applications of chemistry in engineering.
2. It aims at strengthening the students with the fundamental concepts of chemistry. Plastics are nowadays used in household appliances; also they are used as composites (FRP) in aerospace industries.
3. It enables the students to know analysis of Advanced materials and used in diverse fields.
4. It makes the students to effectively use of electro chemistry, battery technology, and corrosion science in engineering applications
5. It enables the students to Spectroscopic techniques and applications.

Course Outcomes:

After completion of course student will be able to

1. The advantages and limitations of plastic materials and their use in design would be understood.
2. Analyze the different types of electrodes and batteries for technological applications.
3. To understand the 3D structure of the organic molecules.
4. Analyze the structure of the chemical compounds.
5. The students would aware of materials like nanomaterials, liquid crystals, green chemistry.

UNIT I: (10 Lectures)

High Polymers and Plastics

Polymerization: Introduction, classification, types of polymerization, Stereo regular polymers, Methods of polymerization (emulsion and suspension), Physical and mechanical properties.

Plastics as engineering materials: Advantages and limitations, Thermoplastics and Thermosetting plastics, Compounding and fabrication (4/5 techniques), Preparation, properties and applications of poly ethene, PVC, Bakelite and Teflon

Elastomers: Natural rubber, compounding and vulcanization, Synthetic rubbers :

Buna S, Buna N, Thiokol- preparation ,properties and applications, applications of elastomers. Composite materials & Fiber reinforced plastics, Conducting polymers.

UNIT II: (10 Lectures)

Electrochemistry And Corrosion

Introduction, Single electrode potential**,** EMF, Galvanic cell, Nernst equation and applications. Reference Electrodes-SHE, calomel electrode. Electro chemical series and uses of this series, Concentration cells

Batteries: Introduction, Types: Dry Cell, Ni-Cd Cells, Pb-acid storage cells, Li ion cells.

Corrosion: Causes Theories of Corrosion (chemical and Electro chemical), types-galvanic, differential aeration, stress corrosion, corrosion control methods– material selection and designing aspects, Cathode protection – sacrificial anodic protection and impressed current cathode. Galvanizing, Tinning, Electroplating of Copper and electro less plating of nickel.

UNIT III: (10 Lectures)

Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds.

UNIT-IV: (10 Lectures)

Spectroscopic Techniques and Organic Synthesis Of Drug Molecule

Principles of spectroscopy and selection rules. Electronic spectroscopy. Vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Synthesis of commonly used drug molecules- Ibuprofen, Aspirin, Paracetamol.

UNIT -V: (8 Lectures)

Chemistry of Advanced Materials

Nano materials:- Introduction – Sol-gel method & chemical reduction method of preparation – Characterization by BET method and TEM methods - Carbon nanotubes and fullerenes: Types, preparation, properties and applications.

Liquid crystals: - Introduction, Types, Applications.

Super conductors: Introduction, Type-I & Type-II super conductors, properties and applications.

Green Chemistry: - Principles, 3or 4 methods of synthesis with examples and applications.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication & Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press.
3. Physical chemistry by K.Bahl and Tuli
4. Elementary organic spectroscopy by Y.R. Sharma, S.Chand publications
5. Spectroscopic techniques by H.Kaur. Pragati Prakashan publications

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others.
2. Engineering Chemistry by Prasanth Rath, Cengage Learning.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others.

Web References:

1. http://jntuk-coeerd.in/
2. http://en.wikipedia.org/wiki/title
3. http://nptel.ac.in/coures/105106/.com
4. https://en.wikipedia.org/wiki/Electrochemistry
5. https://www.youtube.com/watch?v=WLyaZbT97EI&list=PLzW3l18TEXrpqo3jRarGr9ao-61tB2184
6. http://encyclopedia.che.engin.umich.edu/Pages/Polymers/PolymerProduction/PolymerProduction.html
7. http://encyclopedia.che.engin.umich.edu/Pages/ProcessParameters/Spectrometers/Spectrometers.html

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B.Tech I Year I Semester **Course Structure**

L	T	P	C
1	0	3	2.5

ENGINEERING GRAPHICS

(Common to EEE,ECE,CSE,IT Branches)

Internal Marks: 40

Course Code: P18EST02 **External Marks: 60**

Course Prerequisite: NIL

Course objectives:

1. To introduce the students to the "universal language of Engineers" for effective communication through drafting exercises.
2. To enable the students to acquire requisite knowledge, techniques and attitude required for advanced study of engineering drawing.
3. To enable the students to construct the layout development of basic solids for practical situations.
4. To enable the students to gain the ability to convert the Isometric views in to Orthographic views.
5. To enable the students to gain the ability to convert the Orthographic views in to Isometric views.

Course Outcomes:

After completion of the course the student will be able to

1. Gain the knowledge of various Geometrical Elements used in Engineering Practice.
2. Understand concepts of all 2 D elements like polygons, Conic Sections.
3. Understand concepts of 3 D Objects like various Prisms, Cylinders, Pyramids and Cones.
4. Draw and represent the Projections of various objects.
5. Convert the 3 D views in to 2 D views and vice versa.

UNIT-I: (12 Lectures)

Introduction to Engineering Graphics

Introduction to Drawing instruments and their uses, construction of regular polygons, Conic sections- ellipse, parabola, hyperbola using general method, Scales- Diagonal scale, Vernier scale.

UNIT-II: (12 Lectures)

Projections of Points & Lines

Principle of orthographic projection-Method of Projection – First and third angle projection methods- Projections of Points –Projection of straight lines- parallel to one plane and inclined to the other plane.

UNIT-III: (16 Lectures)

Projections of Lines & Planes

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

Projections of Planes: Projections of plane figures: triangle, square, rectangle, pentagon and hexagon, circle with surfaces inclined to both the reference planes.

UNIT-IV: (12 Lectures)

Projections of Solids & Surface Development

Projections of Solids: Projections of regular solids with the axis inclined to only one reference plane.

Development of surfaces for basic solids- prisms, pyramids, cylinder and cone.

UNIT – V: (12 Lectures)

Projections of Pictorial Views

Conversion of isometric views into orthographic views and conversion of orthographic views in to isometric views.

Text Book:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal, Charotar Publications, 2014.
2. Engineering Drawing by Basant Agrawal and C.M. Agrawal ,McGraw Hill Education Pvt. Limited, 2013.
3. Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah, Scitech Publications, 2010.

Reference Books:

1.Engineering Graphics with AutoCAD 2002 by James D. Bethune, PHI, 2011.

2.Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd, 2010.

3.Engineering drawing – P.J. Shah .S.Chand Publishers, 2010.

4.Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers, 2010.

5.Engineering Drawing – M.B. Shah and B.C. Rana, Pearson, 2009.

Web References:

1.https://lecturenotes.in/subject/436/engineering-drawing-ed.

2.web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf.

3.https://www.smartzworld.com/notes/engineering-drawing-pdf-1st-year-notes-ppts

4.https://www.researchgate.net/305754529_A_Textbook_of_Engineering_Drawing

5.www.academia.edu/32510080/N_d_bhatt_engineering_drawing_pdf

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B.Tech. I Year I Semester **Course Structure**

L	T	P	C
0	0	3	1.5

English Language Communication Skills Lab

(Common to EEE,ME,ECE,CSE,IT,AME Branches)

Internal Marks: 40

Course Code: P18HSL01 **External Marks: 60**

Course Prerequisite:

1. Basic knowledge of English grammar
2. Basic understanding of English vocabulary.
3. Ability to speak simple sentences.
4. Have interest to learn the language

Course Objectives

1. To facilitate computer assisted multimedia instructions enabling individualized and independent language learning.
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm.
3. To bring about a consistence accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence.
5. To train students to use language appropriately for public speaking, group discussion and interviews.

Course Outcomes

1. Better understanding of nuances of English language through audio visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking skills with clarity and confidence which in turn enhances their employability skills.
4. Better understanding of the production of sounds of language.
5. Suitable body language for employability.

Scope:

The curriculum of the **ELCS Lab** is designed to focus on the production and practice of sounds of language and to familiarize the students with the use of English in everyday situations and contexts.

EXERCISE – I (3 Sessions)

- **A.** Ice – Breaking Activity, Greeting, Introducing and taking leave
- **B.** Introduction to Phonetics

  Vowel sounds – Pure Vowels & Diphthongs

  Consonant sounds

EXERCISE – II (2 Sessions)

- **A.** JAM Session, Situational Dialogues, Giving Directions & Narration
- **B.** Structure of Syllables - Plural markers & Past tense Markers

EXERCISE – III (2 Sessions)

- **A.** Role play, Giving Information and Asking Information
- **B.** Word Stress & Listening Comprehension – Listening for General Details

EXERCISE – IV (2 Sessions)

- **A.** Describing objects, events, places etc. & Presentation Skills – Extempore, Public Speaking.
- **B.** Consonant Cluster, Rules of 'r' pronunciation and Neutralization of Mother Tongue Influence

EXERCISE – V (3 Sessions)

- **A.** Interview Skills & Group Discussion
- **B.** Intonation & Listening Comprehension – Listening for Specific Details

Textbooks:

1. Strengthen your Communication Skills - Maruthi Publication, Hyderabad 2013
2. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

Reference Books:

1. INFOTECH English (Maruthi Publications).
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)
3. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
4. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
5. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
6. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
7. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad
8. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
9. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
10. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi : Foundation
11. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
12. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
13. English Pronouncing Dictionary Daniel Jones Current Edition with CD.

Web References:

1. http://www.cambridge.org
2. http://www.edufind.com/english/practice
3. http://www.learnenglish.com
4. http://www.penguin.co.uk

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B.Tech. I Year I Semester

L	T	P	C
0	0	3	1.5

C - Programming for Problem Solving Lab
(Common to all Branches)

Course Code: **P18ESL03** **Internal Marks: 40**
External Marks: 60

Course Prerequisite: None

Course Objectives:

1. To understand the various steps in program development.
2. To understand the basic concepts in C Programming Language.
3. To understand different modules that includes conditional and looping expressions.
4. To understand how to write modular and readable C Programs.
5. To write programs in C to solve problems using arrays, structures and files.

EXPERIMENT WISE PROGRAMS

Experiment-1

a) Write a simple C program to Print "Hello World"
b) Write a simple C Program to Calculate Area and Circumference of Circle
c) Write a simple C program to implement basic arithmetic operations - sum, difference, product, quotient and remainder of given numbers.

Experiment-2

Write C programs to demonstrate the following operators

a) Assignment Operator.
b) Relational and Logical Operator.
c) Increment and decrement operator.
d) Bitwise operators.
e) Ternary operator.

Experiment-3

a) Write a C programs - to find the largest and smallest of 2 numbers(if – else), to find the largest and smallest of 3 numbers(Nested if – else), roots of quadratic equation(else – if ladder).
b) The total distance travelled by vehicle in't' seconds is given by distance=ut+1/2at2 where 'u' and 'a' are the initial velocity and acceleration. Write a c program to find the distance travelled at regular intervals of time given the Values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
c) Write a c program, which takes two integer operands and one operator from the user, performs the operation and the prints the result. (consider the operators +,-,*,/,% and use switch statement).

