SRI VENKATESA PERUMAL
COLLEGE OF ENGINEERING & TECHNOLOGY
I AUTONOMOUS I NAAC ACCREDITED I
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Academic Regulations (R18) for
B.Tech (Regular-Full time)
CHOICE BASED CREDIT SYSTEM (CBCS)

(Effective for the students admitted into I year from the Academic Year 2018-19 onwards)

NOTE: The regulations below are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of students (including those already undergoing the programme) as may be decided by the Academic Council. The Jawaharlal Nehru Technological University Anantapur, Ananthapuramu shall confer B.Tech. Under Graduate degree to candidates who are admitted to the Bachelor of Technology Programs and fulfill all the requirements for the award of the degree.

Preliminary Definitions and Nomenclature

In the following Regulations, unless the context otherwise requires:

(i) "**Programme**" means Degree Programme that is B.Tech Degree Programme.

(ii) "**Branch**" means specialization or discipline of B.Tech Degree Programme, like Mechanical Engineering, Electrical and Electronics Engineering etc.

(iii) "**Course**" means a theory or practical subject that is normally studied in a Semester, like Mathematics, Physics, etc.

(iv) "**College/Institute**" means Sri Venkatesa Perumal College of Engineering & Technology, Puttur.

(v) "**University**" means Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

1. Admission Procedure

Admissions are made to the first year of Four year B.Tech. Degree programme as per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. Program Pattern

2.1. The medium of instruction, examinations and project reports shall be in English.

2.2 The entire program of study is for four academic years. All four academic years shall be on semester pattern.

2.3 A student eligible to appear for the end examination in a course, but absent or has failed in the end examination may appear for that course at the next supplementary examination when offered.

2.4 When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfillment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

2.5 The minimum instruction days including exams for each semester shall be 90 days.

3. Award of B.Tech. Degree

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

3.1 Pursues a course of study for not less than four academic years and in not more than eight academic years from the year of their admission. However, for the students availing Gap year facility this period shall be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation.

3.2 Registers for 160 credits and secure all 160 credits.

3.3 Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

Credits

Course	Credits / Course
Lecture (L)	**3 or 4**
Tutorial (T)	**1**
Practical (P)	**1.5**
CRT	**1**
Seminar	**1**
Project (Mini)	**1**
Project Phase-I	**4**
Project Phase-II	**9**

Seminar: 2 technical Presentations + 1 participation in external technical symposia + participation in one 2-day workshop, In the place of one technical presentation, student can choose to participate one day in NSS activity.

4. Branches of study:

With the approval of AICTE & JNTUA, following courses are offered for the B.Tech. Programme from 2018-19

S.No.	Name of the Branch	Branch Code
1	Civil Engineering	01
2	Electrical and Electronics Engineering	02
3	Mechanical Engineering	03
4	Electronics and Communication Engineering	04
5	Computer Science and Engineering	05

and any other course as approved by the authorities of statutory bodies of the college from time to time.

5. Distribution and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated through internal evaluation and /or an external evaluation conducted semester wise.

5.2 Performance evaluation in each course (theory/ practical) shall be based on a total of 100 marks, of which the relative weightage for internal evaluation and end semester examination shall be 30% and 70% respectively.

5.3 Internal Evaluation

The total internal weightage for theory courses is 30 marks with the following distribution.

a) 20 marks for descriptive test.
b) 10 marks for objective test.

For all theory courses there shall be two mid-term tests in each semester. The duration of mid-term test shall be 1 hr 50 minutes. In that, 90 minutes will be for descriptive test and 20 minutes for objective test. The descriptive test consists of 3 questions with individual choice (‘either’, ‘or’ type) for 10 marks each. The total marks 30 shall be scaled down to 20 marks. The objective test consists of 20 objective questions for 10 marks in 20 minutes duration. Together, the maximum marks for each mid-term test shall be 30. First mid-term test shall be conducted for 50% of the syllabus and second mid-term for the remaining syllabus.

Among the two midterm examinations 80% weightage will be given for the better performance and 20 % for the other. The final mid-term marks will be the addition of these two.

Example: If a student scores 23 marks and 24 marks in the first and second mid-term examinations respectively, then

Weighted Average Marks = 24 x 0.8 + 23 x 0.2 = 23.8, rounded to 24 Marks.

Note: The marks of any fraction shall be rounded off to the next higher mark.

5.4 Practical Courses

The total internal weightage for Practical courses is 30 marks. The marks can be evaluated based on Day to Day assessment.

The end semester examination shall be conducted for 70 marks by the laboratory faculty concerned and one senior faculty of the same department nominated by the Principal.

In a practical course consisting of two parts (ex: Engineering and IT workshop Lab), the internal examination shall be evaluated for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in the two parts. End semester examination shall be conducted for 70 marks in each part and final marks shall be arrived by considering the average of marks obtained in the two parts.

5.5 For the subjects having design and /or drawing, such as Engineering drawing, Estimation, Design and Drawing of Irrigation Structures, etc., the distribution will be 30 marks for internal evaluation and 70 marks for the end semester examination.

5.5.1 Within internal evaluation, 10 marks will be for day to day work in the class that shall be evaluated by the concerned subject teacher based on the reports / drawing sheets submitted in the class.

5.5.2 The remaining 20 marks will be based on the student's performance in two mid-term tests of 2 hours duration each. Among the two mid-term examinations 80% weightage will be given for the better performance and 20% for the other. The final mid-term marks will be the sum of these two.

5.6 The laboratory records shall be preserved in the respective department as per the institution norms and should be produced to the committee as and when the same is asked for.

5.7 The student has to complete mandatory courses with a minimum of 40% of marks in internal examination to award the degree and there will be no external examination. The evaluation for mandatory course shall be carried out for a maximum of 30 marks.

5.8 End Semester Examination

- There shall be 6 questions and all questions are compulsory.

- First question shall contain 10 compulsory short answer questions for a total of 20 marks such that question carries 2 marks. There shall be 2 short answer questions from each unit.
- In each of the questions from 2 to 6, there shall be 'either', 'or' type questions each one carry 10 marks. Student shall answer any one of them.
- Each of these questions from 2 to 6 shall cover one unit of the syllabus.

The duration of theory/practical end semester examination shall be 3 hours.

- End semester examination for theory courses consisting of two parts of different courses, for ex: Basic Electrical & Electronics Engineering shall have the following pattern:
    a. Question paper shall be in two parts viz., Part A and Part B with equal weightage.
    b. In each part there shall be 3 either-or type questions for 12, 12 and 11 marks.

5.9 Project Phase - I

Project Phase – I is introduced at IV year I Semester. The objective of Project Phase - I is to enable group of students to take up investigative study in the broad field of relevant engineering branch, theoretical/practical problem to be assigned by the Department under the guidance of a Project Supervisor. The group of students should submit a report and present a seminar at the end of the semester before Project Supervisor and Internal Department Committee (IDC) consists of Head of Department (HOD), Project Coordinator and a senior faculty of the department nominated by HOD. The report submission and oral presentation shall be evaluated for 100 marks by Project Supervisor and IDC.

5.10 Project Phase - II

The objective of Project Phase - II which is continued in IV year II semester is to enable the student to extend further the investigative study taken up under Project Phase - I, and to provide a solution for the theoretical/practical problem**.**

Out of the total 200 marks for the Project Phase - II, 60 marks shall be for internal evaluation and 140 marks for the external evaluation (Viva-voce)**.** The evaluation method of the project is as follows.

Internal Evaluation

Two reviews one at the mid of semester and the other before submitting the project report shall be conducted by IDC and Project Supervisor jointly.

External Evaluation

The external project viva-voce will be conducted by the committee consisting of HOD, Project Supervisor and External examiner nominated by the principal.

Supplementary Examinations

At the end of each Semester there will be regular examinations for the current Semester. Those students who could not clear their courses in their previous attempt can appear for the examinations under supplementary category along with the regular students after registering themselves at the examination branch. Supplementary examinations for the all the other Semesters other than the current one will also be conducted at the same time.

However, Advanced Supplementary examinations will be conducted for IV-II semester examinations.

5.11 Summer Internship / mini project

The student shall do either a summer internship or a mini-project during their course of study preferably during his/her summer vacation immediately after 6th semester.

There shall be 6 weeks duration to complete summer internship during summer vacations. The total internal weightage for internship course is 50 marks and will be evaluated based on day to day assessment by concern industry.

In place of summer internship, a student can also do a mini-project within the college under the supervision of the department faculty. The weightage of marks is similar to that of internship.

The student shall secure a minimum of 40% to pass internship / mini-project.

6. Attendance Requirements

6.1 A student shall be eligible to appear for final examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

6.2 Shortage of attendance below 65% in aggregate shall in **NO** case be condoned.

6.3 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

6.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end semester examination of that class.

6.5 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek re-admission for that semester when offered next.

6.6 A stipulated fee shall be payable towards condonation for shortage of attendance to the Institute as decided by the College Academic Committee.

7. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in Section No.6

7.1 A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks (i.e., 25) in the end semester examination and a minimum of 40% of marks (i.e., 40) in the sum total of the internal evaluation and end examination taken together.

7.2 A student shall be promoted from 4^{th} semester to 5^{th} semester only if he/she acquires 23 credits (i.e 40% of total credits) that have been studied up to 3^{rd} semester from the following examinations, irrespective of whether the candidates takes the end examinations or not as per the normal course of the study

B.Tech 1^{st} Sem - one regular and two supplementary

B.Tech 2^{nd} Sem - one regular and one supplementary

B.Tech 3^{rd} Sem - one regular only

7.2 A student shall be promoted from 6^{th} semester to 7^{th} semester only if he/she acquires 39 credits(i.e 40% of total credits) that have been studied up to 5^{th} semester from the following examinations, irrespective of whether the candidates takes the end examinations or not as per the normal course of the study

B.Tech 1^{st} Sem - one regular and four supplementary

B.Tech 2^{nd} Sem - one regular and three supplementary

B.Tech 3^{rd} Sem - one regular and two supplementary

B.Tech 4^{th} Sem - one regular and one supplementary

B.Tech 5^{th} Sem - one regular only

7.4 In case if student is already detained for want of credits for particular academic year as per Section No. 7.2 and 7.3 above, the student may make up the credits through supplementary exams of the above exams before the commencement of third or fourth year I semester class work respectively of next year.

7.5 A student shall register and put up minimum attendance in all 160 credits and earn all the 160 credits. Marks obtained in all 160 credits shall be considered for the calculation of aggregate percentage of marks obtained.

