VIDYA JYOTHI INSTITUTE OF TECHNOLOGY

An Autonomous Institution

Aziznagar Gate, C.B. Post, Hyderabad - 500 075, Telangana.

ACADEMIC REGULATIONS & SYLLABI (R15)

for

B.Tech (EEE) Third Year

(Applicable for the batches admitted from the Academic Year 2017-2018 onwards)

Part – A

ACADEMIC REGULATIONS (R15)

Definitions of Key Words

Academic Year: An academic year is referred as the period consisting of two consecutive semesters with 16 weeks each of instructional period followed by both the semester exams.

Course: A plan of study of a particular subject leading to an examination. All the courses need not carry the same weight. A course may be designed to comprise of lectures/ tutorials/ laboratory work/ field work/ outreach activities/ project work/ vocational training/ viva/ seminars/ assignments/ presentations etc. or a combination of some of these.

Choice Based Credit System (CBCS): Choice Based Credit System (CBCS) is the programme in which the students have a choice to choose from the prescribed courses and can learn at their own pace and the entire assessment is graded-based on a credit system.

Credit Point: It is the product of Grade Point and Number of Credits for a course.

Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/ field work per week.

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student of all the semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to 2nd decimal place.

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 O, A+, A, B+, B, C, P and F.
Programme: An Educational Programme leading to the award of a Degree.

Semester: Each semester will consist of 16-18 weeks of academic work equivalent to 90 actual teaching days.

Semester Grade Point Average (SGPA): It is a measure of performance of the work done by the student in a semester. It is the ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to 2nd decimal place.

Transcript or Grade Card or Certificate: Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

Types of Courses: The Courses in under B.Tech, program may be of three kind's viz., Core, Elective and Mandatory.

a) **Core Course:-**

There may be a Core Course in every semester, and are to be compulsorily studied by a student and is essential requirement for a given Programme.

b) **Elective Course:-**

Elective Course is a course which can be chosen by the students from a pool of subjects. In general, the elective course is,

- Supportive to the discipline of study
- Providing an expanded scope of the course subjects
- Nurturing student's proficiency/skill/Research.
- In case an elective is "Discipline centric" and is offered by the student's department itself, the elective is called **Professional elective**.
- On the other hand, if the elective is offered by the other departments or if the choice is given to the students to choose from other disciplines, the elective is called an "**Open Elective.**"

c) **Mandatory Courses (Non-Credit Courses)**

AICTE considers that the Course work of certain subjects is essential and as such for the award of a B.Tech degree a pass in these subjects is made mandatory. Therefore, such types of courses are referred as **mandatory courses**. As the AICTE also feels that only a familiarity with the subject content of these courses is essential, only a pass in each of these courses is required. Therefore, these subjects are included in the curriculum as non-Credit courses.

ACADEMIC REGULATIONS FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2017-18 onwards.

1. Courses of Study:

The following Four year Bachelor of Technology (B.Tech.) Programmes under Choice Based Credit System (CBCS) are offered with effect from the Academic Year 2017-18 onwards:

S. No.	Branch	Branch Code
I	Civil Engineering	01
II	Electrical and Electronics Engineering	02
III	Mechanical Engineering	03
IV	Electronics and Communication Engineering	04
V	Computer Science and Engineering	05
VI	Information Technology	12

2. Admission Procedure

2.1. Admissions will be done as per the norms prescribed by the Government of Telangana State.

2.2. The Government orders with regard to the admissions in vogue shall prevail.

2.3. The candidate should have passed the prescribed qualifying examination on the date of Admission.

3. Award of B. Tech. Degree

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

3.1 The candidate shall register for 192 credits and secure all the 192 credits by securing a minimum CGPA of 5.0.

3.2 The external examination in all the subjects shall be conducted at the end of each semester for all the eight semesters.

3.3 Students joining the B.Tech. Programme shall have to complete the programme within 8 years from the year of joining. Similarly, the students joining the B.Tech. Programme in the third semester directly through Lateral Entry Scheme (LES) shall have to complete the programme within 6 years from the year of joining otherwise they shall forfeit they will not be permitted to pursue their studies nor will be allowed to write the exams.

4. Course Structure:

4.1 The course shall be of four Academic year's duration, each academic year having two semesters. Each semester shall have a minimum **16** weeks of instruction, with a minimum of **90** Instructional Days per Semester.

4.2 **Credits:**

Credits shall be assigned to each Subject/ Courses in a L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods: Credits) Structure, based on the following general pattern.

Type of course		Clock hour/week			
		L	T	P	C
Theory	1)	04	01	-	04
	2)	03	01	-	03
	3)	02	01	-	02
Practical		0	0	03	02
Drawing	1)	0	04	-	02
	2)	02	02	-	03
	3)	00	06	-	03
Mini project, Comprehensive Viva Voce Seminar, Major project		-	-	-	15

5. Attendance Requirements

5.1 A student is eligible to write the Semester End examinations only if he / she acquire a minimum of 75% of attendance in aggregate of all the subjects/Courses in that Semester.

5.2 Condonation for the shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on medical grounds with a documentary evidence approved by the Academic Committee.

5.3 A stipulated fee shall be payable towards condonation of attendance shortage.

5.4 Students, whose shortage of attendance is not condoned, are not eligible to write semester end examinations of that semester. Such students are detained and their registration for the examination stands cancelled.

5.5 A student detained due to shortage of attendance in a semester may seek re-admission into that semester, as and when offered, within four weeks from the date of the commencement of class work with the academic regulations of the batch into which he/she gets admitted.

5.6 A student will be promoted to the next semester if he/she satisfies the attendance requirement of the present semester.

5.7 For all mandatory, non credit courses offered in a semester, a "Satisfactory Participation Certificate" shall be issued to the student, only after securing 75% attendance in such course. Letter Grade shall be allotted for these courses.

The courses offered in 8 semesters spread over 4 years have been classified into 8 categories under CBCS

S.No.	Subject categories	No. of Credits
1	Humanities and Social Sciences (HS) Subjects, English, Management and the courses dealing with personality development	15
2	Basic Sciences (BS) Subjects including Mathematics, Physics and Chemistry	30
3	Engineering Sciences (ES), Engg. Workshop, Drawing, Fundamentals of computer Science and courses dealing with the basics of Electrical / Electronics/ Mechanical engineering	30
4	Professional Core (PC) Subjects, Courses dealing with the concerned engineering branch	81
5	Professional Elective (PE) Subjects. The students opt electives offered by the department	12
6	Open Elective (OE) Subjects. Courses offered by the other braches representing technically important subjects from emerging areas.	9
7	Project Work, Seminar and/ or Internship in Industry or elsewhere along with mini project.	10+2+3 =15
8	Mandatory Courses (MC)	nil
Total Number of credits		**192**

B.Tech Year wise distribution of credits under CBCS

S.No.	Year	Semester	Credits	Total
1	1st Year	I	25	**48**
		II	23	
2	2nd Year	I	24	**48**
		II	24	
3	3rd Year	I	24	**48**
		II	24	
4	4th Year	I	24	**48**
		II	24	
		Total No. of Credits		**192**

6. Promotion regulations

6.1 A student shall be promoted from B.Tech., I Year to II Year only if he/she fulfills the academic requirements of securing 50% of total credits (24 credits out of 48 credits, upto I year II Semester), from all the examinations, whether or not the candidate takes the examinations.

6.2 A student shall be promoted from B.Tech., II Year to III Year only if he/she fulfills the academic requirements of securing 50% of total credits (48 out of 96 credits, up to II year II semester, from all the examinations, whether or not the candidate takes the examinations.

6.3 A student shall be promoted from B.Tech., III year to IV year only if he/she fulfills the academic requirements of securing 50% of total credits (72 out of 144 credits) up to III year II semester), from all the examinations, whether or not the candidate takes the examinations.

7.   Minimum Academic Requirements

The following minimum academic requirements are to be satisfied in addition to the requirements mentioned in item no.5.

7.1 A student shall be deemed to have satisfied the minimum academic requirements and has earned the credits allotted to each theory/practical/design/drawing subject/project and secured not less than 35% marks in Semester End Examination (SEE), and minimum 40% of marks in the sum total of the internal evaluation and end examination taken together.

7.2 The student has to pass the failed course by appearing the supplementary examination as per the requirement for the award of degree.

7.3 Students, who fail to earn 192 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 stands cancelled.

7.4 A student shall register and put up minimum Attendance and earn all 192 Credits for the award of degree.

7.5 When a student is detained due to shortage of attendance in any semester, no Grade allotments or SGPA/CGPA calculations will be done for that entire Semester in which a student got detained.