Experiment-4

a) Write a C program to find the sum of individual digits of a positive integer
b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1.Subsequent terms are found by adding the preceding two terms in the sequence .Write a c program to generate the first n terms of the sequence.
c) Write a c program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Experiment-5

a) Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$.
b) Write a C program to generate Pascal's triangle.
c) Write a C program to construct a pyramid of numbers

Experiment-6

a) Write a c program to find both the largest and smallest number in a list of integers.
b) Write a c program that uses functions to perform the following:
    i) Addition of Two Matrices.
    ii) Multiplication of Two Matrices.

Experiment-7

a) Write a programs that use both recursive and non-recursive functions
b) To find the factorial of a given integer.
c) To find the GCD of two given integers.

Experiment-8

a) Write a c program that uses functions to perform the following operations:
    i) To insert a sub-string in given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not.

Experiment-9

a) Write a C program that displays the position or index in the string S Where the string T begins, or - 1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text .

Experiment-10

a) Write a program to print the details of a student like(Name, Rollno, marks) using nested structures.
b) Write a C Program to Calculate Difference Between Two Time Period.

Experiment-11

a) Write a C program that uses functions to perform the following operations:
   i) Reading a complex number
   ii) Writing a complex number
   iii) Addition of two complex numbers
   iv) Multiplication of two complex numbers
   (Note: represent complex number using a structure.)

Experiment-12

a) Write a C program which copies one file to another and display the contents of a file
b) Write a C program to reverse the first n characters in a file.
c) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

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B.Tech I Year I Semester **Course Structure**

L	T	P	C
0	0	3	1.5

APPLIED/ENGINEERING CHEMISTRY LAB

(Common to CE,EEE,ME,AME)

Internal Marks: 40

Course Code: P18BSL03 **External Marks: 60**

Course Prerequisite: Basic Chemistry at Intermediate or equivalent level.

Course Objectives:

The purpose of this course to provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

Course Outcomes:

After completion of this course, the students should be able to

1. Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.
2. Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.

LIST OF EXPERIMENTS:

Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.

Volumetric Analysis:

1. Estimation of Na_2CO_3 using standard HCl solution
2. Estimation of Mohr's salt using potassium dichromate ($K_2Cr_2O_7$) solution
3. Estimation of $CuSO_4$ using sodium thio sulphate ($Na_2S_2O_3$) solution.

Water Analysis:

4. Determination of hardness of water sample by EDTA method
5. Determination of alkalinity of water sample
6. Determination of free chlorine in bleaching powder

Instrumental Titrations:

7. Conduct metric Titrations between strong acid and strong base.
8. Conduct metric Titrations between strong acid and weak base.
9. Potentio metric Titration between Ferrous iron and potassium dichromate ($K_2Cr_2O_7$) solution

Food Analysis & Separation Of Compounds:

10. Estimation of Vitamin-c
11. Thin layer chromatography

Preparation Of Polymeric Resin:

12. Preparation of phenol formaldehyde resin
13. Preparation of urea formaldehyde resin

Lab Manual: Engineering/Applied Chemistry Lab Manual, Dept. of Chemistry, Pace Institute of Technology and Science, Vallur, Prakasam Dist., Andhra Pradesh, India.

Reference Books:

1. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry-II,
2. VGS Techno Series 3. Chemistry Practical Manual, Lorven Publications

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B. Tech- I Year I Semester

Course structure

L	T	P	C
0	0	3	1.5

ENGINEERING WORKSHOP

(Common to EEE,ECE,CSE,IT Branches**)**

Internal Marks: 40

Course Code: P18ESL02 **External Marks: 60**

Course Pre-requisite: NIL

Course Objectives:

1. To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
2. To provide the students hands on experience to make different joints in carpentry with hand tools like jack plane, various chisels & hand saws.
3. To provide the students hands on experience to make different joints in Sheet metal work with hand tools like snips, stacks, nylon mallets etc.
4. To provide the students hands on experience to make different connections in house wiring with hand tools like cutting pliers ,tester ,lamps& lamp holders etc.
5. To develop a right attitude, team working, precision and safety at work place.

Course Outcomes:

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

1. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.
2. Familiarize with the basics of tools and equipment used in Carpentry.
3. Fabricate various basic components using Sheet metal.
4. Apply basic electrical engineering knowledge for house wiring practice.
5. Gain the hands on experience to form different models in Black smithy.

LIST OF EXPERIMENTS:

Minimum two experiments should be conducted from each trade

1. **Carpentry** **(6 Lectures)**
   a) Cross-Lap joint
   b) Dove tail joint
   c) T - Lap joint
   d) Mortise & Tenon joint
2. **Fitting** **(6 Lectures)**
   a) Square fit
   b) V - Fit
   c) Half round fit

d) Dovetail fit

3. **Tin Smithy** **(6 Lectures)**
   a) Rectangular Tray
   b) Cylinder
   c) Square box without lid
   d) funnel
4. **Black Smithy** **(6 Lectures)**
   a) Round rod to Square
   b) S-Hook
   c) Round Rod to Flat Ring
   d) Round Rod to Square headed bolt
5. **House wiring** **(6 Lectures)**
   a) One lamp controlled by one switch
   b) Parallel and Series connections
   c) Fluorescent lamp fitting
   d) Stair case wiring

Reference Books:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers, 2015.
2. Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, Vikas publishers, 2009.
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House, 2003.

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B.Tech. I Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

English-II

(Common to all Branches)

Internal Marks: 40

Course Code: P18HST02 **External Marks: 60**

Course Prerequisite:

The students should have basic knowledge of English grammar and LSRW skills.

Course Objectives:

1. To enable the engineering students to develop their basic communication skills in English for academic and social purposes.
2. To equip the students with appropriate oral and written communication skills.
3. To inculcate the skills of listening, reading and critical thinking.
4. To integrate English Language learning with employability skills and training.
5. To enhance the students' proficiency in reading skills enabling them meet the academic demands of their course

Course Outcomes:

On completion of this course, the student is able to:

1. Use English Language effectively in spoken and written forms
2. Interpret the contextual meaning of words
3. Comprehend the given texts and respond appropriately
4. Recall and reproduce the theme in a given context
5. Communicate confidently in formal and informal contexts

UNIT – I (8 Lectures)

My Struggle for an Education – Booker T. Washington

a. Vocabulary: Collocations

b. Grammar: Finite verbs, Non- finite verbs, Gerund, Transitive and Intransitive Verbs

c. Writing: Precis Writing

UNIT – II (9 Lectures)

In London – M.K.Gandhi

a. Vocabulary: Commonly confused words

b. Grammar: Active voice and Passive voice

c. Writing: Technical Report Writing

UNIT –III (10 Lectures)

Principles of Good Writing – L A Hill

a. Vocabulary: Commonly Misspelt Words

b. Grammar: Direct & Indirect Speech

c. Writing: Essay Writing

UNIT- IV (9 Lectures)

The Secret of Work – Swami Vivekanada

a. Vocabulary: Technical vocabulary

b. Grammar: Degrees of Comparison

c. Writing: Curriculum vitae, Cover Letter and Resume Writing. (Functional, Chronological and standard Resumes)

UNIT – V (9 Lectures)

Oh Father Dear Father – Raj Kinger

a. Vocabulary: Phrasal verbs

b. Grammar: Simple, Compound and Complex Sentences

c. Writing: Hints Development

Textbooks:

1. Board of Editors, "Sure Outcomes"– Orient Blackswan, Hyderabad, 2013
2. "Panorama" – Oxford University Press, New Delhi, 2016
3. "Fluency in English", A Course Book for Engg. Students, Published by Orient Black Swan, Hyderabad, 2016 print.
4. "Technical Communication- Principles and Practice", Third Edition. New Delhi: Oxford University press.

Reference Books:

1. Murphy, "English Grammar with CD", Cambridge University Press, New Delhi, 2004.
2. Rizvi Asheaf M, "Effective Technical Communication", Tata McGraw Hill, New Delhi, 2008
3. Baradwaj Kumkum, Professional Communication", I.K. International- Principles and Practice". Third Edition. New Delhi: Oxford University Press.2015
4. Trailblazers – Board of Editors – Orient Blackswan New Delhi).

Web References:

1. (www.englishhints.com,www.enchantedlearning.com, www.learnenglish.de/grammar/prefixtext.html)
2. (http://www.magickeys.com/books/riddles/words.html)

3. (http://www.pinnacle.edu.in/campusfiles/1826_campusFile_1.pdf)
4. http://www.yourdictionary.com
5. http://www.learnenglish.com
6. http://www.cambridge.org
7. http://www.eslcafe.com
8. http://www.eslgames.com
9. http://www.penguin.co.uk
10. http://www.edufind.com/english/practice

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B. Tech- I Year II Semester

Course structure

L	T	P	C
3	0	0	3

MATHEMATICS-II
(Linear algebra and Vector calculus)
(Common to All Branches)

Internal Marks: 40

Course code: P18BST02 External marks: 60

Course Prerequisite: Mathematics-I (P18BST01)

Course Objectives:

To learn

1. The subject gives the knowledge about matrices and applications to solve linear equations.
2. The course intends to provide an overview of Eigen values and Eigen vectors which occur in Physical and engineering problems.
3. To integration over the regions.
4. The concepts of vector differentiation.
5. Line integral, Surface and volume integrals, Vector integral theorems.

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Apply this knowledge to solve linear equations.
2. Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations.
3. Determine double integral over a region and triple integral over a volume.
4. Analyze the Vector differentiation in various domains.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT I: (10 Lectures)

Linear systems of equations:

Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination – Gauss Jordon- Gauss Jacobi and Gauss Seidal methods.

Applications: Finding the current in electrical circuits.

UNIT II: (10 Lectures)

Eigen values - Eigen vectors and Quadratic forms:

Eigen values - Eigen vectors– Properties – Cayley-Hamilton theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Diagonalization-

Quadratic forms-Reduction of quadratic form to canonical form – Rank - Positive, negative and semi definite - Index – Signature.

UNIT III: Multiple integrals: (9 Lectures)

Double and triple integrals – Change of variables – Change of order of integration.
Applications: Finding Areas, surface areas and Volumes.

UNIT IV: Vector Differentiation: (10 Lectures)

Gradient-Directional derivative, Divergence- Solenoidal vector, Curl –Irrotational Vector, Vector identities.
Applications: Equation of continuity, potential surfaces.

UNIT V: Vector Integration: (9Lectures)

Line integral – Work done – Potential function – Area- Surface and volume integrals
Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.
Applications: Work done, Force.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
4. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

Web Reference:

1. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
2. http://mathworld.wolfram.com/topics
3. http://www.nptel.ac.in/course.php

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B. Tech- I Year II Semester **Course structure**

L	T	P	C
3	0	0	3

PYTHON PROGRAMMING

(Common to EEE,ME,ECE,CSE,IT,AME Branches)

Course Code: P18EST04 **Internal Marks: 40**

External Marks: 60

Course Prerequisite: NIL

Course Objectives:

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and apply OOP concept.
4. To use Python data structures –- lists, tuples, dictionaries.
5. To develop GUI applications in Python.