7.6 Students who fail to earn 160 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand cancelled.

8. With–Holding of Results

If the candidate has any dues not paid to the institute or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld and he/she will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

9. Grading

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below:

Table – Conversion into Grades and Grade Points assigned for Theory, Practical, Internship & Project Phase - I

Range in which the marks in the theory, practical, internship & project phase - I fall	Grade	Grade Points (GP) Assigned
≥ 90	S (Superior)	10
80-89	A (Excellent)	9
70-79	B (Very Good)	8
60-69	C (Good)	7
50-59	D (Average)	6
40-49	E (Below Average)	4
< 40	F (Fail)	0
Absent	Ab (Absent)	0

Table – Conversion into Grades and Grade Points assigned for Project Phase - II

Range in which the marks in the subject fall	Grade	Grade Points (GP) Assigned
≥ 190	S (Superior)	10
170-189	A (Excellent)	9
150-169	B (Very Good)	8
120-149	C (Good)	7
100-119	D (Average)	6
80-99	E (Below Average)	4
< 80	F (Fail)	0
Absent	Ab (Absent)	0

i. A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered.

ii. For audit courses "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

9.1. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

(i) Semester Grade Point Average (SGPA)

The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$\mathbf{SGPA\ (S_i) = \Sigma\ (C_i \times G_i) / \Sigma C_i}$$

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.

(ii) Cumulative Grade Point Average (CGPA)

The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.,

$$\mathbf{CGPA = \Sigma\ (C_i \times S_i) / \Sigma C_i}$$

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

- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- While computing the CGPA the subjects in which the student is awarded Zero grade points will also be included.
- ***Grade Point:*** It is a numerical weight allotted to each letter grade on a 10-point scale.
- ***Letter Grade:*** It is an index of the performance of students in a said course, Grades are denoted by letters S, A, B, C, D, E and F.

EXAMPLE: Computation of SGPA and CGPA

Illustration for SGPA

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade Point)
Course-I	3	S	10	3x10 = 30
Course-II	3	A	9	3x9 = 27
Course-III	3	B	8	3x8 = 24
Course-IV	3	D	6	3x6 = 18
Course-V	2	B	8	2x8 = 16
Course-VI	1	C	7	1x7 = 7
	18			122

Thus, SGPA = 122/18 = 6.8

Illustration for CGPA

Semester	Credits	SGPA	CGPA
1	18.50	6.80	6.80
2	20.50	6.90	6.85
3	19.00	7.30	6.99
4	19.00	6.80	6.95
5	22.00	8.20	7.22
6	23.00	7.40	7.26
7	20.00	7.20	7.25
8	18.00	7.80	7.31

Thus, CGPA = $\frac{(18.5\times6.8)+(20.5\times6.9)+(19\times7.3)+(19\times6.8)+(22\times8.2)+(23\times7.4)+(20\times7.2)+(18\times7.8)}{160} = 7.31$

10. Award of Class

After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B.Tech. Degree he/she shall be placed in one of the following four classes:

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 4.0 < 5.5$

A student with final CGPA is < 4.00 will not be eligible for the Award of the Degree.

11. Gap Year – Concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. Such proposals submitted by the students to the Principal. An evaluation committee shall be constituted by the Principal to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit student(s) to avail the Gap Year.

12. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who

have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section No. 3.3 and they will be in the academic regulations into which they get re-admitted.

Candidates who were permitted with Gap Year shall be eligible for rejoining into the succeeding year of their B.Tech from the date of commencement of class work, subject to Section No. 3.3 and they will be in the academic regulations into which the candidate is presently rejoining.

13. Massive Open Online Courses (MOOCs)

The college in line with the developments in Learning Management Systems (LMS) intends to encourage the students to do online courses in MOOCs, offered internationally. The main intension to introduce MOOCs is to obtain enough exposure through online tutorials, self-learning at one's own pace, attempt quizzes, discuss with professors from various universities and finally to obtain certificate of completion for the course from the MOOCs providers.

Regulations for MOOCs

13.1 Institution intends to encourage the students to do two MOOC courses one in III year II Semester and the other IV year I Semester of relevant B.Tech Programme.

13.2 The respective departments shall give a list from NPTEL or any other standard providers, whose credentials are endorsed by the HOD.

13.3 Each department shall appoint Coordinators/Mentors and allot the students to them who shall be responsible to guide students in selecting online courses and provide guidance for the registration, progress and completion of the same.

13.4 A student shall choose an online course (relevant to his/her programme of study) from the given list of MOOCs providers, as endorsed by the teacher concerned, with the approval of the HOD.

13.6 The details of MOOC(s) shall be displayed in Grade card of a student, provided he/she submits the proof of completion of it to the department concerned through the Coordinator/Mentor.

13.7 Student can get certificate from SWAYAM/NPTEL. The course work should not be less than 12 weeks or student may appear for end examination conducted by the Institute.

13.8 The end examination conducted by Institution for 60 marks shall be scaled up to 100 marks.

13.9 The Provisional Degree Certificate and/or consolidated grade sheet shall be issued only to those students, who have submitted proof of completion of online/offline MOOCs for the courses they have registered with.

14. Virtual Labs

With the help of Virtual Labs the student will be given additional exposure to laboratory practice. This helps in better understanding the concepts and practical significance of engineering.

15. 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.

Regulations for CBCS

15.1 The CBCS, also called as Open Electives (OEs) will be implemented in the College.

15.2 It is mandatory for Under Graduate (UG) students to study two CBCS course during IV Year II Sem of their programme by taking one course.

15.3 A student shall opt for any two courses from the list given by the institute.

15.4 A CBCS course shall be offered by a department, only when there are a minimum number of 20 students opting for that course

16. Minor Engineering

A student shall be eligible to get Under Graduate degree with Honours or additional Minor Engineering. The following are the rules to acquire Minor Degree Engineering

- To earn a minor degree a student has to get a minimum of 20 extra credits.
- These could be acquiring through MOOCs.
- Students who have a SGPA of 8.0 or above up to 3rd semester and without any backlog subjects will be permitted to register for minor degree.
- The student has to maintain SGPA of 8.0 and above in the subsequent semesters without any backlogs to keep the minor registration active, otherwise their registration will be cancelled.

17. Student Transfers

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh from time to time.

18. General

18.1 The academic regulations should be read as a whole for purpose of any interpretation.

18.2 Malpractices rules- nature and punishments are appended.

18.3 Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.

18.4 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

18.5 The Institute, with the approval of the Academic Council, may change or amend the academic regulations / structure / credits / syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Institute.

19. Mandatory Course: A student shall pursue the following four non credit mandatory courses.

i. Environmental Science ii. Induction Training

iii. Indian Constitution iv. Essence of Indian traditional knowledge.

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Academic Regulations (R18) for

B. Tech (Lateral Entry)

(Effective for the students admitted into II year from the Academic Year 2019-20 onwards)

NOTE: All the regulations adopted for B.Tech (Regular-Full Time) programme are applicable to lateral entry students in addition to the following:

1. Award of B.Tech Degree

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

i. Pursues a course of study for not less than three academic years and in not more than six academic years. However, for the students availing Gap year facility this period shall be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation.

ii. Registers for 121 credits and secure all 121 credits.

iii. Students, who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

2. Minimum Academic Requirements:

Students need to acquire necessary credits to get promoted to the subsequent academic year, in addition to the attendance requirements mentioned above.

2.1 A student shall be promoted from 6^{th} semester to 7^{th} semester only if he/she acquires 24 of the credits (i.e 40% of the credits) from the courses that have been studied up to 5^{th} semester from all the regular and supplementary examinations until 5^{th} semester.

- Two regular and one supplementary examinations of 3^{rd} Semester.
- One regular and one supplementary examinations of 4^{th} Semester.
- One regular examination of 5^{th} semester.

2.2 A student shall register and put up minimum attendance in all 121 credits and earn all the 121 credits. Marks obtained in all 121 credits shall be considered for the calculation of aggregate percentage of marks obtained.

2.3 Students who fail to earn 121 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand cancelled.

3. Course Pattern:

3.1 The entire course of study is for three academic years. All years shall be on semester pattern.

3.2 A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may appear for that subject at the next supplementary examination when offered.

3.3 When a student is detained due to lack of credits/shortage of attendance he may be re-admitted when the semester is offered after fulfillment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

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RULES FOR

DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	**Punishment**
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers, blue tooth or any other form of material concerned with or related to the course of the examination (theory or practical) in which he/she 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 course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
(b)	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 examination hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he/she will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. 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 for four consecutive semesters from class work

		and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with for feature of seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the courses of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that Semester/year. The candidate is also debarred for four consecutive Semesters from class work and all Semester end examinations if his involvement is established. Otherwise the candidate is debarred for two consecutive semesters from class work and all 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/she will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year. 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	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course.
6	Refuses to obey the orders of the any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walkout or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that Semester. If candidate physically assaults the invigilator or/officer in charge of the examination, then the candidate is also barred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the examination hall taking away answer script or intentionally tears of the script or any part thereof inside or outside	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has

	the examination hall.	already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year. 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.
8	Possess any lethal weapon or firearm in the examination hall	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the Courses of that Semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the	Expulsion from the examination hall and

	examination hall.	cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course and all other courses the candidate has appeared including practical examinations and project work of that Semester examinations depending on the recommendation of the committee.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal for further action to award suitable punishment.	

Note:

i. All malpractices cases are to be handled by the Chief Controller with a committee consist of Controller of Examinations, HOD concerned and subject expert.

ii. Whenever the performance of a student is cancelled in any course/ courses due to Malpractice, he has to register for the End Examination in those course/courses consequently and has to fulfill all the norms required for award of Degree.

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Course Structure of B.Tech (R18) - 2018-19

I Semester – Electronics & Communication Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH01	Mathematics-I	3	1	0	4
2	18BSBH09	Applied Physics	3	0	0	3
3	18ES0501	Problem Solving Using ‘C’	3	1	0	4
4	18HSBH01	Technical English	3	0	0	3
5	18BSBH11	physics lab	0	0	3	1.5
6	18HSBH02	English Language and communication skills lab	0	0	3	1.5
7	18ES0502	Problem Solving Using ‘C’ lab	0	0	3	1.5
		Total	**12**	**2**	**9**	**18.5**

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Course Structure of B.Tech (R18) - 2018-19

II Semester – Electronics & Communication Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH02	Mathematics-II	2	1	0	3
2	18BSBH12	Engineering Chemistry	3	0	0	3
3	18ES0301	Engineering Graphics & Design	2	0	4	4
4	18ES0204	Electrical Engineering	3	0	0	3
5	18ES0203	Network Analysis	3	0	0	3
6	18BSBH13	Engineering Chemistry lab	0	0	3	1.5
7	18ES0205	Electrical Engineering Lab	0	0	3	1.5
8	18ES0302	Engineering & IT Workshop Practice	0	0	3	1.5
9	18MCBH02	Environmental Science (Mandatory Course)	2	0	0	0
		Total	**15**	**1**	**13**	**20.5**

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Course Structure of B.Tech (R18) - 2018-19

III Semester – Electronics & Communication Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH03	Mathematics-III	2	1	0	3
2	18PC0401	Electronic Devices	3	0	0	3
3	18PC0402	Signals & Systems	3	0	0	3
4	18PC0403	Probability & Stochastic Process	3	0	0	3
5	18PC0404	Digital System Design	3	0	0	3
6	18PC0405	Electronic Devices Lab	0	0	3	1.5
7	18PC0406	Digital System Design Lab	0	0	3	1.5
8	18HSBH03	Soft Skills	0	0	2	1
9	18MCBH03	Constitution of India	2	0	0	0
Total			**16**	**1**	**8**	**19**