7.6 When a Student is detained due to lack of Credits in any year, he may be readmitted after fulfillment of the Academic Requirements, with the Academic Regulations of the Batch into which he gets readmitted for readmitted candidates. If there are any Professional Electives / Open Electives, the same may also be re-registered if offered. However, if those Electives are not offered in later Semesters, then alternate Electives may be chosen from the SAME set of Elective Subjects offered under that category.

7.7 After securing 192 Credits as specified for the successful completion of the entire UGP, an exemption of 6 Credits (two subjects with 3 credits each) may be permitted to drop resulting in 186 Credits for UGP performance evaluation. Accordingly, the performance of student in 186 Credits shall be taken into account for the calculation of 'the final CGPA and shall be indicated in the Grade Card. However, the student's performances in the earlier individual Semesters, with the corresponding SGPA for which already Grade Cards are given, will not be altered. Further, the optional drop out for such 6 Credits shall not be allowed for i) Laboratory courses, ii) Industrial Training/ Mini-Project, iii) Seminar, iv) Major Project v) Open electives.

7.8 A student is eligible to appear in the End Semester Examination in any Subject/ Course, but absent at it or failed (thereby failing to secure P Grade or above), may reappear for that subject/Course at the supplementary exam as and when the examinations are conducted. In such cases, his Continuous Internal Evaluation(CIE) assessed earlier for that subject/Course will be carried over, and added to the marks to be obtained in the supplementary examinations, for evaluating the performance in that subject.

7.9 A student with a final CGPA (at the end of the UGP) < 5.00 will not be eligible for the Award of the Degree.

8   Evaluation - Distribution and weightage of Marks

8.1 The performance of a student in each semester shall be evaluated Subject-wise (irrespective of Credits assigned) for a maximum of 100 marks for Theory or Seminar or Drawing/Design or Industry Oriented Mini-Project or Minor Course, etc. For Practical's a maximum of 75 Marks shall be evaluated. However the B. Tech. Project work (Major Project) will be evaluated for 200 Marks. These evaluations shall be based on 25% CIE (Continuous Internal Evaluation) and 75% SEE (Semester End Examinations) and a Letter Grade corresponding to the % marks obtained shall be given.

8.2 For theory subjects the distribution shall be 25 marks for Continuous Internal Evaluation (CIE) and 75 marks for the Semester End- Examination (SEE).

8.3 For theory subjects, during the semester there shall be 2 midterm examinations. Each midterm examination will be conducted for 20 marks and consists of Part-A (Short Answer Questions) for 6 marks and Part-B (Long Answer Questions) for 14 marks with duration of 90 Minutes. First midterm examination shall be conducted for 2.5 units of syllabus and second midterm Examination shall be conducted for remaining 2.5 units. The Average marks secured by a student in I and II Midterm examination are considered and shall be taken as the final marks secured by the student towards Continuous Internal Evaluation in the theory subject.

8.4 In case a few students are absent due to health reasons or any other unavoidable circumstances, or if the performance of some of the students is very poor, all such cases will be referred to a standing committee consisting of the Controller of examinations (Chairman), HoD of the concerned dept. and the Academic coordinator. On the recommendation of the committee, a makeup test will be conducted on payment of fee fixed by the examination branch.

8.5 In order to improve the attendance and to encourage the students who are regular to the college, 5 marks in each subject will be given to the students as per the percentage of attendance shown in the table,

Table: - Marks for attendance

S.No	Percentage of attendance	Marks to be awarded
1.	Less than 75%	nil
2.	75% to 80%	3
3.	80% to 85%	4
4.	85% and above	5

8.6   The Semester End Examination will be conducted for 75 marks which consist of two parts viz. i). Part-A for 25 marks, ii). Part –B for 50 marks. Part-A is compulsory, which consists of ten questions (numbered from 1 to 10) two from each unit carrying 2/3 marks each. Part-B consists of five questions (numbered from 11 to 15) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice (i.e., there will be two questions from each unit and the student should answer any one question).

8.7   For practical subjects there shall be a continuous evaluation during the Semester for 25 marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the concerned laboratory teacher.

8.8   The Practical End Semester Examination shall be conducted with an external examiner and the laboratory teacher for 50 marks. The external examiner shall be appointed by the Principal from the panel of examiners recommended by Chairman, Board of Studies in respective Branches.

8.9   For the subject having design and/ or drawing, (such as Engineering Graphics, Engineering Drawing, and Machine Drawing), the distribution shall be 25 marks for Internal Evaluation (5 marks for day-to-day work and 20 marks for internal tests) and 50 marks for Semester End Examination. There shall be one internal test in a semester and shall be considered for the award of marks for internal test.

8.10. There shall be an industry-oriented mini-Project, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated in IV year I Semester at the time of practical exams. The industry oriented mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external examiner, Head of the department, the supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for industry oriented mini project.

8.11. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of Head of the Department, Seminar Supervisor and a Senior Faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.

8.12. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a committee consisting of Head of the Department and two Senior Faculty members of the department and is evaluated for 100 marks. The Comprehensive Viva-Voce is intended to assess the students understanding of the subjects he studied during the B. Tech. course. There will be no External Examiner for the Comprehensive Viva-Voce.

8.13. Out of a total of 200 marks for the major project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester evaluation. The End Semester evaluation (viva-voce) shall be conducted by committee. The committee consists of an external examiner, Head of the Department, the supervisor of project and a senior faculty member of the department. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year II Semester. The internal evaluation shall be on the basis of two seminars given by each student on the topic of his project.

8.14 . The Laboratory marks and the sessional marks awarded by the faculty are subject to scrutiny by the Institution whenever/wherever necessary. In such cases, the sessional and laboratory marks awarded by the teacher will be referred to a College Academic Committee. The Committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved as per the University rules and produced before the Committees of the University as and when asked for.

8.15 Candidates shall be permitted to apply for recounting/revaluation of SEE scripts within the stipulated period with payment of prescribed fee.

9.0. Malpractice Rules

S.No.	Nature of Malpractices /Improper conduct during examinations	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion fromthe examination hall and cancellation of the performance in that subject 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 exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/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 and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects 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. If the imposter is an outsider, he 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 subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Semester end examinations.
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.	Cancellation of the performance in that subject.

6	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent/any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer – in charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work & shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Semester 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 subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If a student of the college, who is not a candidate for the particular examination or any person not connected with the examination or college indulges in any type of malpractice or improper conduct mentioned in clauses 6 to 8.	Student of the college will be expelled from the examination hall and cancellation of the performance in that subject and all other subjects. If the candidate has already appeared including practical examinations and project work shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and a police case will be registered against him/her.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that the year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during Special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the head of Institute for further action for a suitable punishment.	

All the cases pertaining to malpractices in examinations will be referred to a committee constituted by the Chief Controller of Examination and the committee will suggest action as per the guidelines mentioned above.

10. Grading Procedure:

10.1. Marks will be awarded to indicate the performance of each student in each theory subject, or Lab/Practical, or Seminar, or Project, or Mini-Project, Minor Course etc., based on the % marks obtained in CIE+SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified, and a corresponding Letter Grade shall be given.

10.2. As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed.

Letter Grade	Performance	Grade Points	% of marks Secured (Class Intervals)
O	Outstanding	10	Greater than or equal to 90%
A+	Excellent	9	80% and less than 90%
A	Very Good	8	70% and less than 80%
B+	Good	7	60% and less than 70%
B	Average	6	50% and less than 60%
C	Pass	5	40% and less than 50%
F	Fail	0	Below 40%
Ab	Absent	0	Absent

10.3. A student obtaining F Grade in any subject shall be considered 'Failed' and will be required to reappear as 'Supplementary Candidate' in the end Semester Examination (SEE), as and when offered. In such cases; his Internal Marks (CIE Marks) in those Subject(s) will remain same as those he obtained earlier.

10.4. A Letter Grade does not imply any specific % of Marks.

10.5.   In general, a student shall not be permitted to repeat any Subject/Course (s) only for the sake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he has to repeat all the Subjects/Courses pertaining to that Semester, when he is detained.

10.6. A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/ Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/ course. Credit Points (CP) = Grade Point (GP) x Credits for a Course.

10.7. The Student passes the Subject/ Course only when he gets GP $\geq$ 4 (P Grade or above).

11.   Registration/Dropping

11.1. Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the academic calendar. It is absolutely necessary for the student to register for courses in time.

11.2. The student has to register for a minimum of 20 credits and may register up to a maximum of 28 credits based on the advice of the Faculty Advisor. On an average, a student is expected to register for 24 credits.

11.3. A student at the end of II year II semester either having CGPA of $\geq$ 7.0 or having passed all previous courses in the first attempt with a minimum SGPA $\geq$ 5.0 is allowed to register for an additional course/ credits from the offered open electives.