Course Outcomes:

At the end of this course, the students will be able to

1. Understand the basics of python programming.
2. Understand control flow and implement various data structures provided by python.
3. Implement packages, methods and functions.
4. Develop real-world applications using oops and exception handling.
5. Build GUI Applications in Python.

UNIT-I (9 Lectures)

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT-II (10 Lectures)

Types, Operators and Expressions: Types - Integers, Strings, Booleans, Expressions and order of evaluations, Control Flow- if, if-elif-else, for, while, break, continue, pass.

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences, Comprehensions.

UNIT III (11 Lectures)

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

Modules: Creating modules, import statement, from. Import statement, name spacing,

Python packages: Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT IV (9 Lectures)

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding.

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions.

UNIT V (9 Lectures)

Brief Tour of the Standard Library & Files - Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Data Compression, Multithreading, GUI Programming, Turtle Graphics, file operations.

Text Books:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/).
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books:

1. John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013
2. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
4. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013.

Web References:

1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
2. https://www.codecademy.com/learn/learn-python
3. https://www.codementor.io/collections/learn-python-bwbc63ulz
4. http://www.diveintopython3.net/
5. https://www.python.org/3/
6. https://www.learnpython.org

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B.Tech. I Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

APPLIED PHYSICS

(Only for EEE)

Internal Marks: 40

Course code: P18BST03 **External Marks: 60**

Course Prerequisites

The basics of analytical and conceptual understanding of physics.

Course Objectives

1. To study the wave nature of light through Interference and diffraction.
2. To learn the basic principles of Lasers and fiber optics.
3. To express the physics of electrostatics and electromagnetic wave concepts through Maxwell's equations.
4. To study the basic concepts of Quantum mechanics.
5. Aware of limits of classical free electron theory and apply band theory of solids.
6. Acquire the knowledge of semiconductor physics.

Course Outcomes

1. Understanding the basic concepts of optics and how to apply them for engineering applications.
2. Acquire the knowledge of fundamentals of Lasers and fiber optics enables the students to develop Laser devices to apply them in various systems like communications, Industries and medicine.
3. Set students to be exposed to Electrostatics, Maxwell's equations, electromagnetic waves and fundamental concepts of quantum mechanics.
4. Enable to learn the fundamental concepts of free electron theory and band theory of solids.
5. Develop knowledge of band theory of solids for fundamentals of Semiconductor physics enables the students to apply the knowledge to various systems like communications, solar cell, photo cells and so on.

UNIT-I

Wave Optics (10 lectures)

Interference: Introduction, Superposition of waves, Interference of light by wave front splitting and amplitude splitting, interference in thin films, Newton's rings.

Diffraction: Introduction, differences between interference and diffraction, difference between Fraunhoffer and Fresnel diffraction, Fraunhoffer diffraction at single slit, Diffraction grating (N-slits qualitative), diffraction at circular aperture, resolving power of microscope, and telescope.

UNIT-II

Lasers And Fiber Optics (9 lectures)

Lasers: Introduction, Characteristics of laser, Absorption, spontaneous emission, stimulated emission, Einstein's coefficients, Pumping, Types of Lasers: Ruby laser, He-Ne laser.

Fiber optics: Introduction, Total internal reflection-wave propagation in optical fiber, Acceptance angle, numerical aperture.

UNIT-III

Electrostatics, Maxwell's Equations And Electromagnetic Wave (9 lectures)
Electrostatics: Coulombs law, electric field, electric field intensity, electric flux Density, electrostatic potential, divergence of electric field, Laplace's and Poisson's equations for electrostatic potential, Gauss theorem in electrostatics.
Maxwell's equations and electromagnetic waves: Gauss theorem in magneto statics, Faraday's law of electromagnetic induction, Ampere's law, displacement current, Maxwell's equations in vacuum, electromagnetic wave equation in dielectric medium, velocity of propagation of electromagnetic wave, poynting vector and poynting theorem.

UNIT-IV

Quantum Mechanics, Free Electron Theory And Band Theory (12 lectures)

Quantum Mechanics: Introduction to quantum physics, de-Broglie's hypothesis and properties of matter waves, Schrodinger's time independent wave equation, Particle in one dimensional box, physical significance of wave function.

Free electron theory: Free electron theory of metals assumptions and failures, Fermi Dirac distribution function- Fermi level, density of states.

Band theory of solids: Introduction, Bloch's theorem, Kronig penny model(qualitative), E-K diagram, Brillouin's zones, classification of solids into metals, semiconductors and insulators, effective mass of electron and concept of hole

UNIT-V
Semiconductor Physics (8 lectures)
Semiconductor physics: Introduction**,** Intrinsic and Extrinsic semiconductors. carrier concentration in intrinsic semiconductors, carrier concentration in N-type and P-type

semiconductors, Dependence of Fermi energy on carrier-concentration and temperature, diffusion and drift, Hall effect and its applications, mechanism in LED, solar cell and photo conductor

Text Books:

1. A Textbook of Engineering Physics by Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.
2. Optics by Ajoy Ghatak, Tata McGraw-Hill Publishing company limited
3. Lasers and nonlinear optics by BB Laud, New age International Publishers
4. Introduction to Electrodynamics by David Griffiths, Cambridge University Press
5. Introduction to Quantum physics by Eisberg and Resnick.
6. Solid state physics by AJ Dekker.

Reference Books:

1. Applied physics by Palanisamy (Scitech publications)
2. Optics by Eugene Hecht, Pearson Education.
3. Principle of Lasers by O.Svelto
4. Electricity, magnetism and light by W. Saslow
5. Introduction to Quantum mechanics by D.J.Griffiths. Cambridge University Press
6. Quantum mechanics by Richard Robinett.
7. Quantum Chemistry by Daniel McQuarrie
8. Semiconductor Optoelectronics by J. Singh, Physics and Technology, Mc Graw-Hill inc
9. Engineering Physics by B.K. Pandey, S. Chaturvedi - Cengage Learing.
10. Physics by Halliday and Resnick

Web References:

1. http://jntuk-coeerd.in/
2. http://www.youtube.com
3. http://en.wikipedia.org
4. http://nptel.ac.in/syllabus/122106027/

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B.Tech. I Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to ECE,CSE,IT,EEE)

Internal Marks: 40

Course Code: P18EST01 **External Marks: 60**

Course Prerequisite: Physics.

Course Objective:

1. To study the concept of passive elements, and understand the applications of network theorems for analysis of electrical networks.
2. To Analyze the single-phase ac circuits consisting of R,L, C, RL, RC, RLC combinations.
3. To understand the faraday's laws and basic Principle of transformer.
4. To understand the working principle of various rotating machines.
5. To study the operation of PN junction diode, half wave, full wave rectifiers, Transistors and OP-AMPs.

Course Outcomes:

After completion of this course, the student is able to:

1. Solve various electrical networks in presence of active and passive elements and by using principles of network theorem.
2. Analyze the single-phase ac circuits consisting of R,L, C, RL, RC, RLC combinations.
3. Understand the faraday's laws and basic Principle of transformer.
4. Understand the working principle of various rotating machines.
5. Study the operation of PN junction diode, half wave, full wave rectifiers, Transistors and OP-AMPs

UNIT – I (10 Lectures)

Electrical Circuits

Basic definitions – Types of network elements- Types of sources - Ohm's Law - Kirchhoff's Laws –Inductive networks - Capacitive networks – Series - Parallel circuits- Star-delta and delta-star transformations - Source transformation - nodal analysis and mesh analysis - Super position theorem.

UNIT – II (9 Lectures)

AC Circuit Analysis

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R,L, C, RL, RC, RLC combinations. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT –III (9 Lectures)

Magnetic Circuits and Transformers

Basic definition of Magnetic quantities - Faraday's laws of electromagnetic induction- Analogy between electrical and magnetic circuits. Concept of self and mutual inductance. Principle of operation and construction of single phase transformer–EMF equation – Applications.

UNIT- IV (11 Lectures)

Rotating Machines

Construction and Principle of operation of DC Machines - EMF equation – Torque equation –Speed control of DC Shunt Motor- power losses and efficiency - Principle of operation and construction of 3-phase Induction motor - Principle of operation and construction of alternators.

UNIT – V (9 Lectures)

Introduction to Semiconductor Devices

PN junction diode - Diode applications -Half wave -Full wave rectifiers – Types of Transistors - PNP and NPN junction transistors, transistor as an amplifier- Frequency response of CE Amplifier- Characteristics of Operational Amplifiers.

Textbooks:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company,6th Edition
2. Electrical Technology by Surinder Pal Bali, Pearson Publications.
3. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th Edition, PEI/PHI 2006.
4. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill

Reference Books:

1. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group
2. Electrical Machines by D. P.Kothari, I .J .Nagarth, Mc Graw Hill Publications, 4th Edition
3. Electrical Machines by R.K.Rajput, Lakshmi publications, 5th Edition.
4. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications
5. Electronic Devices and Circuits by David A. Bell, Oxford University Press
6. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA MC Graw Hill, Second Edition

Web References:

1. https://embeddedengineers.files.wordpress.com/2015/09/electronic-devices-and-circuits-by-salivahanan.pdf
2. https://electricalanswers.files.wordpress.com/2014/09/a-textbook-of-electrical-technology-volume-i-basic-electrical-engineering-b-l-theraja.pdf

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B. Tech I Year II Semester **Course Structure**

L	T	P	C
3	0	0	0

ENVIRONMENTAL SCIENCE
(Common to CE,EEE,ME,AME Branches)

Course Code: P18MCT01 **Internal Marks: 100**

Course Prerequisite:

Basic knowledge about sciences up to intermediate or equivalent level.

Course Objectives:

1. Overall understanding of the natural resources
2. Basic understanding of the ecosystem and its diversity
3. Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
4. An understanding of the environmental impact of developmental activities
5. Awareness on the social issues, environmental legislation and global treaties

Course Outcomes:

At the end of the course, the students will be able to acquire

1. The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web
2. The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources
3. Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
4. The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
5. Social issues both rural and urban environment and the possible means to combat the challenges and environmental assessment stages involved in EIA and the environmental audit.

UNIT- I (9 Lectures)

Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance– Need for Public Awareness. Renewable energy Resources, Solar energy-solar cells, solar batteries, wind energy, wind mills, ocean energy, tidal energy and nonrenewable energy resources: LPG, water gas, producer gas. World food problems, degradation and Soil erosion - overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity.

UNIT- II (8 Lectures)

Ecosystems: Concept of an ecosystem. – Structure, Components and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Ecological pyramids - Food chains, food webs and Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem. b. Grassland ecosystem c. Desert ecosystem d. Aquatic – River and Lake Ecosystems.

UNIT -III (8 Lectures)

Biodiversity and Its Conservation: Introduction, Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India –Value of biodiversity: consumptive use, Productive use, social, ethical and aesthetic values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT- IV (9 Lectures)

Environmental Pollution: Definition, Cause, Effects and Control measures of : a. Air Pollution, b. Water pollution, c. Soil pollution, d. Marine pollution, e. Noise pollution, f. Nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – **Disaster management:** floods, earthquake, cyclone and landslides.

UNIT -V (8 Lectures)

Social Issues And The Environment: From unsustainable to sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management –Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies Population growth – Impacts on society, variation among nations. Environmental Impact Assessment (EIA) and Environmental Protection Acts.