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Course Structure of B.Tech (R18) - 2018-19

IV Semester – Electronics & Communication Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH06	Mathematics-IV	3	0	0	3
2	18PC0407	Electromagnetic Waves	3	0	0	3
3	18ES0503	Python Programming	3	0	0	3
4	18HS0112	Managerial Economics & Financial Analysis	3	0	0	3
5	18PC0408	Analog Circuits	3	0	0	3
6	18PC0409	Analog Circuits Lab	0	0	3	1.5
7	18PC0410	Electromagnetic Waves & Basic Simulation Lab	0	0	3	1.5
8	18PS0401	Seminar-I	0	0	2	1
9	18MCBH04	Essence of Indian Traditional Knowledge	2	0	0	0
		Total	**17**	**0**	**8**	**19**

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B.Tech - I Semester

L	T	P	C
3	1	0	4

(18BSBH01) MATHEMATICS - I
(Common to all branches)

Course Objectives: To learn
- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigen values and eigenvectors and to reduce the quadratic form to canonical form
- Concept of mean value theorems and their application to the mathematical problems, Finding maxima and minima of function of two and three variables.
- Concept of Sequence and series
- Concept of Fouries series

Course Outcomes: After learning the contents of this paper the student must be able to
- Write the matrix representation of a set of linear equations and to analyses the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Analyses the nature of sequence and series.
- Gain knowledge to tackle engineering problems using the concepts of fourier series

UNIT-I: Matrices

Matrices: Types of Matrices- Rank of a matrix by Echelon form and Normal form- System of linear equations- Homogeneous and Non-Homogeneous equations - Gauss elimination method- Gauss Seidel Method- Crout's triangularisation method - Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II: Eigen values and Eigen vectors

Eigen values and Eigen vectors and their properties- Cayley-Hamilton Theorem (without proof)- finding inverse by Cayley-Hamilton Theorem- Diagonalization of a matrix- finding power of a matrix - Quadratic forms: Reduction of Quadratic form to canonical form and their nature .

UNIT-III: Differential Calculus and its applications

Rolle's theorem- Lagrange's Mean value theorem- simple examples of Taylor's and Maclaurin's series –Functions of several variables- Jacobian–maxima and minima functions of two variables - Lagrange's method of multipliers with three variables.

UNIT-IV: Sequences & Series

Convergence of sequence and series- Tests for convergence - Geometric test- P- test- limit comparison test- D' Alember ratio test- Raabe's test- Cauchy's Integral test- Cauchy's root test-

Logarithmic test- Power series - Taylor's series-series for exponential-trigonometric and logarithm functions.

UNIT-V: Fourier Series

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

TEXTBOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, 9th Edition, John Wiley & Sons,2006.
3. Calculus and Analytic geometry by G.B. Thomas and R.L. Finney, 9thEdition,Pearson, Reprint, 2002.

REFERENCES:

1. A text book of Engineering Mathematics by N.P.Bali and Manish Goyal, Laxmi Publications, Reprint, 2008.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Engineering mathematics, volume-I&II, E.Rukmangadachari & E.Keshava Reddy Pearson Publishers.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

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B.Tech - I Semester

L	T	P	C
3	0	0	3

(18BSBH09) APPLIED PHYSICS
(Common to EEE & ECE)

Objectives:

1. Will understand the basics of quantum mechanics
2. Will recognize the basic concepts and applications of lasers and optical fibers
3. Will understand the basic concepts of semiconductors, dielectrics, magnetic and nanomaterials.

UNIT-I: Quantum Mechanics

wave particle duality, de-Broglie's hypothesis, Davisson and Germer experiment, Heisenberg's Uncertainty principle, physical significance of wave function, Schrodinger's time dependent and independent wave equation, Particle in one dimensional potential box.

UNIT-II: Lasers and Fibre Optics

Lasers: basic principle, characteristics, spontaneous and stimulated emission, Coherence, Principle and working of Laser, Population inversion, Pumping mechanism, Types of Lasers: Nd: YAG laser, He-Ne laser, Applications of laser.

Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Types of optical fibres: Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

UNIT-III: Semiconductor Physics

Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect, p-n junction diode, Zener diode and their V-I Characteristics.

UNIT-IV Dielectrics and Magnetic Materials

Introduction: Dielectric constant- Dipole moment –Various types of polarization –Electronic –ionic and orientional polarization -Clausius-Mossotti equation-Measurement of Dielectric constant – Application of dielectrics.

Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

UNIT-V: Physics of Nano materials

Introduction of nano materials : Zero, one , two dimensional nano structures, surface to volume ratio– Quantum confinement –density of states and dependence of dimensionality –properties of nano materials - physical and electrical- Synthesis of nano materials: Top down process: Ball milling –Bottom up process –Sol gel method, Application of Nano materials .

TEXT BOOKS:

1. Engineering Physics-K.Thyagarajan,MCGrawHill Education Private Ltd, New Delhi.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995)

Course Outcomes:

Studies will be familiar with

- The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state.
- The knowledge of fundamentals of Semiconductor physics, Nano materials, Lasers and fibre optics
- Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
- The course also helps the students to be exposed to the phenomena of exposure on magnetic materials and dielectric materials

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B.Tech - I Semester

L	T	P	C
3	1	0	4

(18ES0501) PROBLEM SOLVING USING 'C'
(Common to EEE,ECE & CSE)

COURSE OBJECTIVES:

- To Understand the Hardware of the computer and the General form of a C program.
- To Understand the Decision Making and Loop statements of C Language.
- To Understand the Arrays and String concept of C Language.
- To understand the concept of Functions and Pointers in C Language.
- To Understand about Structures, Unions and Files in C Language.

COURSE OUTCOMES:

- Able to describe the Hardware components of a computer.
- Able to implement the 'if...else' statements and 'for', 'while', 'do…while' loop statements.
- Able to write programs using Arrays and Strings concept.
- Able to implement Function and Pointer concepts on various applications.
- Able implement File concepts of C Language.

UNIT-I

Overview of Computers and Programming: Electronic Computers Then and Now, Computer Hardware, Computer Software, Computer Languages, Algorithm, Steps in an Algorithm, Flowchart, The Software Development Method, Applying The Software Development Method.
Introduction to C Programming: C Language Elements, Variable Declarations, Data Types, Executable Statements, General Form of a C program, Expressions, Precedence and Associativity, Operators, Type Conversion.

UNIT-II

Decision Making Statements- Simple **if** Statement, **if-else** Statement, Nested **if-else** Statement**,** **if-else-if** Ladder Statement**,** Example Programs.
Loop Control Statements- The "for" loop, the "while" loop, the "do-while" loop, Example Programs, **Break** Statement, **Continue** Statement, **go to** Statement, **Switch ()- Case** Statement

UNIT-III

Arrays- Definition, One-Dimensional Arrays- Declaration, Initialization, "for" loop for Sequential access, Example Programs. Two-Dimensional Arrays: Declaration, Initialization, Example Programs.
Strings- Introduction, Declaration and Initialization of String Variables, Reading Strings from Terminal, Writing Strings to screen, Arithmetic Operators on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions, Table of Strings.

UNIT-IV

Functions- Elements of User-Defined Functions, Definition of Functions, category of Functions, Nested Functions, Recursion, Passing Arrays to Functions, Scope, Storage Classes, Type Qualifiers.

Pointers- Introduction, Understanding Pointers, Accessing the Address of a Variable, Declaring Pointer Variable, Initialization of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expression, Pointer Increments and Scale Factor, Pointers and Arrays, Array of Pointers, Pointers as Function Arguments.

UNIT-V

Structures- Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure Variables, Operations on Individual Members, Arrays of Structures, Arrays within Structures, Unions, TYPEDEF, ENUM.

File Management in C- Introduction, Types of Files, Defining and Opening a File, Closing a File, Input/output Operation on Files, Error handling during I/O Operations, Random Access to Files, Command Line Arguments.

Text Books

1. Programming In “C” and Data Structures- By Jeri. R. Hanly, Elliot. B. Koffman, Ashok Kamthane, A. Ananda Rao, 5th Edition, Pearson Publication. (Units I and II).
2. Programming In “C” and Data Structures- By E. Balagurusamy, McGraw Hill Publication (Units III, IV and V).

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B.Tech - I Semester

L	T	P	C
3	0	0	3

(18HSBH01) TECHNICAL ENGLISH
(Common to CE, EEE, MECH & ECE)

Course Objective:

- To enable the students to communicate in English for academic and social purpose
- To enable the students to acquire structures and written expressions required for the profession
- To enhance the study skills of the students with emphasis on LSRW skills
- To encourage investigating questions of the humanities throw rhetorical study
- To develop and practice and evaluative reading

Course Outcomes:

- Student can responding to a variety of situations and contexts calling for purposeful shifts in the voice, tone level of formality, design, medium and structure
- Become effective in the use of different modes of written communication in professional environment
- Well trained in LSRW skills and develop communicate competence
- Use key rhetorical concepts through analyzing and composing a variety of text
- Develop competence to apply different reading methods to evaluate a mass of data on the net and to glean the necessary information

UNIT – I

Chapter entitled " MEDIA MATTERS" from Mindscapes English for Technologists and Engineers

L - Techniques – Importance of Phonetics and Correct Pronunciation
S - Meet & Greet and Leave taking, Introducing Oneself and others (Formal and Informal situations)
R - Reading strategies - Skimming and Scanning
W - Writing strategies – Sentence structures
G - Parts of Speech – Noun -number, Pronoun- Personal Pronoun – Verb –analysis
V - Affixes – Prefix and Suffix – Root words, derivatives

UNIT – II

Chapter entitled "LESSONS FROM THE PAST" from Mindscapes English for Technologists and Engineers

L - Listening to details: Types of Listening 1. Discriminative listening 2. Comprehension listening 3. Critical listening 4. Appreciative listening

S - Requesting, Making Polite Conversations and Role Play
R - Note Taking and Note Making Strategies
W - Paragraph Writing and Good qualities of Paragraph
G - Tenses – Present Tense, Past Tense and Future Tense

V - Homonyms, Homophones, Homographs, Synonyms and Antonyms

UNIT – III
Chapter entitled "TRAVEL AND TOURISM" from Mindscapes English for Technologists and Engineers

L - Listening to Speeches of Great leaders and Scientists
S - Accepting Invitations, Fixing a Time and Advising
R - Reading Tables, and Charts
W - Conversation, Role Play and autobiography
G - Types of Sentences (Simple, Complex and Compound)
V - Word formations and One –Word Substitutes

UNIT – IV
Chapter entitled "THE LOST LEAF" from American stories by O. Henry

L - Listening Dialogues and News
S - Expressing Ideas, Opinions and Telephone Skills
R - Reading Short Stories
W - Biography and Reporting Writing
G - Conditional Clauses and Voices
V - Fixed Expressions and Idioms

UNIT – V
Chapter entitled "SUNITA WILLIAMS" A Star in Space: Puffin Lives Kindle Edition by Aravinda Anatharaman

L - Types of Listening Speeches: Informative, Demonstrative, Persuasive , Entertaining
S - Making Presentations (Mime and Guess, Mono action, Autobiography and Biography)
R - Reading for Entertainment (Humorous short skits)
W – Resume, CV and Cover letter
G - Direct Speech & Indirect Speech
V - Phrasal Verbs and Collocations

Text Book:
1. Mindscapes English for Technologists and Engineers Published by Orient Black Swan
2. American stories by O. Henry
3. A Star in Space: Puffin Lives Kindle Edition by Aravinda Anatharaman

References:
1. A. Textbook of English Phonetics for Indian Students by T. Balasubramanian, 2012
2. Communication Skills, Sanjay Kumar & Pushpalatha Oxford University Press
3. Every Day Dialogues in English – Robert J. Dixson, Prentice Hall of India
4. Raymond Murphy's English Grammar with CD, Murphy, Cambridge University Press, 2012

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B.Tech - I Semester

L	T	P	C
3	0	0	1.5

(18BSBH11) PHYSICS LAB
(Common to CE,EEE,MECH & ECE)

Course Description:
it is meant for making the students to gain practical knowledge and skills to correlate with the theoretical studies.