11.4. A series of open Electives will be offered to the students of III year I & II sems. and IV year I sem., which can be registered by the students as and when the notifications are issued at the end of II year II sem. and III year II sem. Prior permission for registration of open Electives as an additional course is compulsory.

11.5. A student would be allowed to register for an additional course only if he/she satisfies the prerequisites.

11.6. Departments will notify at the time of registration about the minimum number of students to be enrolled for a particular open elective to be offered.

11.7. Any student may be barred from registering for any course for specific reasons like disciplinary reasons or any other activities carried out by a student, which detrimental to the discipline of the college.

11.8. Dropping of Courses: Within four weeks after the commencement of the semester, the student may, in consultation with his / her faculty advisor, drop one or more courses without prejudice to the minimum number of credits. The dropped courses are not recorded in the Grade Card.

11.9. After Dropping, minimum credits registered shall be 20.

12. Earning of Credits

A student shall be considered to have completed a Course successfully and earned the credits if he/she secures an acceptable letter grade in the range 'O' to 'P'. Letter grade 'F' in any Course implies failure of the student in that Course and no credits earned.

13. Passing Standards:

13.1. A student shall be declared successful or 'passed' in a Semester, only when he gets a SGPA $\geq$ 5.00 (at the end of that particular Semester); and a student shall be declared successful or 'passed' in the entire UGP, only when he/she gets a CGPA $\geq$ 5.00; subject to the condition that he secures a GP $\geq$ 4 (P Grade or above) in every registered Subject/ Course in each Semester (during the entire UGP) for the Degree Award, as required.

13.2. (i) In spite of securing P Grade or above in some (or all) Subjects/ Courses in any Semester, if a Student receives a SGPA < 5.00 and/ or CGPA < 5.00 at the end of such a Semester, then he 'may be allowed' (on the 'specific recommendations' of the Head of the Department and subsequent approval from the Principal) to be promoted to the next year in the course.

(ii) If a student gets **P** grade or an SGPA is less than 5, is eligible to re appear for one or more of the same Subject(s)/ course(s) in which he has secured P Grade(s) in that Semester, at the Supplementary Examinations to be held in the next subsequent Semester(s). In such cases, his Internal Marks (CIE Marks) in those Subject(s) will remain same as those obtained earlier. In these considerations, the newly secured Letter Grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

13.3. A Student shall be declared successful or 'passed' in any Non-Credit Subject/ Course, if he secures a 40% marks or **P** grade in the end sem exam conducted by the college along with the other examinations.

13.4. After the completion of each Semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the registered students of that semester, indicating the Letter Grades and Credits earned. It will show the details of the courses registered (Course Code, Title, No. of Credits, Grade Earned etc.), Credits earned, SGPA, and CGPA.

14. Eligibility for the award of B.Tech. Degree

A student shall be eligible for award of the B.Tech degree if he/she fulfils all the following Conditions:

14.1. The students should successfully complete all the components prescribed in the Programme of study to which he/ she is admitted.

14.2. The student should also obtain CGPA greater than or equal to 5.0.

14.3. Not having any pending disciplinary action.

15. Evaluating of Grade Point Averages:

15.1. SGPA and CGPA the *credit index* can be used further for calculating the Semester Grade Point Average *(SGPA)* and the Cumulative Grade Point Average *(CGPA),* both of which being important performance indices of the student. While *SGPA* is equal to the *credit index* for a semester divided by the total number of *credits* registered by the student in that semester, *CGPA* gives the sum total of *credit indices* of all the previous semesters divided by the total number of *credits* registered in all these semesters. Thus, The Grade Point Average (GPA) will be calculated according to the formula:

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

where Ci = number of credits for the course i, Gi = grade points obtained by the student in the course.

15.2. Semester Grade Point Average (SGPA) is awarded to candidates considering all the courses of the semester. Zero grade points are also included in this computation. SGPA is rounded off to TWO Decimal Places.

SGPA will be computed as follows;

$$\frac{\sum [(Course\ credits) \times (Grade\ points)]\ (for\ all\ Courses\ passed\ in\ that\ semester)}{\sum [(Course\ credits)]\ (for\ all\ courses\ registered\ in\ that\ semester)}$$

15.3. To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time. CGPA is rounded off to TWO Decimal Places.

CGPA will be computed as follows:

$$\frac{\sum [(Course\ credits) \times (Grade\ points)]\ (for\ all\ Courses\ passed\ up\ to\ that\ semester)}{\sum [(Course\ credits)]\ (for\ all\ Courses\ registered\ until\ that\ semester)}$$

CGPA is thus computed from the I Year First Semester onwards, at the end of each Semester, as per the above formula. However, the SGPA of I year I Semester itself may be taken as the CGPA, as there are no cumulative effects.

15.4. Illustrative Example:

An illustrative example given in below Table below indicates the use of the above two equations in calculating SGPA and CGPA, both of which facilitate the declaration of academic performance of a student, at the end of a semester and at the end of successive semesters respectively . Both of them shall be normally calculated up to the second decimal position, so that the CGPA, in particular, can be made use of in rank ordering the student's performance in a class. If two students get the same CGPA, the tie should be resolved by considering the number of times a student has obtained higher SGPA; But, if it is not resolved even at this stage, the number of times a student has obtained higher grades like O, A, B etc shall be taken into account in rank ordering of the students in a class.

Year and Semester	Course No.	Credits	Grade	Grade Points	Credit Points
I Year I sem	XX101	5	A	8	40
I Year I sem	XX102	4	F	0	00
I Year I sem	XX103	3	A+	9	27
I Year I sem	XX104	4	F	0	00
I Year I sem	XX105	5	C	5	25
I Year I sem	XX106	5	P	4	20
Total		26(18*)			112
SGPA = 112/26 = 4.31				CGPA = 4.31	
I Year II Sem	XX107	5	B+	7	35
I Year II Sem	XX108	4	A	8	32
I Year II Sem	XX109	3	C	5	15
I Year II Sem	XX110	5	P	4	20
I Year II Sem	XX111	4	A+	9	36
I Year II Sem	XX112	2	F	0	00
I Year II Sem	Xx113	2	A	8	16
Total		25(23*)			154
SGPA = 154/25 = 6.16			CGPA = 266/51 = 5.22		

*Total No. of credits excluding those with 'F'; this is particularly important to keep track of the number of credits earned by a student up to any semester.

16. Award of Class

16.1. After a student has satisfied the requirements prescribed for the completion of the program and is Eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

CGPA	Class Awarded	
≥8.00	First Class with Distinction	From the CGPA secured from 192 credits
≥6.50 - <8.00	First Class	
≥5.50 - <6.50	Second Class	
≥5.00 - <5.50	Pass Class	

16.2. The marks obtained in Internal Evaluation (IE) and Semester End Examination (SEE) will be shown in the memorandum of marks.

16.3. For the purpose of awarding first Class with Distinction (CGPA $\geq$ 8.0), the student must obtain the minimum required CGPA within 4 academic years or within 3 academic years in case of Lateral Entry candidates by clearing all the courses.

16.4. Candidates detained/ prevented from writing the semester end examinations due to any reason in any semester are not eligible for the award of First Class with Distinction. Such candidate's even if the CGPA $\geq$ 8.0 shall be placed in first class.

16.5. For the purpose of awarding First, Second and Pass Class, CGPA obtained in the examinations appeared within the maximum period allowed for the completion of course shall be considered as per the regulations.

16.6. A student with final CGPA (at the end of the UGP) < 5.00 will not be eligible for the award of the Degree.

16.7. The CGPA can be converted to equivalent percentage of marks by using the equation., % of Marks = (CGPA - 0.5) X 10.

17. Consolidated Grade Card

A consolidated grade card containing credits & grades obtained by the candidates will be issued after completion of the four years B. Tech Programme.

18. Withholding of Results

If a student is having any indiscipline related issues pending, the result of the student will be withheld and will not be allowed to move into the next semester. His/ her degree will be withheld in such cases and the matter will be referred to the academic council for final decision.

19. Transitory Regulations

19.1. Discontinued, detained for attendance, detained for want of credits, or failed students are eligible for readmission as and when the course is offered during the subsequent academic year as per the college admission procedures.

19.2. Students on transfer from a non- autonomous or from an autonomous college shall complete all the courses of the concerned programme not covered in the earlier organization. However, he/she should take the remaining courses in the programme along with the other students.

19.3. There shall be no branch transfers after the cutoff date of admissions made in the B.Tech. I year.

20. Transcripts

After successful completion of the total programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee.