Text Book:

1. Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press, 2005.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi, 2008.

Reference Books:

1. Environmental Science & Engineering by Dr. A. Ravikrishnan, Hitech Publishing Company Pvt. Ltd. 2013.

2. Perspectives in Environmental Studies, Second edition, AnubhaKoushik and C.P. Koushik, New Age International (P) Limited, Publishers, 2004.

Web References:

1. Environmental Science - Oxford Research Encyclopedia
2. Environmental Science - Museum of Science and Industry
3. Collegesat.du.ac.in/UG/Envinromental%20Studies_ebook.pdf

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B. Tech I Year II Semester **Course Structure**

L	T	P	C
0	0	3	1.5

PYTHON PROGRAMMING LAB

(Common to EEE,ME. ECE,CSE,IT,AME Branches)

Course Code: P18ESL04 **Internal Marks: 40**
External Marks: 60

Course Outcomes:

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
2. Express different Decision Making statements and Functions.
3. Interpret Object oriented programming in Python.
4. Understand File handling operations.
5. Design GUI Applications.

Exercise1 - Basics

a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purpose fully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise 3 – Control Flow

a) Write a Program for checking whether the given number is a even number or not.
b) Using a for loop, write a program that prints out the decimal equivalents of 1/2,1/3,1/4,...,1/10.
c) Write a program using a for loop that loops over a sequence. What is sequence?
d) Write a program using a while loop that asks the user for a number, and prints a count down from that number to zero.

Exercise 4 – Control Flow-Continued

a) Find the sum of all the primes below two million. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise 5 - DS

a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
b) Write a program to use split and join methods in the string and trace a birth day with a dictionary data structure.

Exercise 6- DS-Continued

a) Write a program combine_lists that combines these lists into a dictionary.
b) Write a program to count frequency of characters in a given file. Can you use characterfrequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise 7 - Files

a) Write a program to print each line of a file in reverse order.
b) Write a program to compute the number of characters, words and lines in a file.

Exercise 8 - Functions

a) Write a function dups to find all duplicates in the list.
b) Write a function unique to find all the unique elements of a list.

Exercise 9 - Functions –Problem Solving

a) Write a function cumulative_product to compute cumulative product of a list of numbers.
b) Write a function reverse to reverse a list. Without using the reverse function.
c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise 10 – Multi - D Lists

a) Write a program to perform addition of two square matrices.
b) Write a program to perform multiplication of two square matrices.

Exercise 11 - OOP

Class variables and instance variable and illustration of the self variable

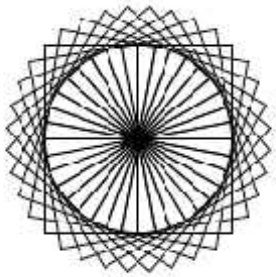
i)Robot.

ii)ATM Machine.

Exercise - 12 GUI, Graphics

a) Write a GUI for an Expression Calculator using tk.

b) Write a program to implement the following figures using turtle



B.Tech. I Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

APPLIED PHYSICS LAB

(Only for EEE)

Internal Marks: 40

Course code: P18BSL01 **External Marks: 60**

Course Prerequisites:

The basics of analytical and conceptual understanding of physics.

Course Objective:

1. Deploy scientific method of experiments in the laboratory.
2. Develop the procedures and observational skills for appropriate use of simple and complex apparatus.
3. Enable analytical techniques, statistical analysis and graphical analysis.
4. Reinforce ideas and concepts covered in lecture host of experiments.
5. Train to find the radius of curvature of a Plano-convex lens forming Newton's rings.

Course Outcomes:

1. Apply the phenomenon of interference and diffraction of light waves.
2. Implement the concept of resonance in LCR circuit and Sonometer.
3. Analyze the SHM to determine its dependent properties.
4. Evaluate the behavior of electronic components and its characteristics.

List of Experiments

(Any eight of the following to be done)

1. Determination of Radius of Curvature of Plano - Convex lens by forming Newton's Rings.
2. Determination of Wavelengths of various spectral lines using diffraction grating with the normal incidence method.
3. Determination of wavelength of laser radiation.
4. Determination of Refractive index of a given prism..
5. Study of magnetic field along the axis of a current carrying coil and to verify Stewart-Gee's method.
6. Determination of energy gap of PN junction Diode.
7. Determination of hall coefficient and carrier concentration using Hall effect
8. Study of V-I characteristics of Zener diode.

9. Study of V-I characteristics of PN junction diode.
10. Determination of frequency of a vibrating bar or electrical tuning fork using Melde's apparatus.
11. Determination of acceleration due to gravity using compound pendulum
12. Verification of laws of transverse waves by Sonometer.
13. Determination of Velocity of sound by volume resonator.
14. Determination of rigidity modulus by Torsional Pendulum.

Text Books:

1. Madhusudhanrao, "Engineering Physics lab manual" Ist edition, Scietech Publication, 2015.
2. Ramarao Sri, Choudary Nityanand and Prasad Daruka, Lab Manual of Engineering physics 5th ed, Excell books, 2010.
3. Physics lab manual, department of physics, PACE Institute of Technology and Sciences.

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B.Tech. I Year II Semester

Course Structure

L	T	P	C
0	0	3	1.5

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

(Common to CE, ME & AME)

Course Code: P18ESL01 **External Marks: 60**

Course Prerequisite: None

Course Objective:

1. To verify and demonstrate on safety precautions and Kirchhoff laws.
2. To demonstrate construction of transformer, rotating machines and various protective devices.
3. To verify superposition theorem and control of dc shunt motor using speed control methods.
4. To analyze the characteristics of PN junction diode and transistor CE characteristics
5. To analyze the characteristics of CE amplifier and operation of half-wave and full-wave rectifier.

Course Outcomes:

After completion of this course, the student is able to:

1. Get an exposure on safety precautions and verify Kirchhoff laws.
2. Get an exposure on construction of transformer, rotating machines and various protective devices.
3. Verify superposition theorem and control the speed of DC shunt motor using speed control methods.
4. Analyze the characteristics of PN junction diode and transistor CE characteristics.
5. Analyze the characteristics of CE amplifier and operation of half-wave and full-wave rectifier.

The following experiments are required to be conducted as compulsory experiments:

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.

2. Verification of Kirchhoff‘s laws.
3. Demonstration of construction of Transformer and Rotating machines.
4. Demonstration on various protective devices.
5. Verification of superposition theorem
6. Speed control of D.C. Shunt motor by
   a) Armature Voltage control b) Field flux control method
7. PN junction diode characteristics
   a. Forward bias
   b. Reverse bias (Cut in voltage and resistance calculations)
8. Transistor CE characteristics (Input and output)
9. CE Amplifier Characteristics
10. Half Wave rectifier and Full Wave Rectifier without filters

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II Year - I Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET01	Electrical Circuit Analysis	3	1	0	4	40	60
2	P18EET02	Electromagnetic Fields	3	0	0	3	40	60
3	P18EET03	Electrical Machines - I	3	0	0	3	40	60
4	P18ECT01	Semiconductor Devices and Circuits	3	0	0	3	40	60
5	P18BST03	Mathematics-III	3	0	0	3	40	60
6	P18MET09	Thermal and Hydraulic Prime Movers	3	0	0	3	40	60
7	P18EEL01	Electrical Circuits Lab	0	0	3	1.5	40	60
8	P18EEL02	Electrical Machines – I Lab	0	0	3	1.5	40	60
Total			18	1	6	22	320	480

B.Tech. II Year I Semester **Course Structure**

L	T	P	C
3	1	0	4

ELECTRICAL CIRCUIT ANALYSIS

Internal Marks: 40

Course Code: P18EET01 **External Marks:** 60

Course Prerequisite: Basic Electrical and Electronics Engineering

Course Objectives:

1. To understand the various network theorems for the analysis of electrical circuits.
2. To study the concepts of balanced and unbalanced three-phase circuits.
3. To study the Coupled Circuits and performance of a network based on input and output excitation / response.
4. To calculate the various two port network parameters and to know interconnections.
5. To understand the applications of network topology to electrical circuits.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Apply network theorems for the analysis of electrical circuits.
2. Solve three- phase circuits under balanced and unbalanced condition.
3. Understand the Coupled Circuits find the transient response of electrical networks for different types of excitations.
4. Find the parameters for different types of network and their interrelations.
5. Solve Electrical networks with network topology concepts.

UNIT-I NETWORK THEOREMS (15 Lectures)

Extension of Node and Mesh Analysis to DC networks - Thevenin's theorem, Norton theorem, Maximum power transfer theorem, Reciprocity theorem and Compensation theorem - Analysis with dependent current and voltage sources.

UNIT-II THREE PHASE CIRCUITS (12 Lectures)

Phase sequence- star and delta connection - relation between line and phase voltages and currents - analysis of balanced three phase circuits -Analysis of three phase

unbalanced circuits: Loop method – Star-Delta transformation Technique. Importance of 3-phase circuits.

UNIT-III COUPLED CIRCUITS & TRANSIENT ANALYSIS IN DC AND AC CIRCUITS (15 Lectures)

Measurement of Self, Mutual Inductance, coefficient of coupling, coupled circuits – dot convention - Locus Diagram - Series, parallel Resonance – concept of band width and Q factor.

Transient response of R-L, R-C, R-L-C circuits for DC and AC excitations, Solution using differential equations and Laplace transforms.

UNIT-IV TWO PORT NETWORKS (9 Lectures)

Two port network parameters – Z, Y, ABCD and Hybrid parameters and their relations, Cascaded networks.

UNIT-V NETWORK TOPOLOGY (9 Lectures)

Definitions of Graph and Tree, Basic cut set and tie set matrices for planar networks, Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

Text Books:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company, 6th edition, 2007.
2. Network Analysis by Van Valkenburg; Prentice-Hall of India Private Ltd, 2015.

Reference Books:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, Mc Graw Hill Education (India), 2013.
2. Linear Circuit Analysis by De Carlo, Lin, Oxford publications, 2008.
3. Electric Circuits– (Schaum's outlines) by Mahmood Nahvi & Joseph Edminister, Adapted by Kuma Rao, McGraw Hill, 5th Edition-2012.
4. Electric Circuits by David A. Bell, Oxford publications, 2009.
5. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications,2013.
6. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi, DhanpatRai & Co, 2009.

Web Resources:

1. www.allaboutcircuits.com
2. www.electronics-tutorials.ws

B.Tech. II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

ELECTRO MAGNETIC FIELDS

Internal Marks: 40

Course Code: P18EET02 **External Marks:** 60

Course Prerequisites: Applied Physics, Mathematics.

Course Objective:

1. To study the production of electric field and potentials due to different configurations of static charges.
2. To study the properties of conductors and dielectrics, calculate the capacitance of various configurations and understand the concept of conduction and convection current densities.
3. To study the magnetic fields produced by currents in different configurations, application of ampere's law and the Maxwell's second and third equations.
4. To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops.
   To develop the concept of self and mutual inductances and the energy stored.
5. To study time varying and Maxwell's equations in different forms and Maxwell's fourth equation for the induced e.m.f.