Course Objectives:
1. Elucidate the concepts of Physics through involvement in the experiment by applying theoretical
knowledge.
2. Illustrate the basics of mechanics, waves and optics to analyze the behaviour and characteristics of various materials for its optimum utilization.
3. Develop an ability to apply the knowledge of physics experiments in the future studies.

List of Experiments: (Any eight experiments to be performed in a semester)

1. Determination of radius of curvature - Newton's Rings
2. Magnetic field along the axis of a current carrying coil - Stewart Gees' Apparatus
3. Determination of Energy gap of a material of p-n junction.
4. Dispersive power of prism – Spectrometer
5. Wavelength of a given laser source- Diffraction Grating
6. Optical fibre: Numerical Aperture and acceptance angle of an optical fibre
7. Diffraction grating: normal incidence method
8. Particle size determination -Laser
9. Study of B-H curve
10. Study of resonance – series and parallel LCR circuits

Reference books:

1. Engineering Physics practical-NU Age Publishing House, Hyderabad
2. Engineering practical Physics – Cengage Learning, Delhi.

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B.Tech - I Semester

L	T	P	C
0	0	3	1

(18HSBH02) ENGLISH LANGUAGE & COMMUNICATION SKILS LAB
(Common to CE, EEE, MECH & ECE)

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts

Objectives:

- To enable students to learn good pronunciation through stress on word accent, intonation and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence.
- To train students to use language appropriately for interviews, group discussion and public speaking.
- To enable students to read with correct pronunciation and Vocabulary development in day today life.

Outcomes:

- Become active participants in the learning process and acquire proficiency in spoken English. Speak with clarity and confidence thereby enhances employability skills.
- Second language learners can acquire fluency in spoken English and neutralize their mother tongue influence.
- Students can use language appropriately for interviews, Group discussions and Public speaking.
- Students can read with correct pronunciation and Develop Vocabulary.

UNIT – I

LISTENING AND READING - PART

A. Reading – Vocabulary Development.
B. Listening – Speeches / Conversation/ Biographies.

UNIT – II

LISTENING AND READING - PART

A. Phonetics – Importance, Introduction to Sounds of English, Vowel and Consonants Sounds and Phonetic Transcription.
B. Word Stress, Syllabification, Rules of Word Stress, Intonation and Types of Intonations.

UNIT – III

WRITING - PART

A. Reports Writing and Types of Reports.
B. Resume/ CV and Cover Letter.

UNIT – IV

SPEAKING - PART

A. Self Introduction, Introducing the others, JAM and Role Play.

B. Describing objects/things/ places and people.

UNIT – V

PARTCIPATING - PART

A. Debate and Group Discussions.

B. Interview Skills (Basic types of Interviews, Do's & Don'ts in Interviews).

Suggested Software:

1. Clarity Pronunciation Power - Part I - Part II (Sky Pronunciation).
2. Walden Info Tech Software.

References:

1. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice –Hall of India Pvt.Ltd.
2. Speaking English Effectively, 2nd Edition Krishnn Mohan & NP Singh, 2011. (Macmillian).
3. A Hand book for English Laboratories, E.Suresh Kumar, P. Sreehari, Foundation Books, 2011.

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B.Tech - I Semester

L	T	P	C
0	0	3	1.5

(18ES0502) PROBLEM SOLVING USING 'C' LAB
(Common to EEE,ECE & CSE)

List of Experiments/Tasks

1. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, to read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
2. Write a program to find the roots of a Quadratic equation.
3. Write a program to compute the factorial of a given number.
4. Write a program to check whether the number is prime or not.
5. Write a program to find the series of prime numbers in the given range.
6. Write a program to generate Fibonacci numbers in the given range.
7. Write a program to find the maximum and minimum of a set of numbers.
8. Write a program to reverse the digits of a number.
9. Write a program to find the sum of the digits of a number.
10. Write a program to find the sum of positive and negative numbers in a given set of numbers.
11. Write a program to check for number palindrome.
12. Write a program to generate Pascal Triangle.
13. Write a program to read two matrices and print their sum and product in the matrix form.
14. Write a program to read matrix and perform the following operations.
    i. Find the sum of Diagonal Elements of a matrix.
    ii. Print Transpose of a matrix.
    iii. Print sum of even and odd numbers in a given matrix.
15. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
16. Write a program to insert a substring in to a given string and delete few characters from the string. Don't use library functions related to strings.
17. Write a program to split a „file" in to two files, say file1 and file2. Read lines into the file from standard input. File1 should consist of odd numbered lines and file2 should consist of even numbered lines.
18. Write a program to merge two files.
19. Write a program to read a set of strings and sort them in alphabetical order.
20. Write a program to read two strings and perform the following operations without using Built in string Library functions and by using your own implementations of functions.
    i. String length determination ii .Compare Two Strings

ii. Concatenate them, if they are not equal iv. String reversing

21. Write programs using recursion for finding Factorial of a number, GCD, LCM, and solving Towers of Hanoi problem.
22. Write a program to exchange two numbers using pointers.
23. Write a program to read student records into a file. Record consists of roll no, name and Marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
24. A file consists of information about employee salary with fields employee id, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employee id, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions are user specified. Compute the Gross and Net salary of the employee and update the file.
25. Write a program to perform Base (decimal, octal, hexadecimal,…) conversions.
26. Write a program to find the square root of a number without using built-in library function.
27. Write C program to convert a string to number.
28. Write C program to generate multiplication tables from 11 to 20.

References:

1. "How to Solve it by Computer", R.G. Dromey, Pearson.
2. "The C Programming Language", Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. "Let us C", YeswantKanetkar, BPB publications
4. "Pointers in C", YeswantKanetkar, BPB publications.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.AnandaRao,Pearson Education.

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B.Tech - II Semester

L	T	P	C
2	1	0	3

(18BSBH02) MATHEMATICS-II
(Common to all branches)

Course Objectives:

- Methods of solving the differential equations of first and higher order.
- Evaluation of method of integration and it's applications.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line Surface and volume integrals.
- To understand Z-Transforms and its applications.

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

- Identify whether the given differential equation of first order is exact or not.
- Solve higher differential equation and apply the concept of differential equation to real world problems.
- Evaluate the multiple integrals and apply the concept of find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped.
- Evaluate the line, surface and volume integrals and converting them from one to another.
- Gain knowledge to tackle engineering problems using the concepts of Z-Transforms.

UNIT – 1: First Order O.D.E

Exact - linear and Bernoulli's equations - Applications to Newton's law of cooling- Orthogonal trajectories. Equations of first order but not of first degree - equations solvable for p- equations solvable for y-equations solvable for x and Clairaut's type.

UNIT –2: Ordinary Differential Equations of higher order

Homogeneous and Non homogeneous linear differential equations of second and higher order with constant coefficients with RHS terms of type e^{ax} - sin ax- cos ax- polynomials in x- e^{ax} v(x) - xv(x).

UNIT –3: Multiple integrals

Multiple integral- double and triple integrals- change of order of integration. Applications to areas and volumes in Cartesian and polar coordinates using double and triple integral.

UNIT –4: Vector Calculus

Introduction-Vector differentiations-Vector differential operator- Gradient – Divergence-Curl and their properties - Vector integration - Line integral-Potential function – Area - Surface and volume integrals- Vector integrals theorems: Green's theorem - Stoke's and Gauss's Divergence theorem (without proof).

UNIT –5: Z-TRANSFORMS

Z-Transform - Inverse Z-transform- properties-Damping Rule – Shifting rule-Initial and Final value theorem - Convolution theorem –Introdution to difference equations -Solutions of difference equations by Z-transforms.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics Volume-I &II by T.K.V. Iyengar, S.Chand publication.

Reference Books:

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
2. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. Engineering Mathematics, volume-I&II, E. Rukmangadachari& E.Keshava Reddy Pearson Publishers.

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B.Tech - II Semester

L	T	P	C
3	0	0	3

(18BSBH12) ENGINEERING CHEMISTRY (ECE, EEE,CIVIL & MECH)

Course Objectives:

- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To provide the information regarding hardness of water, effects of hard water in boilers and treatment methods to avoid bad effect on human health. To check the parameters of various water samples by experimental techniques.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways.
- To make students familiar with importance of electrochemical processes in nature and industry, like coating of objects with metals or metal oxides through electro deposition.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course Outcomes: The basic concepts included in this course will help the student to gain:

- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

UNIT – I: WATER QULAITY AND ITS TREATMENT

INTRODUCTION: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness –Numerical problems on estimation of hardness.

CHEMICAL ANALYSIS OF WATER: Estimation of hardness of water by EDTA method, acidity, alkalinity and dissolved oxygen (BOD & COD).

BOILER TROUBLES: scales and sludges, caustic embrittlement, boiler corrosion and priming and foaming.

SOFTENING OF WATER: Internal Conditioning - Phosphate Conditioning, Calgon Conditioning; **External Treatment** - Zeolite process and Ion-exchange process, advantages and applications.

WATER FOR MUNICIPAL TREATMENT: Disinfection, Chlorination – Breakpoint Chlorination**,** Ozonization, UV Treatment – Reverse Osmosis: Desalination of Brakish water by Electrodialysis.

UNIT – II: MOLECULAR STRUCTURE & THEORIES OF BONDING:

Atomic and Molecular orbitals, Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and H_2^+ molecules. π molecular orbitals of 1,3 butadiene, CO and benzene.

CRYSTAL FIELD THEORY (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries (One Specific Example for Each)

UNIT – III: ELECTRO CHEMISTRY AND CORROSION

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation, Electrochemical series and its applications. Conductometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – Acid Batter and Lithium ion Batteries).

FUEL CELLS: H_2-O_2 fuel cell, Solid oxide fuel cell, PEM fuel cell – Principles, advantages and applications.

SCIENCE OF CORROSION: Definition, Types of Corrosion – Examples: Mechanism of Dry and Wet Corrosion, Factors influencing corrosion

Corrosion control- Cathodic protection – Sacrificial anodic and impressed current cathodic protection methods - Electroplating of (Cu & Cr) and Electro less Plating

UNIT-IV: STEREOCHEMISTRY, REACTION MECHANISM & SYNTHESIS OF DRUG MOLECULES:

STEREO CHEMISTRY: Introduction to representation of 3-dimensional structures, Structural isomers and stereoisomers, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration.