21. Supplementary Examinations

In addition to the Regular end semester examinations, Supplementary Examinations for the previous semesters will be conducted along with end sem. Examinations. A student can appear for any number of supplementary examinations till he/she clears all courses which he/she could not clear in the first attempt. However the maximum stipulated period cannot be relaxed under any circumstances.

22. Graduation Ceremony

23.1. The College shall have its own annual Graduation Ceremony for the award of degree to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute.

23.2. The College shall institute Prizes and Awards to meritorious students, for being given away   annually at the Graduation Ceremony.

24. Termination from the Program

The admission of a student to the program may be terminated and the student may be asked to leave the Institute in the following circumstances:

24.1. The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.

24.2. The student fails to satisfy the norms of discipline specified by the institute from time to time.

25. Non-Credit Courses (Mandatory Courses)

25.1. Requirement of 75% attendance as per the college regulations is compulsory of completing the mandatory courses.

25.2. Specified number of Mandatory Courses among the designated ones is compulsory requirement for all the students for the award of B.Tech Degree.

25.3. Although these courses do not carry any credits, performance in these subjects is evaluated following the procedure adopted for other subjects with the same marks. However, their performance will be indicated in the student's memo of marks as Satisfactory/ Unsatisfactory.

25.4. Although mandatory courses are Non-Credit Course, all the students should secure a   minimum of 40% marks in the end sem. exam conducted by the college along with the other examinations for the award of B.Tech., degree.

26. Amendments

The Academic regulations here under 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 candidates (including those already undergoing the program) as may be decided by the Academic Council.

27.   General

27.1. Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

27.2. The academic regulation should be read as a whole for the purpose of an interpretation.

27.3. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.

27.4. The college may change the academic regulations, course structure & syllabi at any time.

ACADEMIC REGULATIONS FOR B. TECH. (LATERAL ENTRY STUDENTS)

Applicable for the students admitted into II year B. Tech. (Lateral Entry Scheme) from the Academic Year 2016-17 and onwards.

1. **Eligibility for award of B. Tech. Degree (LES)**
   1.1 The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.
   1.2 The candidate shall register for 144 credits and secure 144 credits by securing a minimum CGPA of 5.0 from the exams. of B.Tech. II to IV year for the award of B.Tech. Degree.
   1.3 The students, who fail to fulfill the requirement for the award of the degree in six Academic years from the year of admission, shall forfeit their seats. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech.(LES).

2. **Promotion Rule**
   2.1. A student shall be promoted from B.Tech., II Year to III Year if he/she gets at least a minimum of 24 out of 48 credits, up to II year II semester, from all the examinations, whether or not the candidate takes the examinations.
   2.2. A student shall be promoted from III year to IV year if he/she gets a minimum of 48 out of 96 credits, up to III year II semester, from all the examinations, whether or not the candidate takes the examinations.
   2.3. A student shall register and put up minimum attendance in all 144 credits and earn all 144 credits to be eligible for the award of B.Tech degree.
   2.4. A student, who fails to earn 144 credits as indicated in the course structure within six academic years, shall forfeit his/her admission in B.Tech. Course.

3. **Award of Class**

   A student, who satisfies all the requirements prescribed for the completion of the B.Tech. program, is eligible for the award of the said degree, in any one of the following four classes:

CGPA	Class Awarded	
≥8.00	First Class with Distinction	From the CGPA secured from 144 credits
≥6.50 - <8.00	First Class	
≥5.50 - <6.50	Second Class	
≥5.00 - <5.50	Pass Class	

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

5. The malpractice rules and procedures for evaluating the SGPA and CGPA mentioned under points 9 - 27, are also applicable to the later entry students.

■■■

Part – B

Course Structure & Syllabi
of

B.Tech., III Year I Semester

Academic Calendar of II/III B.Tech (I & II Sem.) for the Academic Year, 2017-18

II/III YEAR I SEMESTER		Commencement of Class Work 12-06-2017	
	From	**To**	**Duration**
Registrations	12.06.2017	17.06.2017	1 Week
I Spell of Instruction	19.06.2017	14.08.2017	8 Weeks
I Mid Examinations	16.08.2017	19.08.2017	4 Days
II Spell of Instruction	21.08.2017	23.09.2017	5 Weeks
Dussehra Holidays	24.09.2017	02.10.2017	10 Days
II Spell of Instruction Continuation	03.10.2017	21.10.2017	3 Weeks
II Mid Examinations	23.10.2017	26.10.2017	4 Days
Preparation & Practical Examinations	27.10.2017	04.11.2017	10 Days
III Mid Examinations (Lateral Entry/ Re-Admitted/Betterment)	06.11.2017	09.11.2017	4 Days
End Semester Examinations	13.11.2017	25.11.2017	2 Weeks
Supply Exams	27.11.2017	09.12.2017	2 Weeks
II/III YEAR II SEMESTER		**Commencement of Class Work 11-12-2017**	
I Spell of Instruction	11.12.2017	06.02.2018	8 Weeks 3 Days
I Mid Examinations	07.02.2018	10.02.2018	4 Days
II Spell of Instruction	12.02.2018	09.04.2018	8 Weeks
II Mid Examinations	10.04.2018	13.04.2018	4 Days
Preparation and Practical Examinations	16.04.2018	21.04.2018	1 Week
End Semester Examinations	23.04.2018	05.05.2018	2 Weeks
Supplementary Examinations	07.05.2018	19.05.2018	2 Weeks
Summer Vacation	14.05.2018	09.6.2018	3 Weeks

B.TECH EEE III YEAR COURSE STRUCTURE

S. No.	Code	Subject	L	T/P	Credits
		III Year I Semester			
1	A15017	Managerial Economics and Financial Accounts	3	1	3
2	A15212	Power Electronics	3	1	3
3	A15213	Power Systems-II	3	1	3
4	A15214	Electrical Machines-III	3	1	3
5	**Open Elective-1**	**A15218 -** Non Conventional Energy Sources **A15219 -** Energy Management	3	1	3
6	**Professional Electives**	**A15215** - High Voltage Engineering **A15216** - Advanced Control Systems **A15217**- Linear Systems Analysis	3	1	3
7	A15285	Electrical Machines Lab-II	0	2	2
8	A15286	Control Systems & Simulation Lab	0	2	2
9	MC-III	Personality Development & Behavioral Skills	2	0	2
		Total Credits	**20**	**10**	**24**
		III Year II Semester			
1	A16421	IC Applications	3	1	3
2	A16221	Electrical Measurements & Measuring Instruments	3	1	3
3	A16222	Power Semiconductor Drives	3	1	3
4	A16223	Switchgear & Protection	3	1	3
5	**Open Elective-2**	**A16227 -** Energy Auditing & Conservation **A16228 -** Principles of Electric Power Utilization	3	1	3
6	**Professional Electives**	**A16224** - Renewable Energy Sources **A16225** - Reliability Engineering and Application to Power Systems **A16226** - Digital Control Systems	3	1	3
7	A16287	Power Electronics and Simulation Lab	0	2	2
8	A16090	Advanced Communication Skills Lab	0	2	2
9	MC-IV	Quantitative Methods & Logical Reasoning	2	0	2
		Total Credits	**20**	**10**	**24**

III Year B.Tech. EEE - I Sem

L T/P/D C
3 1/-/- 3

POWER ELECTRONICS

Objective:
With the advent of semiconductor devices, revolution is taking place in the power transmission distribution and utilization. This course introduces the basic concepts of power semiconductor devices, converters and choppers and their analysis.

UNIT - I
Power Semi-Conductor Devices:
Family of Thyristor – Silicon Controlled Rectifiers (SCR's) –Basic theory of operation of SCR – Static characteristics – Turn on and turn off methods- Dynamic characteristics of SCR - Turn on and Turn off times -Salient points. Two transistor analogy- BJT – Power MOSFET – Power IGBT and their characteristics and other thyristors .
Firing & Commutation Circuits:
SCR - UJT firing circuit ⎯⎯ Series and parallel connections of SCR's – Snubber circuit details – Specifications and Ratings of SCR's, BJT, IGBT - Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT - II
AC-DC Converters 1-Phase Controlled Rectifiers:
Phase control technique – Single phase Line commutated converters – Midpoint and Bridge connections – Half controlled converters with Resistive, RL loads and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Freewheeling Diode –Numerical problems. Fully controlled converters, Midpoint and Bridge connections with Resistive, RL loads and RLE load– Derivation of average load voltage and current – Line commutated inverters - Active and Reactive power inputs to the converters without and with Freewheeling Diode, Effect of source inductance – Derivation of load voltage and current – Numerical problems- Dual converters (single phase).
3-Phase Controlled Rectifiers:
Three phase converters – Three pulse and six pulse converters – Midpoint and bridge connections average load voltage With R and RL loads – Effect of Source inductance– Dual converters (three phase) - Waveforms –Numerical Problems.