Course Outcomes:

After completion of this course, the students are:

1. Able to understand the production of electric field and potentials due to different configurations of static charges.
2. Able to understand the properties of conductors and dielectrics calculate the capacitance of various configurations and understand the concept of conduction and convection current densities.
3. Able to understand the magnetic fields produced by currents in different configurations, application of ampere's law and the Maxwell's second and third equations.
4. Able to understand the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current

loops. To develop the concept of self and mutual inductances and the energy stored.

5. Able to understand the time varying and Maxwell's equations in different forms and Maxwell's fourth equation for the induced e.m.f.

UNIT-I ELECTROSTATICS – I (10 Lectures)

Coordinate systems: Introduction to coordinate systems, rectangular, cylindrical and spherical coordinate systems.

Electrostatics: Coulomb's Law – Electric Field Intensity (EFI) – electric fields due to continuous charge distributions – volume charge, line charge, surface charge - EFI due to a line and a surface charge – electric flux density – gauss law – applications of gauss law – Maxwell equations.

UNIT-II ELECTROSTATICS – II (10 Lectures)

Electric Potential - Properties of potential function – Potential gradient – electric potential due to charge distribution - Work done in moving a point charge in an electrostatic field – Current Density – equation of continuity - conduction and Convection current densities – Ohm's law in point form - Behavior of conductors in an electric field – dielectrics - polarization - Electric dipole – Dipole moment - potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field.

Boundary conditions : Conductors and Insulators - Boundary conditions between conduction to Dielectric and dielectric to dielectrics capacitance - capacitance of parallel plates, spherical and coaxial cables with composite dielectrics – Energy stored and energy density in a static electric field - Laplace's and Poison's equations - solution of Laplace's equation in one variable.

UNIT-III MAGNETOSTATICS – I (10 Lectures)

Biot-Savart's law and its applications: Static magnetic fields – Biot-Savart's law - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI - Maxwell's second Equation, div(B)=0

Amperes circuit law and its applications:

MFI due to an infinite sheet of current and a long filament carrying conductor – Point form of Ampere's circuital law –Field due to a circular loop, rectangular and square loops, Maxwell's third equation, Curl (H)=J.

UNIT-IV MAGNETOSTATICS – II (8 Lectures)

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field - Magnetic potential – scalar magnetic potential and its limitations – vector magnetic potential and its limitations – vector poisons equation

Self and Mutual inductance – determination of self-inductance of a solenoid and toroid – Neumanns formulae - mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT – V ELECTRO DYNAMIC FIELD (7 Lectures)

Faraday's laws of electromagnetic induction – induced emf - Statically and dynamically induced EMFs - Simple problems -Modification of Maxwell's equations for time varying fields - Displacement current - Poynting Theorem and Poynting vector

Textbooks:

1. Engineering Electromagnetics by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th Editon. 2006.
2. Field theory by gangadhar K.A, khanna publishers, New delhi, 15th edition , 2004

Reference Books:

1. Principles of Electro Magnetics by Sadiku, Oxford Publications,4th edition,2010.
2. Introduction to Electro Dynamics by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd edition, 2012.
3. Electromagnetic Field Theory by Yaduvir Singh, Pearson, 2018.

4. Fundamentals of Engineering Electromagnetics by Sunil Bhooshan, Oxford higher Education, 2012.

Web References:

1. www.niehs.nih.gov
2. www.emfields-solutions.com
3. www.electrical4u.com
4. www.indiabix.com
5. www.ece.uah.edu

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B.Tech. II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

ELECTRICAL MACHINES - I

Internal Marks: 40

Course Code: P18EET03 **External Marks:** 60

Course Prerequisite: Basic Electrical and Electronics Engineering

Course Objective:

1. To study the concepts of electromechanical energy conversion, understand the different types of DC machines and their characteristics.
2. To study the torque production mechanism, control the speed of DC motors & Testing of DC Machines.
3. To analyze the performance, losses and efficiency of single phase transformers.
4. To study the regulation of single phase transformers & parallel operation.
5. To study the analyzation, performance of three phase transformers, control voltages with tap changing methods and Three-phase to two-phase transformation

Course Outcomes (COs):

1. Able to assimilate the concepts of electromechanical energy conversion, understand the different types of DC machines and their characteristics.
2. Able to understand the torque production mechanism, control the speed of DC motors & Testing of DC Machines.
3. Able to analyze the performance, losses and efficiency of single phase transformers.
4. Able to predetermine the regulation of single phase transformers & parallel operation.
5. Able to analyze the performance of three phase transformers, control voltages with tap changing methods and Three-phase to two-phase transformation

UNIT-I DC GENERATOR (10 Lectures)

Principles of electromechanical energy conversion – singly excited and multi excited system – Classification of DC generators – Characteristics of DC generator.

DC Motor

Torque and back-emf equations of dc motors, characteristics of separately-excited, shunt, series and compound motors - applications of dc motors

UNIT-II STARTING & SPEED CONTROL D.C. MOTOR (8 Lectures)

Necessity of starter – Starting by 3 point and 4 point starters – Speed control of DC motor.

Testing of DC Machines

Losses and efficiency - brake test, Swinburne's method – Hopkinson's method – Load tests on dc Machine – Field's test.

UNIT-III SINGLE-PHASE TRANSFORMERS (10 Lectures)

Introduction - operation on no-load and on-load – lagging, leading and unity power factor loads - phasor diagrams of transformers – equivalent circuit – regulation – losses and efficiency – effect of variation of frequency and supply voltage on losses – All day efficiency.

UNIT-IV TESTING & PARALLEL OPERATION OF TRANSFORMER (7 Lectures)

Tests on single phase transformer: open circuit and short circuit tests – Sumpner's test – parallel operation with equal and unequal voltage ratios – Autotransformer: equivalent circuit – comparison with two winding transformers.

UNIT-V 3-PHASE TRANSFORMERS (10 Lectures)

Types of Poly-phase connections – Uses of tertiary winding – Concept of Tap Changing - off load and on load tap changers - Scott connection of transformer for phase conversion.

Text Books:

1. Electrical Machines P.S. Bimbra, Khanna Publishers, 7th edition, 2007.

2. Electrical Machines I.J Nagrath & D.P Kothari, Tata Mc Graw-Hill, 3rd edition, 2009.

3. Electrical Machines by S.K. Bhattacharya, 2014.

4. Electrical Machines by J.B. Gupta, Kataria Publications, 2015.

Reference Books:

1. Performance and Design of D.C Machines by A.E. Clayton & Hancock, BPB Publishers, 3rd edition, 2004.
2. Performance and Design of A.C Machines by M.G Say, BPB Publishers, 3rd edition, 2002.
3. Electric Machinery by A.E.Fitzgerald , C Kingsley and S Umans, McGraw Hill 2013.
4. Performance and Design of DC Machines, by Clayton & Hancock, BPB Publishers, 2004.
5. Electro mechanics–I (D.C Machines), by S. Kamakshaiah, Hi-Tech Publishers, 2013.

Web References:

1. www.electrical4u.com
2. www.indiabix.com

B. Tech II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

SEMICONDUCTOR DEVICES AND CIRCUITS

Internal Marks: 40

Course Code: P18ECT01 **External Marks:** 60

Course Prerequisites: Engineering Physics, Engineering Chemistry

Course Objectives:

1. The basic concepts of semiconductor physics are to be reviewed.
2. Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
3. The application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
4. The principal of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics are explained.
5. The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained.

Course Outcomes:

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

1. Understand the basic concepts of semiconductor physics.
2. Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
3. Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
4. Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
5. Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.

UNIT-I **(10 Lectures)**

Semi Conductor Physics : Insulators, Semi conductors, and Metals classification using energy band diagrams, mobility and conductivity, electrons and holes in intrinsic semi conductors, extrinsic semi conductors, drift and diffusion, charge

densities in semiconductors, Hall effect, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors

UNIT-II (10 Lectures)

Junction Diode Characteristics : Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

Special Semiconductor Devices: Zener Diode, Breakdown mechanisms, LED, LCD, Photo Diode, Varactor diode, Tunnel Diode, Construction, operation and characteristics and application of all the diodes, comparison of various diodes in terms of doping levels.

UNIT-III RECTIFIERS AND FILTERS (8 Lectures)

Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors. . Voltage regulators ,zener diode regulator, IC regulator .

UNIT-IV TRANSISTOR CHARACTERISTICS (10 Lectures)

BJT: Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT-V TRANSISTOR BIASING AND THERMAL STABILIZATION (7 Lectures)

Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in VBE, Ic, and β, Stability factors, (S, S', S"), Bias compensation, Thermal runaway, Thermal stability.FET Biasing- methods and stabilization.

Text Books:

1. Electronic Devices and Circuits by J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition,2011.
2. Integrated Electronics by Jacob Millman, C.Halkies, C.D.Parikh, Tata Mc-Graw Hill, 2009.

Reference Books:

1. Electronic Devices and Circuits by K. Satya Prasad, VGS Book Links,2014.
2. Electronic Devices and Circuits by Bell, Oxford,2008.

Web References:

1. www.physics.info
2. www.allaboutcircuits.com
3. www.academia.edu

B.Tech. II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

MATHEMATICS-III

(NUMERICAL METHODS AND FOURIER ANALYSIS)

(Common to All Branches)

Internal Marks: 40

Course Code: P18BST03 **External Marks: 60**

Course Prerequisite: Mathematics-I, Mathematics-II (P18BST01)

Course Objectives: To learn

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The Fourier series of a periodic function and its application to the solution of partial differential equations.
3. To calculate the Fourier transform or inverse transform of common functions including Delta, Unit-Step.
4. Learn to find Solution of One dimensional Wave, Heat equation

Course Outcomes:

1. After learning the contents of this paper the student must be able to Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators.
2. Solve ordinary differential equations numerically using Euler's and RK method.
3. Analyze the spectral characteristics of signals using Fourier analysis. Classify systems based on their properties and determine the response
4. Find Fourier series and Fourier transforms for certain functions.
5. Identify/classify and solve the different types of partial differential equations.

UNIT-I SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL QUATIONS AND INTERPOLATION (10 Lectures)

Introduction- Bisection method – Method of false position – Newton- Raphson method. Interpolation: Introduction- Forward differences- Backward differences. Newton's formula for interpolation - Lagrange's interpolation formula.

UNIT-II NUMERICAL INTEGRATION AND SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (9 Lectures)

Trapezoidal rule- Simpson's 1/3rd and 3/8th rule Solution of ordinary differential equations by Taylor's series- Euler's method –Modified Euler's method, Runge-Kutta method of fourth order.

UNIT-III FOURIER SERIES (9 Lectures)

Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series.

UNIT-IV FOURIER TRANSFORMS (8 Lectures)

Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier Transforms.

UNIT-V FIRST ORDER PARTIAL DIFFERENTIAL EQUATIONS (9 Lectures)

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations. Method of separation of Variables- Solution of One dimensional Wave, Heat equation.

Text Books:

1. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers, 43rd Edition.
2. Engineering Mathematics by N.P.Bali, Lakshmi Publications.