REACTION MECHANISM: Substitution reactions: Nucleophilic substitution reactions: Mechanism of SN^1, SN^2 reactions. Electrophilic and nucleophilic addition reactions: Markownikoff and anti Markownikoff's additions. Elimination reactions: Dehydro halogenation of alkylhalides. Oxidation reactions: Oxidation of alcohols using $KMnO_4$. Reduction reactions: reduction of carbonyl compounds using $NaBH_4$.

SYNTHESIS OF DRUG MOLECULES: Structure, synthesis and pharmaceutical applications of Aspirin.

UNIT – V: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS:

Introduction – Basic principles of UV-Vis, FT-IR, ^{1}HNMR, XRD –One Specific application for each Technique.

SUGGESTED TEXT BOOKS:

1. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
3. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Physical Chemistry, by P. W. Atkins
6. Inorganic Chemistry by J.D.LEE.

REFERENCES

1. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
2. University Chemistry, by B.M. Mahan, Pearson IV Edition

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B.Tech - II Semester

L	T	P	C
2	0	4	4

(18ES0301) ENGINEERING GRAPHICS & DESIGN
(Common to EEE & ECE &CSE)

Course Objectives:

- To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
- To learn about various projections, to understand complete dimensions and details of object.
- Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

Course Outcomes:

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

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Dimensioning, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of regular Plane.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Auto CAD (for Practice only not for External Exam)

Introduction to CAD, Applications, commands, Tool bar, modeling of Simple parts, isometric problems.

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai
3. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:

1. Engineering Drawing / BasantAgrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. A text Book of Engineering Drawing and Graphic, K.Venugopal New Age Publishin New Delhi, 2008.
4. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

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B.Tech - II Semester

L	T	P	C
3	0	0	3

(18ES0204) ELECTRICAL ENGINEERING

Course Objectives:

Electrical Engineering course is one of the important courses of the electrical discipline. In this course the different types of DC Generators, DC Motors and Transformers which are widely used in industry are covered and their performance aspects will be studied.

Course Outcome:

After going through this course the student gets a thorough knowledge on DC Motors & Generators, Transformers and Synchronous Machines with which he/she can able to apply the above conceptual things to real-world problems and applications.

UNIT- I DC GENERATORS

D.C. Generators – Principle of Operation – Constructional Features – E. M.F Equation– Numerical Problems – Methods of Excitation – Separately Excited and Self Excited Generators – Build-Up of E.M.F - Critical Field Resistance and Critical Speed - Load Characteristics of Shunt, Series and Compound Generators- Applications

UNIT – II D.C. MOTORS

D.C Motors – Principle of Operation – Back E.M.F. –Torque Equation – Characteristics and Application of Shunt, Series and Compound Motors-Speed Control of D.C. Motors: Armature Voltage and Field Flux Control Methods. Three Point Starter-Losses – Constant & Variable Losses – Calculation of Efficiency - Swinburne's Test.

UNIT-III SINGLE PHASE TRANSFORMERS

Single Phase Transformers - Constructional Details- Emf Equation - Operation on No Load and on Load - Phasor Diagrams

UNIT-IV TESTS ON SINGLE PHASE TRANSFORMERS

Equivalent Circuit - Losses and Efficiency-Regulation-OC and SC Tests – Sumpner's Test - Predetermination of Efficiency and Regulation.

UNIT – V SYNCHRONOUS MACHINES

Principle And Constructional Features of Salient Pole and Round Rotor Machines – E.M.F Equation- Voltage Regulation by Synchronous Impedance Method- Theory of Operation of Synchronous Motor.

TEXT BOOKS:

1. Electric Machines –by I.J.Nagrath & D.P.Kothari,Tata Mc Graw Hill, 7th Edition.2005
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.

REFERENCE BOOKS:

1. Electrical and Electronic Technology, Hughes, Pearson Education.
2. Electrical Machines, P. S. Bimbhra, Khanna Publishers, 2011.
3. Basic Electrical Engineering, 2nd Edition, V.N. Mittle and Aravind Mittal, Mc Graw hill Education, 2006.

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B.Tech - II Semester

L	T	P	C
3	0	0	3

(18ES0203) NETWORK ANALYSIS

Course objective*:*

To help students develop an understanding on analyzing electrical circuits using various techniques. To make the student familiarize with the fundamental concepts of coupled circuits, resonance, filters and to analyze the transient response in electric circuits.

Course outcomes:

After completing the course the student should be able to do the following:

1. Given a network, find the equivalent impedance by using network reduction techniques
2. Determine the current through any element and voltage across any element
3. Apply the network theorems suitably

UNIT I CIRCUIT ANALYSIS TECHNIQUES:

Voltage and Current Laws, Basic Nodal and Mesh Analysis, Source Transformation. Network Theorems-Linearity and Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Milliman, Tellegan's Theorems.

UNIT II RL AND RC CIRCUITS:

The Source free RL Circuit, The Source free RC Circuit, Properties of Exponential Response, Natural & Forced Response, RLC Circuits, Complete Response of Source free parallel RLC Circuits, Source free Series RLC Circuits.

UNIT III SINUSOIDAL STEADY STATE ANALYSIS:

Characteristics of Sinusoids, Forced Response of Sinusoidal Functions, The Complex forcing Function, The Phasor, Phasor relationships for R,L, and C, Impedance, Admittance.
A.C CIRCUIT POWER ANALYSIS: Instantaneous Power, Average Power, Effective Values of Current and Voltage, Apparent Power, Power Factor, Complex Power.

UNIT IV RESONANCE :

Introduction, Definition of 'quality factor **Q**' of inductor and capacitor, Series resonance, Bandwidth of the series resonant circuits, Parallel resonance (or anti-resonance), Conditions for maximum impedance, Currents in parallel resonance, Impedance variation with frequency; universal resonance curves, Bandwidth of parallel resonant circuits, General case of parallel resonance circuit.

MAGNETICALLY COUPLED CIRCUITS: Mutual Inductance, Energy Considerations, The Linear Transformer, The Ideal Transformer

UNIT V TWO PORT NETWORKS:

Relationship of two port variables, Short circuit Admittance parameters, Open circuit Impedance parameters, Transmission Parameters, Hybrid Parameters, Relationship between parameter sets, Parallel connection of two port networks.

TEXT BOOKS:

1. Engineering Circuit Analysis, W H Hayt, J E Kemmerly and S M Durbin, Tata McGraw-Hill, 7th edition, 2010.
2. Network Analysis Van Valkenburg, PHI, 3rd Edition, 2011.

REFERENCES:

1. Networks, Lines, and Fields, John D. Ryder, PHI publications, Second Edition, 2012.
2. Circuits & Network Analysis & Synthesis, A. Sudhakar & Shyam Mohan S.Pillai Tata McGraw Hill , 2nd Edition, 1994
3. Network Analysis and synthesis ,Franklin F. Kuo, Wiley India Pvt Ltd, 2nd Edition.
4. Circuit Theory (Analysis & Synthesis) by A. Chakrabarti, Dhanpat Rai & Sons, 2010.
5. Network Analysis- A Simplified Approach, K.Chenna Venkatesh, D.Ganesh Rao, Elsevier, 2nd Edition 2010

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B.Tech - II Semester

L	T	P	C
0	0	3	1.5

(18BSBH13) ENGINEERING CHEMISTRY LAB
(ECE, EEE, CIVIL & MECH)

Course Objectives: The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The student will learn:

- The hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.
- The preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications.
- Will able to understand the knowledge to the processes of corrosion and its prevention.

Course Outcomes: The experiments will make the student gain skills on:

- Would have acquired the practical skill to handle the analytical methods with confidence.
- To learn the desirable limits of various constituents in water analysis and its importance.
- To Measure molecular properties such as viscosity, conductance of solutions, etc.
- Estimation of rate constant of a reaction from concentration – time relationships.

LIST OF EXPERIMENTS:

Choice of 10 experiments from the following:

1. Estimation of hardness of water by complexometric method using EDTA.
2. Determination of Alkalinity of water.
3. pH Metry- Analysis of acidic and Basic water samples.
4. Estimation of Dissolved oxygen in water.
5. Preparation of standard $KMnO_4$ solution & Estimation of Iron by Potentiometry.
6. Determination of strength of given strong acid and strong base solution by conductometric titration.
7. Determination of Viscosity of oil through Ostwald/Redwood Viscometer – I.
8. Synthesis of Aspirin.
9. Estimation of Manganese in Cement by Colorimetry.
10. Determination of rate constant of acid catalysed hydrolysis of Methyl acetate.
11. Determination of Surface tension of a give liquid using Stalagmometer.

Prescribed Book:

Lab Manual prepared by SVPCET.

REFERENCE BOOKS:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co.,Delhi).

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B.Tech - II Semester

L	T	P	C
0	0	3	1.5

(18ES0302) ENGINEERING & IT WORKSHOP PRACTICE
(Common to ECE(A&B), EEE)

Part-A Engineering Workshop Lab

Course Objectives:

- To Study of different hand operated tools, uses and their applications
- To Know a basic working knowledge, team work, precision and safety on production of various engineering products.
- To Provide a hands on experience of different engineering materials, tools, equipments and processes those are commonly used in the engineering fields.

Course Outcomes:

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

- Study and practice on machine tools and their operations
- Practice on manufacture of components in different workshop trades.
- Identify and apply suitable tools for different trades of Engineering processes
- Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least TWO exercises from each trade:

I. Carpentry : T-Lap Joint, Dovetail Joint, Mortise &Tenon Joint
II. Tin-Smithy : Square Tin, Rectangular Tray & Conical Funnel

At least ONE exercises from each trade:

III. Fitting : V-Fit, Dovetail Fit & Semi-circular fit
IV. Foundry :Preparation of Green Sand Mould using Single Piece and Split Pattern
V. Welding practice : Arc Welding & Gas Welding
VI. House-wiring : Parallel & Series, Two-way Switch and Tube Light
VII. Black Smithy : Round to Square, Fan Hook and S-Hook

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Tools in construction work and Wood Working.

NOTE: At least the total number of exercises must be SEVEN.

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage

2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech

2. Workshop Manual / Venkat Reddy/ BSP

Part-B IT Workshop Lab

Course Objective:

- To provide Technical training to the students on Productivity tools like Wordprocessors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a Computer from the parts, preparing a computer for use by installing the operating System
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Learning Outcome:

- disassemble and assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Networking and Internet Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, Skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending Messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Productivity tools

Task 5: Word Processor: Students should be able to create documents using the word Processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, Changing the font, changing the color, including images and tables in the word file, Making page setup, copy and paste block of text, images, tables, linking the images Which are present in other directory,

formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 6: Spreadsheet: Students should be able to create, open, save the application Documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and Deleting cell data, format cells, adjust the cell size, applying formulas and functions, Preparing charts,+ sorting cells. Students should submit a user manual of the Spreadsheet Application considered.