UNIT - III
AC-AC Converters (AC Voltage Controllers) & Frequency Changers (Cyclo-Converters): AC voltage controllers – Single phase two SCR's in anti parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor wave forms – Firing circuits -Numerical problems -Cyclo converters – Single phase midpoint cyclo converters with Resistive and inductive load (Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms.

UNIT - IV
DC-DC Converters (Choppers):
Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression, Jones chopper, AC Chopper, Problems.

UNIT - V
DC-AC Converters (Inverters):
Inverters – Single phase inverter – Basic series inverter, parallel inverter - operation and waveforms - Three phase inverters (180, 120 degrees conduction modes of operation) - Voltage control techniques for inverters, Pulse width modulation techniques - Numerical problems.

TEXT BOOKS:
1. Power Electronics, Dr. P. S. Bimbhra, Khanna Publishers
2. Power Electronics Devices, Circuits and Industrial applications, V. R. Moorthi, Oxford University Press.

REFERENCE BOOKS:
1. Power Electronics; Circuits, Devices and Applications, M. H. Rashid, Prentice Hall of India.
2. Power Electronics, M. D. Singh & K. B. Kanchandhani, Tata Mc Graw - Hill Publishing Company.
3. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
4. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
5. Power Electronics, M. S. Jamil Asghar, PHI Private Limited.
6. Power Electronics, P. C. Sen, Tata Mc Graw-Hill Publishing.
7. Power Electronics, K. Hari Babu, Scitech Publications India Pvt. Ltd.
8. Principles of Power Electronics, John G. Kassakian, martin F. Schlect, Geroge C. Verghese, Pearson Education.
9. Thyristorised Power Controllers, G. K. Dubey, S. R. Doradra, A. joshi and R. M. K. Sinha, New Age International (P) Limited Publishers.

Outcomes:
After going through this course the student gets a thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power semiconductor devices, focused analysis of thyristor device, nature of the R, RL and RLE loads for different power inputs, AC-to-DC power conversion through 1-phase & 3-phase controlled rectifiers, DC-to-DC power conversion through step-up and step-down choppers, AC-to-AC power conversion through AC voltage controllers, Frequency conversion through cyclo-converters, DC-to-AC power conversion through 1-phase & 3-phase inverters, different types of PWM (pulse-width modulation) techniques, steady-state and transient state analysis of all the power converters, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

III Year B.Tech. EEE I-Sem   **L T P C**
                                                                   3 1 0 3

POWER SYSTEMS-II - A15213

Objective:
This course is an extension of Power systems-I course. It deals with basic theory of transmission lines modeling and their performance analysis. Also this course gives emphasis on mechanical design of transmission lines, cables and insulators.

UNIT – I
Transmission Line Parameters:
Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

UNIT – II
Performance of Short and Medium Length Transmission Lines:
Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves -Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

UNIT-III
Power System Transients & Factors Governing The Performance of Transmission Lines:
Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems). Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).
Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

UNIT – IV
Overhead Line Insulators & Sag and Tension Calculations:
Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

UNIT – V
Underground Cables:
Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading, HV Cables.

TEXT BOOKS:
1. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers.
2. Power System Engineering, I.J.Nagarath and D.P.Kothari, TMG.

REFERENCE BOOKS:
1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. A Text Book of Power System Engineering, R. K. Rajput, Laxmi Publications (P) Limited.
3. Electrical Power Generation, Transmission and Distribution S. N. Singh, PHI.
4. Principles of Power Systems, V. K. Mehta and Rohit Mehta S. Chand Company Pvt. Ltd.
5. Electrical Power Systems, PSR, Murthy, BS Publications.
6. Power System Analysis and Design, Dr. B. R. Gupta, S. Chand & Company Limited.
7. Power System Analysis, Operation and control, Abhijit Chakrpabarti, Sunitha Halder, PHI, 3/e, 2010
8. Electrical Power Transmission system engineering Analysis and design by Turan Gonen, CRC Press (Taylor & Francis Group) Special Indian Edition, 2/e.

Outcome:
After going through this course the student gets a thorough knowledge on calculation of transmission line parameters, performance analysis of short medium long length transmission lines and factors affecting the performance analysis of transmission lines, transients in power systems, operation of different types of overhead line insulators, sag and tension calculation of transmission lines and detailed analysis of underground cables for power transmission and distribution, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

ELECTRICAL MACHINES-III

Objective:
This subject is an extension of previous machines courses. It deals with the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities. Also concerns about the different types of single phase motors which are having significant applications in house hold appliances and control systems.

UNIT – I
Synchronous Machine & Characteristics
Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation. Harmonics in generated EMF – suppression of harmonics –Excitation of Synchronous generators in thermal plants and Hydro plants-armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination – phasor diagram – load characteristics.

UNIT – II
Regulation of Synchronous Generator
Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of Xd and Xq (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT – III
Parallel Operation of Synchronous Generator
Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactances.

UNIT – IV
Synchronous Motors
Synchronous Motors: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed.

Power Circles: Excitation and power circles – hunting and its suppression – Methods of starting – synchronous Machines & induction motor.

UNIT – V
SPECIAL MACHINES
Principles of operation of Reluctance Motors, Stepper Motors, Universal Motors, Shaded Pole Motors, A.C. Series Motors, Permanent magnet Brushless DC Motors.

TEXT BOOKS:
1. Electrical Machines – by P.S. Bimbra, Khanna Publishers.
2. Electric Machines, I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill Publishers.
3. Performance and Design of AC Machines, MG. Say, BPB Publishers.

REFERENCE BOOKS:
1. Electro-machanics - III (Synchronous and single phase machines), S. Kamakashiah, Right Publishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. Chand Publishing.
3. Theory of Alternating Current Machinery, Langsdorf, Tata McGraw-Hill Companies.
4. Electric machinery, A.E. Fitzerald, C. Kingsley and S. Umans, Mc Graw Hill Companies.
5. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
6. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age International Publishers.
7. Electrical Machines, M. V. Deshpande, PHI Learning Private Limited.
8. Electrical Machines, R. K. Srivastava, Cengage Learning.
9. Brushless Permanent magnet and Reluctace Motor Drives, J.E. Miller, Calrendon Press Oxford, 1989.
10. Stepping Motors- A Guide to Motor Theory and practice,by P.P. Aearnley, Peter perengrinus, London,1982

Outcome:
After going through this course the student gets a thorough knowledge on, construction operation characteristics regulation parallel-operation power circles starting & speed control methods of synchronous machines and construction operation characteristics of single-phase motors and special machines, with which he/she can able to apply the above conceptual things to real-world electrical and problems and applications.

HIGH VOLTAGE ENGINEERING
(Professional Elective-I)

Objective:
This subject deals with the detailed analysis of breakdown occurring in gaseous, liquids and solid Dielectrics. Information about generation and measurement of High voltage and current. In addition High voltage testing methods are also discussed.

UNIT-I
Introduction to High Voltage Engineering
Electric Field Stresses, Gas/Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Surge voltages, their distribution and control, Gases as insulating media, collision process, ionization process.

UNIT-II
Break Down in Dielectric Materials
Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solids dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT-III
Generation & Measurement of High Voltages & Currents
Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators. Measurement of High Direct Current voltages, measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse.

UNIT-IV
Over Voltages & Insulation Co-Ordination & DC measurements:
Natural causes for over voltages- Lighting phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems, Measurements of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

UNIT-V
Testing & Applications Electrical Apparatus:
Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, testing of Transformers, Testing of Surge Arresters, and Radio Interference measurements, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

TEXT BOOKS:

1. High Voltage Engineering, M.S. Naidu and V. Kamaraju, TMH Publications.
2. High Voltage Engineering, C.L. Wadhwa, New Age Internationals (P) Limited.

REFERENCE BOOKS:

1. High Voltage Engineering: Fundamentals, E.Kuffel, W.S. Zaengl, J.Kuffel by Elsevier.
2. High Voltage Insulation Engineering, Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited.
3. High Voltage Engineering, Theory and practice, Mazen Abdel Salam, Hussein Anis, Ahdan, Ahdan El- Morshedy, Roshdy Radwan, Marcel Dekker.

Outcome:
After going through this course the student gets a thorough knowledge on, basics of high voltage engineering , break-down phenomenon in different types of dielectrics, generation and measurement of high voltages and currents, the phenomenon of over voltages, concept of insulation coordination, testing of various materials and electrical apparatus used in high voltage engineering, with which he/she can able to apply the above conceptual things to real- world electrical and electronics problems and applications.

III EEE B.TECH I-SEM

L   T/P/D   C
3   1/-   3

ADVANCED CONTROL SYSTEMS
(Professional Elective-I)

Objective:
This subject deals with state space, describing function, phase plane and stability analysis including controllability and observability.