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig,Wiley-India,10^{th} edition.
2. Advanced Engineering Mathematics by Micheael Greenberg, Pearson edn, 9^{th} edition.
3. Advanced engineering mathematics with MATLAB by Dean G. Duffy, CRC Press.
4. Advanced Engineering Mathematics by Peter O'neil, Cengage Learning.
5. Engineering Mathematics by Srimanta Pal, Subodh C.Bhunia, Oxford University Press.
6. Higher Engineering Mathematics by Dass H.K., Rajnish Verma. Er, S. Chand Co.Pvt. Ltd, Delhi.

Web Resources:

1. www.tutorial.math.lamar.edu
2. www.mathworld.wolfram.com
3. www.nptel.ac.in

B.Tech. II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

THERMAL AND HYDRAULIC PRIME MOVERS

Internal Marks: 40

Course Code: P18MET09 **External Marks:** 60

Course Prerequisite: Basic knowledge of fluids

Course objectives:

1. To make the student learn about the basic air standard cycles and the constructional features, operational details of various types of internal combustion engines.
2. To train the student in the aspects of steam formation and its utilities through the standard steam data tables and charts.
3. To impart the knowledge of gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines
4. To make the student learn about the constructional features, operational details of various types of pumps and hydraulic turbines
5. To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.

Course Outcomes:

After completion of the course the student will be able to

1. Gain the knowledge of various types of internal combustion engines and calculate the performance of different types of internal combustion engines
2. Understand steam formation and the standard steam data tables and charts.
3. understand and the methods to improve the efficiency of gas turbines
4. Gain the knowledge of various types of fluid jets, pumps, hydraulic turbines and working and performance
5. Gain the knowledge of various types of hydro electric power plants, estimation and calculation of different loads by factors.

UNIT-I **(9 Lectures)**

Air standard cycles – Carnot, Otto, Diesel, Dual Combustion cycles -Description and representation on P–V and T-S diagram, Thermal Efficiency.

I.C Engines: Classification, working principles – valve and port timing diagrams, Engine systems - fuel injection, carburetion, ignition, cooling and Lubrication.

UNIT-II **(10 Lectures)**

Properties of Steam and use of Steam Tables- T-S and H-S Diagrams

Vapor Power Cycles: Carnot Cycle-Rankine Cycle- Analysis of simple Rankine Cycle and Re-heat cycle.

Steam Turbines: Schematic layout of steam power plant, Classification of Steam Turbines - Impulse Turbine and Reaction Turbine - Compounding in Turbines - Velocity Diagrams for simple Impulse and Reaction Turbines- Work done & efficiency.

UNIT-III **(9 Lectures)**

Gas Turbines: Simple gas turbine plant-ideal cycle, Classification of Gas Turbines - closed cycle -open cycle-. Efficiency, Work ratio and optimum pressure ratio for simple gas turbine cycle. Actual cycle, analysis of simple cycles & cycles with inter cooling, reheating and Regeneration.

Impact Of Jets: Impulse momentum equation, Impact of Jet on stationary and moving vanes (flat and curved).

UNIT – IV **(9 Lectures)**

Pumps: Types of pumps, Centrifugal and Reciprocating pumps - Main components, Working principle, classifications, Performance and characteristic curves.

Hydraulic Turbines: Classification of turbines; Working principle, Efficiency for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves

UNIT – V **(8 Lectures)**

Hydro Power: Components of Hydro electric power plant: pumped storage systems, Estimation of water power potential; Estimation of load on turbines: load curve, load factor, capacity factor, utilization factor, diversity factor, load – duration curve, firm power, secondary power, prediction of load.

Text Books:

1. Thermal Engineering by Rajput, Lakshmi publications, 2015.

2. Thermal engineering by M.L.Mathur and F.S.Mehta, Jain Brothers, 2015.
3. Hydraulics & Fluid Mechanics by P.N. Modi and S.M. Seth, Text Books House, Delhi, 2017.
4. Fluid Mechanics & Hydraulic Machinery by A.K.Jain, , Khanna Publishers, Delhi, 1998.

Reference Books:

1. Fluid Mechanics by Victor.L.Streeter, McGraw Hill Higher Education; 8th Revised edition edition,1985.
2. Introduction to Fluid Mechanics by Edward .J. Shaughnessy Jr, Oxford University Press; 1 edition, 2004.
3. Fluid Mechanics & Its Applications by Vijay Gupta, Santhosh.k.Gupta, New Academic Science; 3rd Revised edition edition 2012.
4. Fluid Mechanics & Fluid power Engineering by Dr D.S.Kumar, Kataria, SK & Sons,2009.
5. Water Power Engineering by M.M Desumukh, Dhanpati Rai Publications,2010.

Web References:

1. www.en.wikipedia.org
2. www.wartsila.com
3. www.engineeringtoolbox.com
4. www.hydroworld.com
5. www.iitg.ac.in

B.Tech. II Year I Semester

Course Structure

L	T	P	C
0	0	3	1.5

ELECTRICAL CIRCUITS LAB

Internal Marks: 40

Course Code: P18EEL01 **External Marks:** 60

Course Prerequisites: Basic electrical Engineering & Electrical circuit Analysis

Course Objectives:

1. To verify the Thevenin's, Norton's and Maximum Power Transfer Theorems.
2. To verify the Compensation Theorem and Reciprocity Theorem.
3. To draw the Locus Diagrams of RL and RC Series Circuits and to find the Series and Parallel Resonance frequency.
4. To determine the Self, Mutual Inductances, Coefficient of coupling and Z and Y Parameters.
5. To determine the Transmission, hybrid parameters and Parameters of a choke coil.

Course Outcomes:

At the end of this course, students will able to

1. Verify the Thevenin's and Norton's and Maximum Power Transfer Theorems Practically.
2. Verify the Compensation Theorem and Reciprocity Theorem Practically.
3. Draw the Locus Diagrams of RL and RC Series Circuits and to find the Series and Parallel Resonance frequency.
4. Determine the Self, Mutual Inductances, Coefficient of coupling and Z and Y Parameters.
5. Determine the Transmission, hybrid parameters and Parameters of a choke coil.

The following experiments are to be conducted:

1. Verification of Thevenin's and Norton's Theorems.
2. Verification of Maximum Power Transfer Theorem.
3. Verification of Compensation Theorem.
4. Verification of Reciprocity Theorems.
5. Locus Diagrams of RL and RC Series Circuits.

6. Series and Parallel Resonance.
7. Determination of Self, Mutual Inductances and Coefficient of coupling.
8. Z and Y Parameters.
9. Transmission and hybrid parameters.
10. Parameters of a choke coil.

B.Tech. II Year I Semester **Course Structure**

L	T	P	C
0	0	3	1.5

ELECTRICAL MACHINES – I LAB

Internal Marks: 40

Course Code: P18EEL02 **External Marks:** 60

Course Prerequisite: Electrical Machines - I & Basic Electrical Lab

Course Objectives:

1. To plot the magnetizing characteristics of DC shunt generator.
2. To control the speed of the DC motors.
3. Determine and predetermine the performance of DC machines.
4. To predetermine the efficiency and regulation of transformer.

Course Outcomes

1. Able to understand the open circuit characteristics of DC shunt generator.
2. Able to understand the speed control methods for dc motors.
3. Able to understand the performance characteristics of various DC machines.
4. Able to find the efficiency, regulation and equivalent circuit parameters of transformers.

Any 10 of the following experiments are to be conducted

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC shunt generator. Determination of characteristics.
3. Brake test on DC shunt motor. Determination of performance curves.
4. Load test on DC compound generator. Determination of characteristics.
5. Hopkinson’s test on DC shunt machines. Predetermination of efficiency.
6. Swinburne’s test and Predetermination of efficiencies as Generator and Motor.
7. Brake test on DC compound motor. Determination of performance curves.
8. Load test on DC series generator. Determination of characteristics.
9. O.C. & S.C. Tests on Single phase Transformer
10. Sumpner’s test on single phase transformers
11. Scott connection of transformers
12. Parallel operation of Single phase Transformers

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II Year - II Semester								
S.No	Course Code	Course	L	T	P	Credits	Internal	External
1	P18EET04	Electrical Machines - II	3	1	0	4	40	60
2	P18EET05	Control Systems	3	1	0	4	40	60
3	P18EET06	Power Systems -I	3	0	0	3	40	60
4	P18CST02	Data Structures	3	0	0	3	40	60
5	P18ECT03	Switching Theory and Logic Design	3	0	0	3	40	60
6	P18BST04	Mathematics - IV	3	0	0	3	40	60
7	P18ECL01	Semi Conductor Devices and Circuits Lab	0	0	3	1.5	40	60
8	P18EEL03	Electrical Machines – II Lab	0	0	3	1.5	40	60
9	P18CSL01	Data Structures Lab	0	0	3	1.5	40	60
Total			18	2	9	24.5	360	540

B.Tech. II Year II Semester **Course Structure**

L	T	P	C
3	1	0	4

ELECTRICAL MACHINES-II

Internal Marks: 40

Course Code: P18EET04 **External Marks:** 60

Course Prerequisites: Basic Electrical and Electronics Engineering, Electrical Machines-I

Course Objectives:

1. To assimilate the concepts of 3-Phase induction motor.
2. To understand the starting and testing methods of 3-Phase induction motor.
3. To analyze the performance, losses and efficiency of single phase induction motor.
4. To determine the regulation of synchronous generator.
5. To analyze the performance of synchronous motor.

Course Outcomes (COs):

1. Able to assimilate the concepts of 3-Phase induction motor.
2. Able to understand the starting and testing methods of 3-Phase induction motor.
3. Able to analyze the performance, losses and efficiency of single phase induction motor.
4. Able to determine the regulation of synchronous generator.
5. Able to analyze the performance of synchronous motor.

UNIT-I 3-PHASE INDUCTION MOTORS (12 Lectures)

Construction details of cage and wound rotor machines - production of rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor current and pf at standstill and during running conditions - rotor power input, rotor copper loss and mechanical power developed and their interrelationship – Harmonics.

UNIT-II CHARACTERISTICS, STARTING AND TESTING METHODS OF INDUCTION MOTORS (12 Lectures)

Torque equation - expressions for maximum, starting and running torque - torque slip characteristics - double cage and deep bar rotors - crawling and cogging – speed control of induction motor with V/f method – no load and blocked rotor tests - circle diagram– methods of starting.

UNIT-III SINGLE PHASE INDUCTION MOTORS (12 Lectures)

Single phase induction motors – Constructional features - Problem of starting – Double field revolving theory– Cross field revolving theory - Starting methods - equivalent circuit – Brake test on single phase induction motors.

UNIT-IV SYNCHRONOUS GENERATORS (14 Lectures)

Constructional features of non–salient and salient pole type – Armature windings – Distributed and concentrated windings – Distribution and Pitch factors –E.M.F equation – Improvement of waveform - armature reaction.

Voltage Regulation of Synchronous generator

Voltage regulation by synchronous impedance method– MMF method and Potier triangle method – Phasor diagrams – Synchronizing power – Load sharing – Slip Test – Methods of Phase Sequence - Numerical problems.