Task 7: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Task 8: Latex introduction, Document Structure, Typesetting Text, table of contents packages, math, adding pictures

Task 9: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

_ Desktop computer
_ Server computer
_ Switch (computer science related)

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B.Tech - II Semester

L	T	P	C
0	0	3	1.5

(18ES0205) ELECTRICAL ENGINEERING LAB

OBJECTIVE:

To make the student learn about:

- Experimental verification of theorems
- Experimental verification of two port network parameters
- Analyze the performance of various machines

Any Ten of the following experiments are to be conducted.

PART A

1. Verification of Superposition Theorem with analysis.
2. Verification of Thevenin's Theorem with analysis.
3. Verification of Norton's Theorem with analysis.
4. Verification of Maximum Power Transfer Theorem with analysis.
5. Two Port Network Parameters – Z-Y Parameters,
6. Two Port Network Parameters – ABCD and H-Parameters.

PART B

7. Swinburne's Test on DC Shunt Motor
8. Brake Test on DC Shunt Motor
9. OC & SC Test on Single phase Transformer
10. Load Test on Single phase Transformer
11. Brake Test on DC Compound Motor
12. OCC Characteristics on DC Generator

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B.Tech - II Semester

L	T	P	C
0	0	0	0

(18MCBH02) ENVIRONMENTAL SCIENCE
(Common to all)

Course Objectives:

• Understanding the importance of ecological balance for sustainable development.
• Understanding the impacts of developmental activities and mitigation measures.
• Understanding the environmental policies and regulations

Course Outcomes:

- Students will get the sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
- Students will realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.
- Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
- By studying environmental sciences, students is exposed to the environment that enables one to find out solution of various environmental problems encountered on and often.
- At the end of the course, it is expected that students will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. This will enable every human being to live in a more sustainable manner.

UNIT-I ECOSYSTEMS:

Definition, Scope and Importance of ecosystem – Structure and function of an ecosystem – Energy flow in the ecosystem – Food chain, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-II NATURAL RESOURCES:

Classification of Resources: Living and Non-Living resources, **Water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III BIODIVERSITY AND BIOTIC RESOURCES:

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

UNIT-IV ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES:

Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Noise pollution

SOLID WASTE MANAGEMENT: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

E– WASTE MANAGEMENT: Definition of E-Waste, Effect of E-Waste on Humans and Environment, Treating and management of E-Wastes.

UNIT – V SOCIAL ISSUES AND THE ENVIRONMENT:

Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Climate change, global warming, acid rain, ozone layer depletion,– Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela.2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BSPublications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

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B.Tech - III Semester

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3	0	0	3

(18BSBH03) MATHEMATICS-III
(Common to EEE, MECH & ECE)

Course Objectives:
Our emphasis will be more on conceptual understanding and application of Laplace transforms, Fourier transforms, Solution of Algebraic, Transcendental Equations and Numerical solutions of ordinary differential equations.

Course Outcomes: After learning the contents of this paper the student must be able to
- Analyze the engineering problems using the concept of laplace transforms.
- Solve the engineering problems using concept of fourier transforms
- Gain knowledge to tackle engineering problems using the concepts of Numerical methods

UNIT– I Laplace Transform-I
Laplace transform of standard functions– First shifting Theorem - Second shifting theorem- Transforms of derivatives and integrals – Unit step function –Dirac's delta function- Laplace transform of periodic functions.

UNIT–2 Laplace Transform-II
Convolution theorem- Differentiation and integration of transform – Inverse laplace transform – Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT – 3 Fourier Transform
Introdution – Fourier integral theorem (only statement) – Fourier sine and cosine integrals- Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT – 4 Numerical Method-I
Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method
Interpolation: Finite differences-Forward differences- Backward differences- Newton's forward and backward interpolation formulae – Lagrange's formulae.

UNIT – 5 Numerical Method-II
Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method- Modified Euler's Method-Runge-Kutta Methods-Predictor-corrector method-Milne's Method.

TEXT BOOKS:
1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

REFERENCES:

1. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

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B.Tech - III Semester

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(18PC0401) ELECTRONIC DEVICES

Pre-Requisites: A course on Engineering Physics

Course Objectives:

1. To give understanding on semiconductor physics of the intrinsic, p and n materials, characteristics of the p-n junction diode.
2. To understand operation of various Electronic devices such as Diodes, BJT, JFET AND MOSFET.
3. To understand various applications of diode and special purpose electronic devices.
4. To understand the design of various biasing circuits of BJT and JFET.

Course Outcomes:

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

1. Understand the principles of semiconductor Physics
2. Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.
3. Design and analyze basic transistor circuits using BJT and FET

UNIT-I

Introduction to Semiconductor Physics: Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; sheet resistance, design of resistors, Generation and recombination of carriers; Poisson and continuity equation. P-N junction characteristics,I-V Characteristics.

UNIT-II

Diode Circuits and small signal switching models, Rectifiers-types and Filters, Avalanche breakdown, Zener diode, Varactor diode, Tunnel Diode ,Schottky diode, LED, photodiode and solar cell, UJT.

UNIT-III

Bipolar Junction Transistor, I-V characteristics, Ebers-Moll Model,MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, and small signal models of MOS transistor,

UNIT-IV

Biasing schemes for BJT and FET, bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features, Bias compensation, Thermal runaway, Thermal stability.

UNIT-V

Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process.

TEXT BOOKS:

1. J. Millman, C. Halkias, "Electronic Devices and Circuits", Tata Mc-Graw Hill, 4thEdition,2010.
2. R.L. Boylestad and Louis Nashelsky,"Electronic Devices and Circuits",Pearson Publications,,9thEdition,2006.

REFERENCES:

1. Jacob Millman, C. Halkies, C.D.Parikh, "Integrated Electronics", Tata Mc-Graw Hill, 2009.
2. BV Rao, KBR Murty, K Raja Rajeswari, PCR Pantulu, "Electronic Devices and Circuits", Pearson, 2nd edition.
3. Salivahanan, Kumar, Vallavaraj, "Electronic Devices and Circuits", Tata Mc-Graw Hill, Second Edition

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B.Tech - III Semester

L	T	P	C
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(18PC0402) SIGNALS & SYSTEMS
(Common to ECE, EEE)

Pre-Requisites: A course on transformation techniques and partial differential equations

COURSE OBJECTIVES:

1. To study about signals and systems.
2. To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
3. To understand the stability of systems through the concept of ROC.
4. To know various transform techniques in the analysis of signals and systems.

COURSE OUTCOMES:

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

1. Analyze different types of signals
2. Represent continuous and discrete systems in time and frequency domain using different transforms
3. Investigate whether the system is stable
4. Sampling and reconstruction of a signal

UNIT I: Introduction to Signals and Systems

Signals and systems as seen in everyday life, and in various branches of engineering and science. Continuous time signals (CT signals)- Discrete time signals (DT signals) – Step, Ramp, Pulse, Impulse, Exponential - classification of CT and DT signals – periodic and aperiodic signals, random signals, deterministic signals, Energy ,Power signals - CT systems and DT systems. Classification of systems System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability.

UNIT II: Behavior of continuous and Discrete-time LTI systems

Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis. Impulse response and step response, convolution, input-output behavior with a periodic convergent inputs, cascade interconnections. Characterization of causality and stability of LTI systems.

UNIT III: Continuous & Discrete Fourier Transforms:

Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, Properties & Signal representation. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem.

UNIT IV: Laplace and Z- Transforms

Review of the Laplace Transform for continuous time signals and systems, system functions, poles and zeros of system functions and signals.
Review of the z-Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis
.

UNIT V: Sampling and Reconstruction

The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects. Relation between continuous and discrete time systems.

Text/References:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "Signals and systems", Prentice Hall India,1997.
2. J. G. Proakis and D. G. Manolakis, "Digital Signal Processing: Principles, Algorithms, and Applications", Pearson, 2006.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, "Signals and Systems", John Wiley and Sons, 2007.
5. A. V. Oppenheim and R. W. Schafer, "Discrete-Time Signal Processing", Prentice Hall, 2009.
6. M. J. Robert "Fundamentals of Signals and Systems", McGraw Hill Education, 2007

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B.Tech - III Semester

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(18PC0403) PROBABILITY THEORY & STOCHASTIC PROCESSES

Pre-Requisites: A course on Engineering Mathematics

COURSE OBJECTIVES:

- To understand the concepts of a Random Variable and operations that may be performed on a single Random variable.
- To understand the concepts of Multiple Random Variables and operations that may be performed on Multiple Random variables.
- To understand the concepts of Random Process and Temporal & Spectral characteristics of Random Processes.

COURSE OUTCOMES:

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

- Understand representation of random variables.
- Investigate the characteristics of random signals.
- Make use of theorems related to random signals.
- Determine the temporal and spectral characteristics of random signals.

UNIT-I

Probability: Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Joint Probability, Conditional Probability, Total Probability, Baye's theorem, Independent Events.

The Random Variable : Definition of a Random Variable, Conditions for a Function to be a Random Variable, Types of random variables, Distribution and Density functions, Properties, Conditional Distribution, Methods of defining Conditioning Event, Conditional Density, Properties.

UNIT-II

Various Distribution functions: Binomial, Poisson, Gaussian, Exponential, Uniform and Rayleigh Distribution functions.

Operations on Single Random Variable: Introduction, Expected Value of a Random Variable, Moment about the Origin, Central Moment, Variance and Skew, Characteristic Function and moment generating function.

UNIT-III

Multiple Random Variables : Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected).

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case.

UNIT-IV

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and its Properties, Covariance Functions.

UNIT-V

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Text Books:

1. Peyton Z. Peebles, “Probability, Random Variables & Random Signal Principles”, TMH, 4th Edition, 2001.
2. Athanasios Papoulis and S. Unnikrishna Pillai, “Probability, Random Variables and Stochastic Processes”, PHI, 4th Edition, 2002.

References:

1. R.P. Singh and S.D. Sapre, “Communication Systems Analog & Digital”, TMH, 1995.
2. Henry Stark and John W.Woods, “Probability and Random Processes with Application to Signal Processing”,Pearson Education, 3rd Edition.
3. George R. Cooper, Clave D. MC Gillem, “Probability Methods of Signal and System Analysis”, Oxford, 3rd Edition, 1999.
4. S.P. Eugene Xavier, “Statistical Theory of Communication”, New Age Publications, 2003.
5. B.P. Lathi, “Signals, Systems & Communications”, B.S. Publications, 2003.

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B.Tech - III Semester

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3	0	0	3

(18PC0404) DIGITAL SYSTEM DESIGN

Pre-Requisites:

COURSE OBJECTIVES:

- To provide fundamental concepts used in the design of digital systems and learn the methods for the design of digital circuits.

COURSE OUTCOMES:

- To introduce basic postulates of Boolean algebra and the methods for simplifying Boolean expressions
- To illustrate the concepts and study the procedures for the analysis and design of combinational circuits and sequential circuits
- To introduce the concepts of Logic Families.
- To design combinational and sequential circuits using VDHL code.

UNIT I

Number System & Boolean Algebra:

Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers. Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, other logic operations & Logic gates.