UNIT - I
State Space Analysis of Continuous time Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization-Solving the Time invariant state Equations- State Transition Matrix and it's Properties, Canonical Forms –Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

UNIT - II
Controllability and Observability: Tests for controllability and observability for continuous time systems, Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement, Full order observer and reduced order observer.

UNIT - III
Describing Function Analysis: Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems.

UNIT - IV
Phase-Plane Analysis: Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

UNIT - V
Stability Analysis: Stability in the sense of Lyapunov, Lyapunov's stability and Lypunov's instability theorems. Direct method of Lypanov, generation of Lyapunov functions-Variable gradient method, Krasooviski's method.

TEXT BOOKS:
1. Advanced Control Systems, B. N. Sarkar, PHI Learning Private Limited.
2. Modern Control System Theory, M. Gopal, New Age International Publishers.

REFERENCE BOOKS:
1. Control systems, A.Ananad Kumar, PHI.
2. Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
3. Modern Control Engineering, Yaduvir Singh, S. Janardhanan, Cengage Learning.
4. Modern Control Engineering, K. Ogata, Prentice Hall of India, 3d edition.
5 Modern Control Engineering, D. Roy Choudhury, PHI Learning.
5. Modern Control Systems An introduction, S.M.Tripathi, Jones & Bartlett Publishers.

Outcomes:
After going through this course the student gets a thorough knowledge on, basics of advanced control systems, state space analysis of continuous time systems and concept of controllability and observability, non-linear systems, describing functions, phase-plane analysis, stability analysis through Lypanov stability, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

III Year B.Tech. EEE –I Sem   **L   T   P   C**
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LINEAR SYSTEMS ANALYSIS
(Professional Elective-I)

Objectives:
This subject gives basic knowledge of signals which is required by all the engineers.
This course focuses on:

- To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

UNIT - I
Signal Analysis: Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT – II
Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Typers of Sampling - Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT – III
Signal Transmission Through Linear Systems: Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

UNIT – IV
Convolution and Correlation of Signals: Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

UNIT – V

Z–Transforms: Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

TEXT BOOKS:
1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.

REFERENCE BOOKS:
1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed.
2. Signals and Signals – Iyer and K. Satya Prasad, Cengage Learning
3. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
4. Introduction to Signal and System Analysis – K.Gopalan 2009, Cengage Learning.
5. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
6. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.

Outcomes:

Upon completing this course the student will be able to:

- Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
- Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
- Understands the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.
- Can design a system for sampling a signal.
- For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
- Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform.

ELECTRICAL MACHINES LAB – II

Any Ten of the following experiments are required to be conducted.
1. O.C & S.C tests on single phase transformer.
2. Sumper's test on a pair of single phase transformer.
3. Brake test on three phase induction motor.
4. No-load & Blocked rotor tests on three phase induction motor.
5. Regulation of a three – phase alternate by synchronous impedance m.m.f methods.
6. V and inverted V curves of a three – phase synchronous motor.
7. Equivalent circuit of a single phase induction motor.
8. Determination of Xd and Xq of a salient pole synchronous machine.

In addition to the above eight experiments alteast any two of the following experiments are required to be conducted from the following list.
9. Regulation of three phase alternator by Z.P.F. and A.S.A methods
10. Scott connection of transformer and Parallel operation of single phase transformer.
11. Separation of core losses of a single phase transformer.
12. Load characteristics of three phase Induction Generator.

Reference books:
1. Electric machinery- P.S. Bimbra, Khanna Publishers, 7[th]edition, 2010.
2. Theory and Performance of Electrical Machines- JB. Gupta, S.K. Kataria and ISons, 2009.
3. Electro mechanics (transformers and induction motors) – S.Kamakshiah , Hitech publishers 2009.

CONTROL SYSTEMS AND SIMULATION LAB

Any Ten of the following experiments are to be conducted

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Transfer function of DC Shunt generator
7. Characteristics of magnetic amplifiers
8. Characteristics of AC servo motor
9. PSPICE Simulation of Op-Amp based Integrator and Differentiator circuits.
10. Linear system analysis (Time domain analysis, Error analysis).
11. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system.
12. State space model for classical transfer function– Verification.

REFERENCE BOOKS

1. MATLAB and Tool books user's manual and- Math Works, USA.
2. PSPICE A/D Users Manual-Microsim,USA
3. PSPICE reference Guide –Microsim, USA.
4. Simulation of Electrical and Electronics Circuits Using P-Spice- By MH. Rashid, M/s PHI publications.

Part – C

Syllabi of

B.Tech., III Year II Semester

IC APPLICATIONS

UNIT - I:
Integrated Circuits: Classification, chip size and circuit complexity, Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate-Analysis & characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tri-state outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT - II:
OP-AMP and Applications: Basic information of OP-AMP, ideal and practical OP-AMP, internal circuits, OP-AMP characteristics, DC and AC characteristics, 741 OP-AMP and its features, modes of operation-inverting, non-inverting, differential.
Basic application of OP-AMP, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample & hold circuits, multipliers and dividers, Differentiators and Intergrators, Comparators, introduction to voltage regulators.

UNIT - III:
Active Filters & Oscillators: Introduction, 1st order LPF, HPF filters, Band pass, Band reject and all pass filters. Oscillator types and principle of operation - RC, Wien and quadrature type, waveform generators - triangular, sawtooth, square wave and VCO.

UNIT - IV:
Timers & Phase Locked Loops: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT - V:
D-A and A-D Converters: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and slope ADC. DAC and ADC specifications.

TEXT BOOKS:
　　1.　Linear Integrated Circuits, D. Roy Chowdhury, New Age International (p) Ltd.
　　2.　Op-Amps & Linear ICs, Ramakanth A. Gayakwad, PHI

REFERENCES BOOKS:
　　1.　Operational Amplifiers & Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.
　　2.　Operational Amplifiers & Linear Intergrated Circuits: Theory & Applications, Denton J. Daibey, TMH.
　　3.　Design with Operational Amplifiers & Analog Integrated Circuits, Sergio Franco, McGraw Hill.
　　4.　Digital Fundamentals - Floyd and Jain, Pearson Education.

III Year B.Tech. EEE II-Sem   **L T   P C**
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ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

Objectives:
Electrical Measurements & Measuring Instruments course introduces the basic principles of all measuring instruments. It also deals with the measurement of RLC parameters, voltage, current, power factor, power, energy, frequency and magnetic measurements. It also introduces transducers and oscilloscopes- CRO.

UNIT-I
Introduction to Measuring Instruments:
Classification-deflection, control and damping torques- Ammeters and Voltmeters-PMMC, moving iron type instruments- expression for the deflecting torque and control torque- Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters- electrometer type and attracted disc type, Extension of range of Electrostatic Voltmeters.

UNIT-II
Potentiometers & Instrument Transformers
Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate types, standardization- applications. CT and PT- Ratio and Phase angle errors.

UNIT-III
Measurement of Power & Energy:
Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of reactive power.

Single phase Induction type energy meter–driving and braking torques-errors and compensations – testing by phantom loading using RSS meter. Three phase energy meter- Maximum demand meters.

UNIT – IV
D.C & A.C Bridges:
Method of measuring low, medium, high resistances – sensitivity of wheat- stone Bridge – carey foster's Bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistacne – loss of charge method. Measurement of Inductance – Factor – Maxwell's Bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle – Desauty Bridge. Wien's Bridge – Schering Bridge.

UNIT – V
Transducers & oscilloscopes:
Definition of transducers, classification of transducers, Advantages of Electrical transducers, characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers, LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, photo diodes.
CRO: Cathode ray oscilloscope – cathode ray tube – time base generator- horizontal and vertical amplifiers, CRO Probes, Applications of CRO, Measurement of Phase and Frequency-Lissajous patterns.

TEXT BOOKS:
1. Electrical & electronic measurement & Instruments, A.K.Swehney, Dhanpat Rai & Co . Publications.
2. Electrical measuring instruments and measurements, S.C. Bhargava, BS Publications.

REFERENCE BOOKS:
1. Electrical and electronic measurements and instrumentation, R.K.Rajput, S.Chand & company Ltd.
2. Electrical and electronic measurements, G.K.Banerjee, PHI Learning Pvt.Ltd.

Outcome:
Understanding - basic construction of all the Analog measuring instruments, Extension of range of all measuring instruments. Application of these concepts in measuring electrical quantities like voltage, current, power and energy.Analysis & Design of instrument transformers. Explain the principles - D.C and A.C potentiometer, methods of standardization & solution to problems. Explain DC and AC Bridges & apply basic bridge principles to measure the electrical parameters R,L,C,f. Basic principle, classification, advantages & applications of transducers, applications of CRO.