UNIT-V SYNCHRONOUS MOTOR (10 Lectures)

Synchronous Motor working principle and theory of operation – Phasor diagram – Starting torque – V & Inverted V curves – Synchronous Condenser – Hunting and it's suppression – Methods of starting – Applications - Numerical problems.

Text Books:

1. Electrical Machines by P.S. Bimbra, Khanna Publishers, 7th edition, 2007.
2. Electrical Machines by I.J Nagrath & D.P Kothari, Tata Mc Graw-Hill, 3rd edition, 2009.
3. Electrical Machines by S.K. Bhattacharya, 2014.
4. Electrical Machines by J.B. Gupta, Kataria Publications, 2015.

Reference Books:

1. Performance and Design of D.C Machines by A.E. Clayton & Hancock, BPB Publishers, 3rd edition, 2004.
2. Performance and Design of A.C Machines by M.G Say, BPB Publishers, 7th Edition, 2002.
3. Electric Machinery by A.E.Fitzgerald, C Kingsley and S Umans, McGraw Hill, 2013.
4. Performance and Design of DC Machines by Clayton & Hancock, BPB Publishers, 2004.
5. Electro mechanics – I (D.C Machines) by S. Kamakshaiah, Hi-Tech Publishers, 2010.

Web References:

1. www.electrical4u.com
2. www.indiabix.com

B. Tech II Year II Semester **Course Structure**

L	T	P	C
3	1	0	4

CONTROL SYSTEMS

Internal Marks: 40

Course Code: P18EET05 **External Marks: 60**

Course Prerequisites: Laplace Transformation & Differential Equations.

Course Objectives:

1. To learn the mathematical modelling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
2. To analyze the time response of first and second order systems and improvement of Performance by PI, PD & PID controllers
3. To investigate the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
4. To present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion. To discuss basic aspects of design and compensation of linear control systems using Bode plots.
5. Ability to formulate state models and analyze the systems. To present the concepts of Controllability and Observability.

Course Outcomes: After completion of the course the student will be

1. Ability to derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
2. Capability to determine time response specifications of second order systems and to determine error constants.
3. Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
4. Capable to analyze the stability of LTI systems using frequency response methods and able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.
5. Ability to represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.

UNIT-I MATHEMATICAL MODELING OF CONTROL SYSTEMS (15 Lectures)

Classification of control systems, Open Loop and closed loop control systems and their differences, Feed-Back Characteristics, Transfer function of linear system, Differential equations of electrical networks, mechanical systems.

Transfer Function of DC Servo motor & AC Servo motor- Synchro transmitter and receiver - Block diagram algebra – Representation by Signal flow graph - Mason's gain formula.

UNIT-II TIME RESPONSE ANALYSIS (10 Lectures)

Standard test signals - Time response of first and second order systems - Time domain specifications - Steady state errors and error constants – Effects of PI, PD and PID control systems.

UNIT-III STABILITY ANALYSIS IN S-DOMAIN (15 Lectures)

The concept of stability – Routh's stability criterion –limitations of Routh's stability – Root locus concept - construction of root loci (Simple problems).

Introduction to Frequency domain specifications - Bode diagrams - transfer function from the Bode Diagram - Phase margin and Gain margin - Stability Analysis from Bode Plots.

UNIT-IV FREQUENCY RESPONSE ANALYSIS & CLASSICAL CONTROL DESIGN TECHNIQUES (10 Lectures)

Lag, Lead, Lag-Lead compensators, design of compensators – using Bode plots. Polar Plots, Nyquist plot - Stability criterion.

UNIT-V STATE SPACE ANALYSIS OF LTI SYSTEMS (10 Lectures)

Concepts of state, state variables and state model - state space representation of transfer function, Transfer function from State Space Representation, Solving the time invariant state equations – State transition matrix and it's Properties – Concepts of Controllability and Observability.

Text Books:

1. Control Systems principles and design by M.Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition, 2014.
2. Automatic control systems by Benjamin C.Kuo, Prentice Hall of India, 2nd Edition, 2012.

Reference Books:

1. Modern Control Engineering by Kotsuhiko Ogata, Prentice Hall of India, 2010.

2. Control Systems by ManikDhanesh N, Cengage publications, 2012.
3. Control Systems Engineering by I.J.Nagarath and M.Gopal, Newage International Publications, 5th Edition, 2015.
4. Control Systems Engineering by S.Palani, TataMcGraw Hill Publications, 2016.

Web references:

1. www.easyengineering.net

2. www.books.google.co.in

B. Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

POWER SYSTEMS-I

Internal Marks: 40

Course Code: P18EET06 **External Marks: 60**

Course Prerequisite: Electrical Circuit Analysis, Thermal & Hydraulic Prime Movers.

Course Objectives:

1. To study the electrical power generation in India and type of power plants.
2. To study the thermal power plant.
3. To study the working principle of nuclear power plant.
4. To study the constructional and operation of air and gas Insulated substations.
5. To study the different types of load curves and tariffs applicable to consumers.

Course Outcomes:

Students are

1. Able to understand the electrical power generation in India and type of power plants.
2. Able to understand the thermal power plant.
3. Able to understand the working principle of nuclear power plant.
4. Able to understand the constructional and operation of air and gas Insulated substations.
5. Able to understand the different types of load curves and tariffs applicable to consumers.

UNIT-I CHOICE OF POWER STATIONS AND UNITS (9 Lectures)

Growth of electrical power generation in India, Typical layout of power system, Types of power stations – choice of generation - size of generator units - effect of variable load on plant operation and design.

UNIT-II (8 Lectures)

Thermal power stations: Selection of site for thermal station – layout and salient features - boilers - economizers - condensers - coal handling - feed water treatment – electro static precipitator.

UNIT-III (8 Lectures)

Nuclear Power Stations: Principles of nuclear power station – basic factors in designing of reactors - pressurized water reactor – boiling water reactor - CANDU reactor - liquid metal cooled reactor – shielding and safety precautions

UNIT-IV SUBSTATIONS (10 Lectures)

Air Insulated Substations - Indoor & Outdoor substations, Substations layouts of 33/11 KV showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, double bus bar with one and two circuit breakers, main and transfer bus bar system with relevant diagrams.

Gas Insulated Substations (GIS) – Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, constructional aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

UNIT-V ECONOMIC ASPECTS OF POWER GENERATION & TARIFF (10 Lectures)

Economic Aspects - Load curve, load duration and integrated load duration curves, Discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, power capacity factor and plant use factor, Base and peak load plants.

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

Text Books:

1. Elements of Electrical power station design by M.V. Deshpande , Wheeler Publishing Co,2010.

2. Generation of Electric Power by B.R. Gupta, S. Chand & Company Ltd, 2014.

Reference Books:

1. Solar power Engineering by B.S.Magal, TMH Publishing Company. Ltd., New Delhi, 2005.

2. Power plant Technology by M.M.el.Wakil, TMH Publishing Company. Ltd.,New Delhi, 2014.

3. Electrical power systems theory and practice –PHI", by M. N. Bandyopadhyay, 2006.

4. Generation distribution and utilization of electrical energy by C.L. Wadhwa, New Age International (P) Limited, 2005.

5. Renewable Energy Resources by John Twidell & Tony Weir, Taylor & Francis, 2nd Edition, 2007.

Web Resources:

1. www.nptel.iitm.ac.in

2. www.solarsystem.nasa.gov

3. www.microhydropower.net

B. Tech II Year II Semester **Course Structure**

L	T	P	C
3	0	0	3

DATA STRUCTURES

Internal Marks: 40

Course Code: P18CST02 **External Marks: 60**

Course Prerequisite: C-Programming

Course Objectives:

1. Comprehensive knowledge of data structures and ability to implement the same in software applications.
2. Exposure to algorithmic complexities, recursive algorithms, searching techniques.
3. Exposure to sorting technique, Applying stack techniques for logical operations.
4. Applying queue techniques for logical operations, Exposure to list representation models in various types of applications.
5. Implementation of tree in various forms, Advanced understanding of other variants of trees and their operations.
6. Orientation on graphs, representation of graphs, graph traversals, spanning trees Graphs.

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

UNIT-I **(8 Lectures)**

Data Structure, Recursion & **Searching:** Preliminaries of algorithm, Algorithm analysis and complexity. **Data Structure:** Definition, types of data structures.

Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Types of recursion (Linear, binary and Tail), recursive algorithms for factorial function, GCD Computation, Fibonacci sequence, Towers of Hanoi.

Searching: List Searches using Linear Search, Binary Search, Fibonacci Search

UNIT-II **(10 Lectures)**

Sorting Techniques: Basic Concepts, Sorting by: Insertion (Insertion Sort), Selection(heap sort), Exchange(Bubble sort, Quick Sort), distribution(Radix sort) and merging(Merge sort) Algorithms.

Stacks: Basic Stack operations, Representation of a stack using arrays, Stack Applications: Reversing list,Infix to postfix transformation.

UNIT-III **(8 Lectures)**

Queues: Introduction, Representation of a Queue using arrays, Queue Operations, Applications of queues- Round Robin Algorithm, Circular Queues, Priority Queues.

Linked List: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, Reversing a single linked list, applications: single linked list to represent polynomial expressions, Circular linked list, Double linked list.

UNIT-IV **(9 Lectures)**

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays, operations on a Binary tree, Binary Tree Traversals (recursive).

Advanced Tree Concepts: Binary search tree, Basic concepts, BST operations: Searching, insertion, deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees Definition and Examples only, Red-Black Trees-Definitions and Examples only (No operations)

UNIT-V **(10 Lectures)**

Graphs: Basic concepts, Graph Representations- Adjacency matrix, Adjacency lists, Graph algorithms: Graph Traversals (BFS & DFS), applications: Dijkstra's shortest path, Transitive closure, Minimum Spanning Tree using Prim's & Kruskal's Algorithm .

Text Books:

1. "Data Structures", by Richard F, Gilberg , Forouzan, Cengage, 2011.
2. "Data Structures and Algorithms", by G.A.V.Pai, TMH 2008.

Reference Books:

1. "Data Structure with C", by Seymour Lipschutz, TMH,2010.
2. "Classic Data Structures", by Debasis, Samanta, PHI 2009.
3. "Fundamentals of Data Structure in C", by Horowitz,Sahni, Anderson Freed, UniversityPress,2014.

Web References:

1. www.cs-fundamentals.com
2. www.geeksforgeeks.org
3. www.nptelvideos.in

B. Tech II Year I Semester **Course Structure**

L	T	P	C
3	0	0	3

SWITCHING THEORY AND LOGIC DESIGN

Internal Marks: 40

Course Code: P18ECT03 **External Marks: 60**

Course Prerequisite: Set theory (Mathematics), Basic logic operations like bit wise operations, Shift operations, flow charts, ASCII codes, etc. (Computer Programming)

Course Objectives:

1. To learn basic tools for the design of digital circuits and fundamental concepts used in the design of digital systems
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits
4. To design combinational logic circuits, sequential logic circuits
5. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
6. To implement synchronous state machines using flip flops.

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

1. Manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, gray, and BCD.
2. Manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

UNIT-I **(8 Lectures)**

Number Systems: Base Conversion Methods, Complement of Numbers, Codes - Binary codes, Binary Coded Decimal code and its properties, Unit distance codes, Alpha Numeric codes, Error detecting and correcting codes.