UNIT II

Gate Level Minimization:

The map method, four variable & Five variable K-map, POS & SOP Simplification, Don't care conditions, Tabular Method.

Combinational Logic Circuits:

Combinational circuits, Analysis & Design procedure, Binary Adder-Subtractor, Binary Multiplier, Decoder, Encoders, Multiplexers.

UNIT III

Sequential Logic Circuits:

Sequential Circuits, Latches, Flips-Flops - RS, JK, Master-Slave JK, D & T flip flops, Analysis of Clocked sequential circuits, Registers & Counters – Registers, Shift Registers, Ripple Counters, Synchronous counters, asynchronous counters.

UNIT IV

Logic Families and Semiconductor Memories

Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable logic devices like FPGA. Logic implementation using Programmable Devices.

UNIT V

VHDL Modeling:

HDL Based digital design, HDL design Flow, Different modeling styles in VHDL, Synthesis and simulation, VHDL models for combinational and sequential circuits.

Text Books:

1. M.Morris Mano & Michel D. Ciletti,"Digital Design", 5th Edition Pearson.
2. Zvi Kohavi and Nirah K.Jha, "Switching theory and Finite Automata Theory", 3rd Edition Cambridge.
3. John F.Wakerly ,"Digital Design Principles and Practices" 4th edition, Pearson Education., 2009

References:

1. Subratha Goshal, "Digital Electronics", Cambridge
2. Comer, "Digital & State Machine Design", Third Indian edition, OXFORD
3. Stephen Brown and ZvonkoVranesic, "Fundamentals of digital logic with VHDL design" 2nd edition McGraw Hill Higher Education.
4. J. Bhasker, "A VHDL PRIMER" 3rd edition Eastern Economy Edition, PHI Learning,2010.

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B.Tech - III Semester

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(18PC0405) ELECTRONIC DEVICES LAB

Objectives:

1. This Lab provides the students to get an electrical model for various semiconductor devices.
2. Students can find and plot V_I characteristics of all semiconductor devices. Student learns the practical applications of the devices.
3. Students can find and plot Input & Output characteristics of BJT's and FET's

Outcomes:

1. Students Have Practical knowledge on R, L, C Components (Colour Codes) testing, identification, Specifications, Bread Boards, BJT'S,FET'S,LED'S, etc.....
2. Students Have knowledge on PN diode, zener diode V-I characteristics, different rectifiers.
3. Have practical knowledge on BJT characteristics.

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs,.
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.

PART B: List of Experiments

(For Laboratory Examination-Minimum of Ten Experiments)

1. P-N Junction Diode Characteristics (Forward bias & Reverse bias)
2. Zener Diode Characteristics (Forward bias & Reverse bias)
3. Half-wave Rectifier (without and with filter)
4. Full-wave Rectifier (without and with filter)
5. BJT Input & Output Characteristics (CE Configuration)
6. BJT Input & Output Characteristics (CB Configuration)
7. FET Transfer & Output Characteristics (CS Configuration)
8. FET Transfer & Output Characteristics (CD Configuration)
9. Transistor Biasing
10. CRO Operation and its Measurements
11. UJT Characteristics
12. Transistor acts as a switch

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B.Tech - III Semester

L	T	P	C
0	0	3	1.5

(18PC0406) DIGITAL SYSTEM DESIGN LAB

Course Objectives:

- To verify the logical operations of the digital ICs (Hardware) in the laboratory.
- To develop VHDL code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.

Course Outcome:

After completion of the course the students will be able to

- Verify the functionality of digital circuits using digital ICs
- Write VHDL source code for various digital circuits, simulate and analyze the simulation results using necessary synthesizer.

Part-A (Experiments Using IC's)

1. Logic Gates- 74XX.
2. Realization of basic gates using universal gates
3. Half Adder, Half Subtractor, Full Adder, Full Subtractor
4. SR Flip-Flop & JK Master Slave Flip-Flop
5. D Flip-Flop 74X74.
6. JK Flip-Flop 74X109.

Part-B (Simulation using appropriate HDL Tool)

1. Ripple Carry Adder & Carry Look Ahead Adder.
2. 4 bit Comparator-74X85.
3. Decade counter-74X90.
4. Universal shift register -74X194.
5. 3-8 Decoder -74138 & 8-3 Encoder- 74X148.
6. 8 x 1 Multiplexer -74X151 and 2x4 Demultiplexer-74X155.

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B.Tech - III Semester

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(18HSBH03) SOFT SKILLS
(Common to all)

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts

Objectives:

- To bring about a consistent accent and intelligibilty in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking and interviews and group discussion

Outcomes:

- Become active participants in the learning process and acquire proficiency in spoken English
- Speak with clarity and confidence thereby enhances employability skills.

UNIT – I

1. Communication skills
2. Introducing yourself
3. Story telling
4. Telephonic communication

UNIT – II

1. Writing skills
2. Narrating an images
3. Business letters
4. E-mail writing
5. Report writing

UNIT – III

1. Time Management and Goal setting

UNIT – IV

1. Making effective presentations
2. Speaking on various occasions
3. Resume preparations

UNIT – V

1. Group discussions

2. Interview skills
3. Leaderships skills

Sugested Software:
1. K – Van Advanced Communication Skills
2. Globareena Communication skills Software

References:
1. D. Sudha Rani, A Manual for English language Laboratory, Pearson Education.
2. D. Sudha Rani, Advanced Communication Skills Laboratory, Pearson Education.
3. R. Manivannan and G.Immanueal, Communication Skills Laboratory, VK .Publications
4. Nira Kumar, English Language laboratories, PHI Learning Pvt.Ltd.New Delhi.

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B.Tech - III Semester

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(18MCBH03) CONSTITUTION OF INDIA
(Mandatory Course)

COURSE OBJECTIVES:

Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

COURSE OUTCOMES:

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

UNIT-I

- Meaning of the Constitution Law

UNIT-II

- Historical Perspective of the Constitution of India
- Salient features and characteristics of the Constitution of India

UNIT-III

- Scheme of the fundamental rights
- The scheme of the Fundamental Duties and its legal status
- The Directive Principles of State Policy – Its importance and implementation
- Federal structure and distribution of legislative and financial powers between the Union and the States

UNIT-IV

- Parliamentary Form of Government in India – The constitution powers and status of the President of India.
- Amendment of the Constitutional Powers and Procedure.
- The historical perspectives of the constitutional amendments in India.
- Emergency Provisions : National Emergency, President Rule, Financial Emergency

UNIT-V

- Local Self Government – Constitutional Scheme in India.
- Scheme of the Fundamental Right to Equality.
- Scheme of the Fundamental Right to certain Freedom under Article 19
- Scope of the Right to Life and Personal Liberty under Article 21

Text Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Framing of Indian Constitution, Dr. S. N. Busi, Dr. B. R. Ambedkar 1st Edition, 2015

Reference Books:

1. Indian Constitution Law, M. P. Jain 7th Edn., Lexis Nexis, 2014.
2. Introduction to the Constitution of India, D.D. Basu, Lexis Nexis, 2015.

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B.Tech - IV Semester

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(18BSBH06) MATHEMATICS-IV
(Common to ECE & EEE)

OBJECTIVES:

The aim of this course is to introduce complex functions and their applications. Students learn about analytical functions, complex integration, classification of singularities etc. They would also learn conformal mappings. Some special functions and their applications will also be introduced.

OUTCOMES:

- This course will help the student in analysis of real to complex numbers and apply them whenever the problem arises in real analysis and calculus.
- The students will understand path and contour integrals and able to apply different theorems of integral formulae
- The student will be able to evaluate some standard integrals using contour integrals
- The student will be able evaluate the real integrals using beta and gamma functions
- The student will be able evaluate the real integrals using bessel's and legendre's functions

UNIT – I (Complex variable –Differentiation)

Functions of a complex variable – Continuity – Differentiability – Analytic function and its Properties – Cauchy-Riemann equations in Cartesian and polar coordinates- Harmonic and conjugate harmonic functions – Milne–Thomson method- Conformal mapping: Bilinear transformation - Fixed point – Cross ratio – Determination of bilinear transformation.

UNIT – II (Complex variable –Integration)

Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula- Liouville's theorem.

Complex power series: Radius of convergence – Expansion in Taylor's series- Maclaurin's series and Laurent series- Singular point – Isolated singular point – Pole of order m – Essential singularity.

UNIT – III Residues

Evaluation of residue by formula and by Laurent's series – Cauchy's Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_0^{2\pi} f(sin\theta, cos\theta)\,d\theta$ (c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$

UNIT – IV: Special functions-I

Special Functions: Gamma and Beta Functions – their properties – Evaluation of improper integrals- Series Solutions of ordinary differential equations (Power series and Frobenius Method).

UNIT – V: Special functions-II

Bessel functions – Properties – Recurrence relations – Orthogonality- Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - III, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

REFERENCES:

1. Mathematics III by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publications.
2. Advanced Engineering Mathematics, Peter V.O'Neil, CENGAGE publisher.
3. Advanced Engineering Mathematics by M.C. Potter, J.L. Goldberg, Edward F.Aboufadel.

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B.Tech - IV Semester

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(18PC0407) ELECTROMAGNETIC WAVES

PRE-REQUISITES:
Coordinate Systems, Vector Algebra, Vector Calculus.
Course objectives: This course provides the foundational education in static electromagnetic fields, and time varying electromagnetic waves.

Course Outcomes:
1. At the end of this course, students will demonstrate the ability to Analyse transmission lines and estimate voltage and current at any point on transmission line for different load conditions.
2. Provide solution to real life plane wave problems for various boundary conditions.
3. Analyse the field equations for the wave propagation in special cases such as lossy and low loss dielectric media.
4. Visualize TE and TM mode patterns of field distributions in a rectangular wave-guide.
5. Understand the Microwave bench setup.

UNIT-I Maxwell's Equations
Basic quantities of Electromagnetics, Basic laws of Electromagnetics: Gauss's law, Ampere's Circuital law, Faraday's law of Electromagnetic induction. Maxwell's equations, Surface charge and
surface current, Boundary conditions at media interface.

UNIT-II Uniform Plane Waves & Plane Waves at Media Interface
Wave equation for time harmonic fields,Solution of the wave equation, Uniform plane wave, Wave polarization, Wave propagation in conducting medium, Phase velocity of a wave, Power flow and Poynting vector, Plane wave at dielectric interface, Reflection and refraction of waves at dielectric interface, Total internal reflection, Wave polarization at media interface, Brewster angle, Fields and power flow at media interface, Lossy media interface, Reflection from conducting boundary.

UNIT-III Waveguides
Parallel plane waveguide: Transverse Electric (TE) mode, transverse Magnetic(TM) mode, Cut-off frequency, Phase velocity and dispersion. Transverse Electromagnetic (TEM) mode, Analysis of waveguide-general approach, Rectangular waveguides.

UNIT-IV Transmission Lines
Introduction, Concept of distributed elements, Equations of voltage andcurrent, Standing waves and impedance transformation, Lossless and low-loss transmission lines, Power transfer on a transmission line, Analysis of transmission line in terms of admittances, Transmission line calculations with the help of Smith chart, Applications of transmission line, Impedance matching using transmission lines.