III Year B.Tech. EEE II-Sem   **L   T   P   C**
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POWER SEMICONDUCTOR DRIVES

Objective:
This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase Converters and choppers are given in detail. The control of AC motor drives with variable frequency conveners and variable voltage are presented.

UNIT –I
Control of DC Motors through Phase Controlled Rectifiers:
Introduction to Thyristor controlled Drives, Single Phase semi and fully controlled converters connected to DC separately excited and DC series motors -continuous current operation - output voltage and current waveforms- Speed and Torque expressions - Speed - Torque Characteristics- Problems on Converter fed DC motors. Three phase semi and fully controlled converters Connected to DC separately excited and DC series motors - output voltage and current waveforms - Speed and Torque expressions - Speed - Torque characteristics - Problems.

UNIT – II
Four Quadrant Operations of DC Drives through Dual Converters:
Introduction to Four quadrant operation - Motoring operations, Electric Braking - Plugging, Dynamic and Regenerative Braking operations, Four quadrant operation of D C motors by dual converters -Closed loop operation of DC motor (Block Diagram Only).

UNIT III
Control of DC Motors by Choppers (1-. 2-, 4- Quadrant Operations):
Single quadrant, Two -quadrant and four quadrant chopper fed separately excited and series exacted motors - Continuous current operation - Output voltage and current wave forms - Speed torque expressions - speed torque characteristics - Problems on Chopper fed DC Motors - Closed Loop operation (Block Diagram Only).

UNIT –IV
Control of Induction Motors:
Variable voltage characteristics: Control of Induction Motor by AC Voltage Controllers - Waveforms - speed torque characteristics.
Variable frequency characteristics:
Variable frequency control of induction motor by Voltage source and current source Inverter and cyclo-converters- PWM control - Comparison of VSI and CSI operations - Speed torque Characteristics - numerical problems on induction motor drives - Closed loop operation of induction motor delves (Block Diagram Only).

Static rotor resistance control:
Slip power recovery - Static Scherbius drive – Static Kramer Drive - their performance and speed torque characteristics - advantages applications - problems.

UNIT – V
Control of Synchronous Motors: Separate control & self control of synchronous motors - Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor - Operation - Waveforms - speed torque characteristics - Applications -Advantages and Numerical Problems Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cyclo converter, PWM, VFI, CSI.

TEXT BOOKS:
1. Power Semiconductor Drives, PV Rao, BS Publications.
2. Fundamentals of Electric Drives, G K Dubey Narosa Publications

REFERENCE BOOKS:
1. Power Semiconductor Drives, S. B. Dewan, G R. Slemon , A. Straughen. Wiley Pvt Ltd.
2. Electric Drives N K. De, P. K. Sen, PHI Learning Private Ltd.
3. Thyristor Control of Electric drives, Vedam Subramanyam Tata McGraw Hill Pubications
4. Electrical machines and Drive Systems, John Hindmarsh, Alasdair Renfrew, Newnes.
5. Electric Motors and Drives, Fundamentals, Types and Applications Austin Hughes, Newnes.
6. Power Electronics and Variable Frequency Drives Technology and Applications, Bimal K. Bose, Wiley India Pvt, Ltd.
7. A First course on Electrical Drives, S K Pillai, New Age International (P) Ltd.
8. Modern Power Electronics and AC Drives, B.K.Bose, PHI.
9. Power Electronic Circuits, Devices and applications, M,H.Rashid, PHI

Outcome:
After going through this course the student gets a Thorough knowledge on, steady-state analysis control speed-torque characteristics and closed-loop operation of DC motors (separately excited shunt motor and series motor) through phase controlled rectifiers and choppers, single-quadrant two-quadrant and four-quadrant operations forward-motoring forward-braking reverse-motoring reverse-regenerative braking operations of DC motors.

III Year B.Tech. EEE II-Sem   **L T P C**
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SWITCH GEAR AND PROTECTION

Objective:

This course introduces all varieties of circuit breakers and relays for protection of generators, transformers feeders and bus bars from different faults with emphasis on neutral grounding.

UNIT–I
Circuit Breakers:

Circuit Breaker (CB) – Elementary principles of arc interruption, Recovery– Restriking Voltage and Recovery voltages–Restriking phenomenon–Average and Max. RRRV– Numerical problems-Current chopping and Resistance switching–CB ratings and specifications: Auto reclosing. Description and operation of following types Circuit Breaker: Minimum Oil Circuit Breaker, Air Blast Circuit Breaker–Vacuum and SF6 circuit breakers and their applications.

UNIT–II
Electromagnetic, Static Relays & Numerical Relays:

Principle of operation and construction of attracted armature– Balanced beam– induction disc and induction cup relays– Relays classification– Instantaneous– DMT and IDMT types– Applications of relays: Over current/under voltage relays– Directional relays– Differential relays and percentage differential relays

Distance relays:

Impedance– Reactance– Mho and offset mho relays– Characteristics of distance relays, Static Relays and Numerical Relays, Comparison of numerical relays & static relays with electromagnetic relays.

UNIT–III
Generator & Transformer Protection:

Protection of generators against stator faults– Rotor faults and abnormal conditions– restricted earth fault and inter turn fault protection– Numerical examples on percentage windings unprotected. Protection of transformers: Percentage differential protection– Numerical problems on Design of CT's ratio– Buchholz relay protection.

UNIT–IV
Feeder and Bus bar Protection& Grounding Protection of Lines:

Over current– earth fault, Carrier current and three zone distance relay using impedance relays Protection of bus bars– Differential protection.

Neutral grounding:

Grounded & ungrounded neutral systems.-Effects of ungrounded neutral on system performance. Methods of neutral grounding: Solid resistance, reactance-Arcing grounds. Earthing practices in Substations.

UNIT–V:

Protection against over voltage and grounding:

Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc–Oxide lighting arresters– Insulation coordination– BIL– impulse ratio–. Earthing Practices in Substations.

TEXT BOOKS:

1. Power system protection and switch gear by Badri Ram, Viswakarma TMH publications
2. Switchgear & protection, Sunil Rao, Khanna publishers.
3. Protection & switchgear, Bhavesh Bhalja, R.P Mahesheari, Nilesh G.Chothani, and Oxford University press.

REFERENCE BOOKS:

1. Electrical power systems, C.L Wadhwa, New age international (P) limited, Publishers.
2. Electrical Power System Protection by C. CHRISTOPOULOS and A. Wright, Springer publications.
3. Electrical power systems, P.S.R Murthy, BS Publications.
4. Power System Protection& switchgear by Bhuvanesh Oza, TMH.
5. A textbook on power system engineering, M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanapat Rai & Co pvt.ltd.
6. A textbook on power system engineering, R.K Rajput, Laxmi Publications (P) ltd.
7. Principle of power system, V.K Mehta& Rohit Mehta, S.Chand company pvt ltd.
8. Digital and numerical relays by T.S Madhavarao Tata Magra hills
9. Technical Reference Book, Vol. 1, APTRANSCO

Outcomes:

After going through this course the students gets a thorough knowledge on various types of circuit breakers and   relays used for protection of generators, transformers, feeders, bus-bars etc., they understand the applications of relays, neutral grounding, lightening arrestors, and numerical relays in the power systems.

III Year B.Tech. EEE II-Sem   **L   T   P   C**
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RENEWABLE ENERGY SOURCES
(Professional Elective-II)

Objectives:

It introduces solar energy its radiation, collection, storage and application. It also introduces the Wind energy, Biomass energy, geothermal energy and ocean energy as alternative energy sources.

UNIT-I

Principles of solar radiation:

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection, Storage & Applications:

Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Storage & Applications:

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

Wind Energy:

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria. Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Blo-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

UNIT-IV

Geothermal Energy:

Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy:

OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and Conversion techniques, mini-hydel power plants, and their economics.

UNIT-V

Miscellaneous energy conversion systems:

Coal gasification and liquefaction, thermo electric energy conversion-Thomson effect, peltier effect and see beck effect. Types of fuel cells, H2-O2 Fuel cells, Application of fuel cells, Environmental effects of energy conversion systems, pollution from coal and preventive measures, steam stations and pollution

TEXT BOOKS

1. Non-Conventional Energy Sources, G.D. Rai, Khanna Publishers.
2. "Energy conversion systems" by Rakosh das Begamudre, New age International publishers, New Delhi - 2000.
3. Introduction to renewable energy, Vaughn Nelson, CRC Press (Taylor & Francis).