Boolean Algebra: Basic theorems and properties

Switching Functions: Canonical and Standard forms, Algebraic simplification of digital logic gates, Properties of XOR gates , Universal gates, Multilevel NAND/NOR realizations.

UNIT-II MINIMIZATION AND DESIGN OF COMBINATIONAL CIRCUITS (10 Lectures)

Introduction, The Minimization with theorem, The Karnaugh Map Method, Five and Six variable Maps, Prime and Essential Implications, Don't care Map entries, Using the maps for Simplifying, Tabular method, Partially specified Expressions, Multi-Output Minimization, Minimization and combinational Design, Arithmetic Circuits, Comparator, Multiplexers, Code Converters, Wired Logic, Tristate Bus system, Practical Aspects related to Combinational Logic Design, Hazards and Hazard Free Relations.

UNIT-III SEQUENTIAL MACHINES FUNDAMENTALS (8 Lectures)

Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, the Binary Cell, Fundamentals of Sequential Machine Operation, The Flip-Flop, The D- Latch Flip-Flop, the Clocked T Flip-Flop, the clocked J-K Flip-Flop, Design of a clocked Flip-flop, conversion from one Type of Flip-Flop to another, Timing and Triggering considerations, Clock skew.

UNIT-IV SEQUENTIAL CIRCUITS DESIGN AND ANALYSIS (9 Lectures)

Introduction, State diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops.

Counters: Design Of Single Mode Counters; Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter using Shift Register.

UNIT-V SEQUENTIAL CIRCUITS (10 Lectures)

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

Text Books:

1. "Switching & Finite Automata theory", by Zvi Kohavi and Neeraj K Jha, Cambridge ,3rd Edition,2010.
2. "Digital Design", by Morris Mano, PHI, 3rd Edition,2012.

Reference Books:

1. "Introduction to Switching Theory and Logic Design", by Fredriac J Hill, Gerald R Peterson, John Willey and Sons Inc, 3rd Edition,2014.
2. "Digital Fundamentals", by A Systems approach – Thomas L Floyd, Pearson, 2013.
3. "Digital Logic Design", by Ye Brian and Holds Worth, Elsevier,2012.
4. "Fundamentals of Logic Design", by Charles H. Roth, Thomson Publications ,5thEdition,2014.
5. "Digital Logic Applications and Design", by John M. Yarbrough, Thomson Publications, 2006
6. "Digital logic and state machine design", by Comer, Oxford, 3rd edition, 2013.

Web references:

1. www.geeksforgeeks.org
2. www.circuitglobe.com
3. www.ee.surrey.ac.uk
4. www.circuitstoday.com

B. Tech- II Year II Semester **Course structure**

L	T	P	C
3	0	0	3

MATHEMATICS-IV

Internal Marks: 40

Course code: P18BST04 **External marks: 60**

Course Prerequisite: Mathematics-I, Mathematics-II (P18BST01)

Course objectives:

1. To learn the properties of beta and gamma functions.
2. To learn the knowledge on functions of a complex variable.
3. To learn the concepts of complex integration and series expansions.
4. To learn the concept of complex integration using residues.
5. To learn the concept of conformal mapping.

Course Outcomes: Students will be able to

1. Evaluate the improper integrals using beta and gamma functions.
2. Have the knowledge on functions of complex variables.
3. Understand the concepts of exponential, trigonometry, hyperbolic functions and their properties.
4. Understand about conformal mapping

UNIT-I SPECIAL FUNCTIONS **(9 Lectures)**

Beta and Gamma functions- Properties - Relation between Beta and Gamma functions-Evaluation of improper integrals.

UNIT-II FUNCTIONS OF A COMPLEX VARIABLE **(9 Lectures)**

Introduction–Continuity–Differentiability –Analyticity–Properties –Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions –Milne – Thompson method.

UNIT-III INTEGRATION AND SERIES EXPANSIONS **(9 Lectures)**

Complex integration: Line integral – Cauchy's integral theorem, Cauchy's integral formula, Generalized integral formula (all without proofs)- Radius of convergence– Expansion in Taylor's series, Maclaurin's series and Laurent series.

UNIT-IV INTEGRATION USING RESIDUES **(9 Lectures)**

Types of Singularities: Isolated, pole of order m, essential - Residues – Residue theorem (without proof) - Evaluation of real integrals of type (a) $\int_0^{2®} f(\sin^{-}, \cos^{-}) d^{-}$ (b) $\int_{-\infty}^{\infty} f(x)dx$ (c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT V: Conformal Mapping: **(9 Lectures)**

Transformation by exp z, lnz, z^2, z^n(n positive integer), Sin z, cos z, z +a/z- Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles.

Text Books:

1. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers, 43rd Edition.
2. Engineering Mathematics by N.P.Bali, Lakshmi Publications.

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley-India, 10th Edition.
2. Advanced Engineering Mathematics by Micheael Greenberg, Pearson edn, 9th edition.
3. Advanced engineering mathematics with MATLAB", by Dean G. Duffy, CRC Press
4. Advanced Engineering Mathematics by Peter O'neil, Cengage Learning.
5. Engineering Mathematics by Srimanta Pal, Subodh C.Bhunia, Oxford University Press.
6. Higher Engineering Mathematics by Dass H.K., Rajnish Verma. Er., S. Chand Co. Pvt. Ltd, Delhi.

Web Resources:

1. www.tutorial.math.lamar.edu
2. www.mathworld.wolfram.com
3. www.nptel.ac.in

B. Tech II Year II Semester **Course Structure**

L	T	P	C
0	0	3	1.5

SEMICONDUCTOR DEVICES AND CIRCUITS LAB

Internal Marks: 40

Course Code: P18ECL01 **External Marks: 60**

Course Prerequisite: BEEE Lab

Course Objectives:

1. To create interest in Hardware Technology
2. To identify active and passive components
3. To study multimeter, Function Generator, Regulated Power Supply and CRO
4. To analyze the V-I characteristics of diodes and transistor
5. To understand the fabrication of electronic circuits on PCB

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

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

List of Experiments: (Minimum of Ten Experiments has to be performed)

PART-A

1. P-N Junction Diode Characteristics
   Part A: Germanium Diode (Forward bias& Reverse bias)
   Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
   Part A: V-I Characteristics
   Part B: Zener Diode as Voltage Regulator
3. Rectifiers (without and with c-filter)
   Part A: Half-wave Rectifier
   Part B: Full-wave Rectifier

4. BJT Characteristics (CE Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
5. FET Characteristics (CS Configuration)
   Part A: Drain Characteristics
   Part B: Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements

PART-B

PCB Hard Ware: Soldering Shop: Introduction of material required for the fabrication of PCB's

10. Fabrication of diode (Forward bias& Reverse bias) Characteristics
    a) Artwork & printing of a simple PCB.
    b) Etching & drilling of PCB.
    c) Wiring & fitting: Fitting of power supply along with a meter in cabinet.
    d) Testing of regulated power supply fabricated.
11. Fabrication of DC regulated power supply.
    a) Artwork & printing of a simple PCB.
    b) Etching & drilling of PCB.
    c) Wiring & fitting: Fitting of power supply along with a meter in cabinet.
    d) Testing of regulated power supply fabricated.

PCB Soft Ware: Introduction to layout tools and creating layout board using soft ware

12. Design full wave rectifier using software and its output on a virtual oscilloscope
13. Design a BJT Characteristics (CE Configuration) both input and output using soft ware

Equipment Required:

1. Regulated Power supplies
2. Analog /Digital Storage Oscilloscopes
3. Analog /Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)

8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. PCB design soft ware

B. Tech II Year II Semester **Course Structure**

L	T	P	C
0	0	3	1.5

ELECTRICAL MACHINES-II LAB

Internal Marks: 40

Course Code: P18EEL03 **External Marks: 60**

Course Prerequisites: BEEE Lab, Electrical Machines - II.

Course objectives:

1. To control the speed of three phase induction motors.
2. To determine the performance characteristics of three phase and single phase induction motors.
3. To improve the power factor of single phase induction motor.
4. To predetermine the regulation of three –phase alternator by various methods.
5. To find X_d / X_q ratio of alternator and asses the performance of three–phase synchronous motor.

Course Outcomes:

1. Able to understand the speed control of three phase induction motor.
2. Able to assess the performance of single phase and three phase induction motors.
3. Able to understand the power factor of single phase induction motor with & without capacitor.
4. Able to understand the predetermination of regulation of three–phase alternator by various methods.
5. Able to find the X_d / X_q ratio of alternator and asses the performance of three–phase synchronous motor.

List of Experiments: (minimum 10 experiments has to be performed)

1. Brake test on three phase Induction Motor
2. No–load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance method.
4. Regulation of a three –phase alternator by MMF method
5. Regulation of three–phase alternator by Potier triangle method
6. V and Inverted V curves of a three—phase synchronous motor.
7. Determination of X_d and X_q of a salient pole synchronous machine
8. Equivalent circuit of single phase induction motor
9. Speed control of induction motor by V/f method.

10. Determination of efficiency of three phase alternator by loading with three phase induction motor.
11. Power factor improvement of single phase induction motor by using with & without capacitors.
12. Brake test on 1-phase induction motor.

B. Tech II Year II Semester **Course Structure**

L	T	P	C
0	0	3	1.5

DATA STRUCTURES LAB

Internal Marks: 40

Course Code: P18CSL02 **External Marks: 60**

Course Prerequisite: Data Structures

Exercise 1: Write recursive program for the following

a) Write recursive C program for calculation of Factorial of an integer
b) Write recursive C program for calculation of GCD (n, m)
c) Write recursive program which computes the n^{th} Fibonacci number
d) Write recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

Exercise 2:

a) Write recursive C program for functions to perform linear search for a Key value in a given list.
b) Write recursive C program for functions to perform Binary search for a Key value in a given list.
c) Write recursive C program for functions to perform Fibonacci search for a Key value in a given list.

Exercise 3:

a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order
b) Write C program that implement Quick sort, to sort a given list of integers in ascending order
c) Write C program that implement Insertion sort,to sort a given list of integers in ascending order

Exercise 4:

a) Write C program that implement heap sort, to sort a given list of integers in ascending order

b) Write C program that implement radix sort, to sort a given list of integers in ascending order

c) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise 5:

a) Write C program that implement stack (its operations) using arrays

b) Write C program that implement stack (its operations) using Linked list

Exercise 6:

a) Write a C program that uses Stack operations to Convert infix expression into postfix expression

b) Write C program that implement Queue (its operations) using arrays.

c) Write C program that implement Queue (its operations) using linked lists

Exercise 7:

a) Write a C program that uses functions to create a singly linked list

b) Write a C program that uses functions to perform insertion operation on a singly linked list

c) Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 8:

a) Write a C program to Create a Binary Tree of integers

b) Write a recursive C program for traversing a binary tree in preorder, inorder and postorder.

Exercise 9: Write a C program for BST operations (insertion, deletion)

Exercise 10:

a) Write a C program for finding minimum spanning tree in a graph by using Prim's algorithm.

b) Write a C program for finding minimum spanning tree in a graphby using Kruskal's algorithm.