UNIT-V

Description of Microwave bench-different blocks and their features, errors and precautions; Microwave power measurement-Bolometers, Measurement of attenuation, frequency ,standing wave measurements –measurement of low and high VSWR, cavity- Q, impedance measurements

TEXT BOOKS:

1. Matthew N.O. Sadiku, "Elements of Electromagnetics," Oxford Univ. Press, 2007.
2. William H. Hayt Jr. and John A. Buck, "Engineering Electromagnetics," TMH, 7th ed., 2006.

REFERENCES:

1. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Ed., 2000.
2. Electromagnetics – John D. Krauss, McGraw- Hill publications, 3rd ed., 1988.
3. John D. Ryder, "Networks, Lines, and Fields," PHI publications, Second Edition, 2012.
4. Schaum's out – lines, "Electromagnetics," Second Edition, Tata McGraw-Hill publications, 2006.
5. C. A. Balanis, "Antenna Theory: Analysis and Design", John Wiley & Sons, 2005.

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B.Tech - IV Semester

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3	0	0	3

(18ES0503) PYTHON PROGRAMMING

PRE-REQUISITES:

Course Objectives

- Introduction to Script Language.
- Exposure to various problems solving approaches of computer science.

Course Outcomes:

By the end of the course, the students will be able to:

- Making Software easily right out of the box
- Experience with an interpreted Language.
- To build software for real needs.
- Prior Introduction to testing software.

UNIT-I

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

UNIT-II

Types, Operators and Expressions: Types-Integers, Strings, Booleans; Operators-Arithmetic Operators, Comparison(Relational)Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations control flow-if, if-elif-else, for, white, break, continue, pass.

UNIT-III

Data Structures:

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

UNIT-IV

Functions: Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions,(Function Returning Values),Scope of the Variable 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-V

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.

Text Books

1. "Python Programming:A modern Approach,Vamsi Kurama,Pearson.
2. Learning Python,Mark Lutz,Orielly.

Reference Books

1. Think Python,Allen Downey,Green Tea Press.
2. Core Python Programming,W.Chun,Pearson.
3. Introduction to Python,Kenneth A.Lambert,Cengage.

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18HS0112) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objective:
The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to enrich analytical skills in helping them take sound financial decisions for achieving higher productivity.

Course Outcome:
The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

UNIT I
INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics - Definition, nature and scope –Role of Managerial Economics in Business Decisions- Demand Analysis: Determinants- Law of Demand - Elasticity of Demand. Significance – types – measurement of elasticity of demand - Demand forecasting- factors governing
Demand forecasting- methods of demand forecasting

UNIT II
THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost
Combination of inputs - - laws of returns - Internal and External Economies of scale - **Cost Analysis**: Cost concepts- Time Value of Money - Break-Even Analysis (BEA) – Managerial Significance and limitations of BEA - Determination of Break Even Point (Simple Problems)

UNIT III
INTRODUCTION TO MARKETS AND FORMS OF BUSINESS ORGANIZATIONS

Market structures: Types of Markets - Perfect and Imperfect Competition - Features, Oligopoly -Monopolistic competition. Price-Output determination - Pricing Methods and Strategies. Forms of Business Organization – Sole Proprietorship- Partnership – Joint Stock Companies –National Income: Concepts-Inflation: Types – Business Cycle: Phases of business cycle

UNIT IV
INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - emerging need and importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Techniques – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

UNIT V

CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Sources of Short term and Long term capital - Estimating Working Capital requirement – Capital budgeting – Features of Capital budgeting proposals – Methods and Evaluation of Capital budgeting – Pay Back Method –Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

Text Books:

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

Reference Books:

1. Premchand Babu, Madan Mohan:Financial Accounting and Analysis,Himalaya, 2009
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2009.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2009.
5. H.L.Ahuja: Managerial Economics, S.Chand, 3/e, 2009
6. Gupta G.S., Managerial Economics, TaTa Mc Gra Hill
7. Joel Dean, Managerial Economics, Prentice Hall

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18PC0408) ANALOG CIRCUITS

Course Objectives:

1. The aim of this course is to familiarize the student with the analysis and design of multistage amplifiers with compound connections.
2. To familiarize the student with the analysis and design of feedback amplifiers, oscillators, power amplifier Circuits.
3. To study and analyze the functioning of OP-AMP circuits.

Course Outcomes:

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

1. Understand the small signal analysis of transistors
2. Design and analyze various feedback amplifier circuits
3. Design sinusoidal oscillators
4. Understand the functioning of OP-AMP and design of OP-AMP based circuits
5. Design ADC and DAC

UNIT-I

Small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance, output resistance etc., design procedure for particular specifications, low frequency analysis of multistage amplifiers, cascode amplifier.

UNIT-II

Amplifier models: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier,Feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability.

Oscillators: Review of the basic concept, Barkhausen criterion, RC oscillators(phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.).

UNIT-III

High frequency transistor models, frequency response of single stage and multistage amplifiers, Various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues.

Differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR. OPAMP design: design of differential amplifier for a given specification, design of gain stages and output stages, compensation.

UNIT-IV

OP-AMP applications: review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, Instrumentation Amplifier precision rectifier, Schmitt trigger and its applications.
Active filters: Low pass, high pass, band pass and band stop, design guidelines.

UNIT-V
Digital-to-analog converters (DAC): Weighted resistor, R-2R ladder, resistorstring etc. Analog-to digital converters (ADC): Single slope, dual slope, successive approximation, flash etc. Switched capacitor circuits: Basic concept, practical configurations, application in amplifier, integrator, ADC etc.

Text Books:
1. Donald A. Neaman, "Electronic Circuit Analysis and Design", McGraw Hill.
2. Salivahanan, N.Suressh Kumar, A. Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill, Second Edition.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College11

References:
1. J. Millman and C.C. Halkias, "Integrated Electronics", McGraw-Hill, 1972.
2. Robert T. Paynter, "Introductory Electronic Devices and Circuits", Pearson Education, 7th Edition
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory" Pearson/Prentice Hall,9th Edition, 2006.

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B.Tech - IV Semester

L	T	P	C
0	0	3	1.5

(18PC0409) ANALOG CIRCUITS LAB

Objectives

1. To understand the concept of designing of multistage amplifiers.
2. To understand the concept of designing of feedback and power amplifiers.
3. The student will construct and analyze Oscillator circuits.
3. To understand the concept of designing of OPAMP circuits. configuration
4. To understand the principle operation of filters and A/D & D/A converters

Outcomes:

- The ability to analyze and design single and multistage amplifiers at low and high frequencies.
- Designing and analyzing the feedback amplifiers and oscillators.
- Determine the efficiencies of power amplifiers.
- Designing and analyzing the OPAMP circuits.
- Able to Analyze all the circuits using simulation software and Hardware.

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

1. Voltage-Series Feedback Amplifier
2. RC Phase Shift/Wien Bridge Oscillator
3. Hartley/Colpitt's Oscillator
4. Two Stage RC Coupled Amplifier
5. Darlington Pair Amplifier
6. Class A Series-fed Power Amplifier
7. Complementary Symmetry Class B Push-Pull Power Amplifier
8. OPAMP Applications- Adder, Subtractor & Voltage Follower
9. OPAMP integrator and differentiator
10. Instrumentation Amplifier
11. Active Filters using OPAMP
12. Digital to Analog Converter

PART B: Equipment required for Laboratory

Software:

i. Multisim/ Pspice/Equivalent Licensed simulation software tool
ii. Computer Systems with required specifications

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B.Tech - IV Semester

L	T	P	C
0	0	3	1.5

(18MCBH03) ELECTROMAGNETIC WAVES & BASIC SIMULATION LAB

Course Objectives:

- To verify the logical operations of the digital ICs (Hardware) in the laboratory.
- To develop VHDL code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.

Course Outcome:

After completion of the course the students will be able to

- Verify the functionality of digital circuits using digital ICs
- Write VHDL source code for various digital circuits, simulate and analyze the simulation results using necessary

Part-A List of Experiments:

1. Generation of Various signals and Sequences (Periodic and Aperiodic), Such as Unit Impulse, Unit Step, Square, Saw Tooth, Triangular, Sinusoidal, Ramp, Sinc.
2. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
3. Convolution between Signals and Sequences.
4. Autocorrelation and Cross correlation between Signals and Sequences.
5. Verification of Linearity and Time Invariance Properties of a Given Continuous / Discrete System.
6. Finding the Fourier Transform of a given Signal and plotting its Magnitude and Phase Spectrum.
7. Waveform Synthesis using Laplace Transform.
8. Generation of Gaussian Noise (Real and Complex), Computation of its Mean, M.S.Values and its Skew, Kurtosis, and PSD, Probability Distribution Function.
9. Sampling Theorem Verification.
10. Removal of Noise by Auto Correlation / Cross correlation in a given signal corrupted by noise.
11. Impulse response of a raised cosine filter.
12. Checking a Random Process for Stationary in Wide Sense.

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B.Tech - IV Semester

L	T	P	C
0	0	0	0

(18MCBH04) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Course objective

The course aims at imparting basic principles of thought process, reasoning and inference. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. The course focuses on introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system.

Outcome: Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective

Unit-I

- Basic structure of Indian Knowledge System: Astadash Vidya- 4 ved
- 4 Upaved (Ayurved, Dhanurved, Gandharva Ved & Sthapthya Adi.,)

Unit-II

- 6 Vedanga (Shisha, Kalppa, Nirukha, VYkaran, Jyothish & Chand)
- 4 Upanga (Dharma Shastra, Meemamsa, Purana & Tharka Shastra)

Unit-III

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case studies

Unit-IV

- Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec,Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain & Boudh
- Indian Linguistic Tradition –(Phonology, morphology, syntax and semantics)

Unit-V

- Indian Artistic Tradition - Chitra kala, Moorthi kala, Vasthu kala , Sthapthya, Sangeetha, Nruthya Yevam Sahithya
- Case studies

Text Books:

1. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan
4. Fritzof Capra, Tao of Physics
5. Fritzof Capra, The Wave of life

References:

1. VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Arnakulam
2. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016
3. RN Jha, Science of Consciousness Psychotherapyand Yoga Practices, Vidyanidhi Prakashan, Delhi 2016
4. P B Sharma (English translation), Shodashang Hridayan
5. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014
6. S.C. Chaterjee & D.M. Datta, An Introduction to Indian Philosophy, University of Calcutta, 1984
7. K.S. Subrahmanialyer, Vakyapadiya of Bhartrihari, (Brahma Kanda), Deccan College Pune 1965
8. Panini Shiksha, MotilalBanarasidas
9. V.N. Jha, Language, Thought and Reality, Vasudevasharan AGRAWAL Kala yevam Samskruthi, Shithya Bhavan Elahabad, 1952
10. Pramod Chandra, India Arts, Howard Univ. Press, 1983
11. Krishna Chaitanya, Arts of India, Abhinav Publications, 1987
12. R. Nagaswamy, Foundations of Indian Art, Tamil Arts Academy, 2002