REFERENCE BOOKS

1. Renewable Energy Resources, Twidell & Wier, CRC Press (Taylor & Francis).
2. Renewable Energy Sources and Emerging Technologies, D. P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Private Limited.
3. Fundamentals of Renewable Energy Systems, D. Mukherjee, S. Chakrabarti, New Age International.
4. Renewable Energy Power for a sustainable Future, Godfrey Boyle, Oxford University Press.
5. Renewable energy resources, Tiwari and Ghosal, Narosa publications.
6. Renewable Energy Technologies, Ramesh & Kumar, Narosa publications.
7. Non-Conventional Energy Systems, K Mittal, Wheeler publications.

Outcomes:

After going through this course the student gets a thorough knowledge on,various types of renewable energy sources i.e. solar, wind, bio-mass, geothermal, ocean, hybrid energy systems and principles of direct energy conversion, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

III Year B.Tech. EEE II-Sem   **L   T   P   C**
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RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS
(Professional Elective-II)

Objective:
This subject introduces the concept of probability, reliability, distribution functions and various methods and techniques to calculate and estimate the reliability of different engineering problems and models.

UNIT - I
Basics of Probability theory & Distribution & Network Modeling and Reliability Analysis:
Basic probability theory – rules for combining probabilities of events – Bernoulli's trials – probabilities density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.
Analysis of Series, Parallel, Series-Parallel networks – complex networks – decomposition method.

UNIT – II
Reliability functions & Markov Modeling:
Reliability functions f(t), F(t), R(t), h(t) and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution – reliability measures MTTF, MTTR, MTBF.
Markov chains – concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities. – Markov processes one component repairable system – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabilities using STPM – two component repairable models.

UNIT – III
Frequency & Duration Techniques & Generation System Reliability Analysis:
Frequency and duration concept – Evaluation of frequency of encountering state, mean cycle time, for one , two component repairable models – evaluation of cumulative probability and cumulative frequency of encountering of merged states.
Reliability model of a generation system– recursive relation for unit addition and removal – load modeling - Merging of generation load model – evaluation of transition rates for merged state model – cumulative Probability, cumulative frequency of failure evaluation – LOLP, LOLE.

UNIT - IV
Composite Systems Reliability Analysis:
Decompositions method – Reliability Indices – Weather Effects on Transmission Lines.

UNIT – V
Distribution System and Reliability Analysis:
Basic Concepts – Evaluation of Basic and performance reliability indices of radial networks.

TEXT BOOKS:
1. Reliability Evaluation of Engg. System – R. Billinton, R.N.Allan, Plenum Press, New York, reprinted in India by B.S.Publications, 2007.
2. Reliability Evaluation of Power systems – R. Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S.Publications, 2007.

Outcome:
After going through this course the student gets a thorough knowledge on, basic probability theory, distribution functions, reliability analysis of various models through different methods, reliability functions, repairable inseparable systems reliability through markov modeling frequency and duration techniques, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

III Year B.Tech. EEE II-Sem   **L T P C**
                                    3 1 0 3

DIGITAL CONTROL SYSTEMS
(Professional Elective-II)

Objective:

This course gives fundamentals digital control systems, Z- transforms, state space representation of the control systems, concepts of controllability and obervability, estimation of stability in different domains, design of discrete time control systems, compensators, state feedback controllers, state observers through various transformations.

UNIT – I
Introduction:

Block Diagram of typical control system- advantages of sampling in control systems – examples of discrete data and digital systems – data conversion and quantization – sample and hold devices – D/A and A/D conversion – sampling theorem – reconstruction of sampled signals –ZOH. Z-transform: Definition and evaluation of Z-transforms – mapping between s-plane and z-plane – inverse z-plane transform – theorems of the Z-transforms –limitations of z-transforms –pulse transfer function –pulse transfer function of ZOH –relation between G(s) and G(z) – signal flow graph method applied to digital systems.

UNIT- II
State Space Analysis:

State space modeling of digital systems with sample and hold – state transition equation of digital time in variant systems – solution of time in variant discrete state equations by the Z-Transformation – transfer function from the state model – Eigen values – Eigen vector and diagonalisation of the A-matrix – Jordan canonical form. Computation of state transition matrix-Transformation to phase to variable canonical form-The state diagram – decomposition of digital system – Response of sample data system between sampling instants using state approach. Stability: Definition of stability – stability tests – The second method of Liapunov.

UNIT- III
Time Domain Analysis:

Comparison of time response of continuous data and digital control systems-correlation between time response and root locus ¡ the s-plane and z-plane – effect of pole-zero configuration in the z-plane upon the maximum overshoot and peak time of transient response – Root loci for digital control systems – steady state error analysis of digital control systems – Nyquits plot – Bode plot-G.M and P.M.

UNIT- IV
Controller Design:
The digital control design with digital controller with bilinear transformation – Digital PID controller-Design with deadbeat response-Pole placement through state feedback-Design of full order state observer-Discrete Euler Lagrance Equation – Discrete maximum principle.

UNIT-V
Digital State Observer:
Design of - Full order and reduced order observers. Design by max. Principle: Discrete Euler language equation-discrete maximum principle.

TEXT BOOKS:
1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition.
2. Digital Control Systems, V. I. George, C. P. Kurian, Cengage Learning.
3. Digital Control and State Variable Methods by M.Gopal, TMH. 4. Digital Control Engineering, M.Gopal

REFERENCE BOOKS:
1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering Analysis and Design M. Sami Fadali Antonio Visioli, AP Acad

Outcome:
After going through this course the student gets a thorough knowledge on, basics of digital control systems, Z-transforms, mapping between S-plane and Z- plane, state-space analysis, concept of controllability and obervability, derivation of pulse-transfer function, stability analysis in S-domain and Z-domains, stability through jury-stability test, stability through bilinear transformation and R-H criteria, design of discrete-time control systems, design of lag, lead, lead-lag compensators, design of PID controllers and design of state feedback controllers and observers, with which he./she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

POWER ELECTRONICS AND SIMULATION LAB

Any ten of the following experiments are required to be conducted.

1. Study of the characteristics of SCR, MOSFET &IGBT.
2. Gate Firing Circuits for SCRs (R- Triggering, RC Triggering & UJT Triggering).
3. Single Phase AC voltage Controller with R & RL Loads.
4. Single Phase fully Controlled Bridge Converter with R& RL Loads.
5. DC Jones Chopper with R& RL Loads.
6. Single Phase Parallel Inverter with R& RL Loads.
7. Single Phase Cyclo-Converter with R& RL Loads.
8. Single Phase Series Inverter with R& RL Loads.
9. Single Phase Half controlled converter with R Load.
10. PSPICE simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads.
11. PSPICE simulation of resonant pulse commutation circuit and Buck Chopper.
12. PSPICE simulation of single phase Inverter with PWM control.

REFERENCE BOOKS:

1. Simulation of Electrical and Electronics Circuits Using PSPICE- by M.H. Rashid, M/s PHI publications.
2. PSPICE A/D Users Manual-Microsim, USA
3. PSPICE reference Guide –Mircosim, USA
4. MATLAB and Tool books user's manual and- MATH Works, USA

Part – D

OPEN ELECTIVES

&

GENERAL SUBJECTS

OPEN ELECTIVES

Introduction

The B.Tech course structure under CBCS consists of 4 Professional Electives and 3 open electives. Each professional elective offered by the students own department gives a choice of three to four courses out of which the student is to select one course. Similarly under open elective system, the student is offered one course each in 3 semesters viz., 3/1, 3/2 & 4/1 with 3 credits.

The six engg. and along with MBA depts. of the college have been divided into four groups
Group- I - ECE & EEE
Group –II - CSE & IT
Group –III - Mechanical & Civil
Group –IV- MBA
Under CBCS, a student from a particular group cannot opt the courses offered by that particular group.

Details of the Courses offered by different Groups -1
Courses offered by Group -1 Departments

ECE
III Year – I Semester
1. Introduction to Microcontrollers & Applications
2. Basic Electronics & Instrumentation
III Year – II Semester
1. Fundamentals of Embedded Systems
2. Principles of Communications

EEE
III Year – I Semester
1. Non Conventional Energy Sources
2. Energy Management
III Year – II Semester
1. Principles of Electrical Power Utilization
2. Energy Auditing &Conservation

Courses offered by Group-2 Departments

CSE/IT

III Year – I Semester

1. Java Programming
2. Operating Systems

III Year – II Semester

1. Database Management Systems
2. Software Engineering

Courses offered by Group-3 Departments

MECH

I Semester

1. Elements of Mechanical Engineering
2. Industrial Engineering

II Semester

1. Basic Automobile Engineering
2. Material Science and Engineering

CIVIL

I Semester

1. Remote Sensing and GIS
2. Smart City

II Semester

1. Green Building
2. Environmental Pollution and Control Methods

Courses offered by Group-4 Department

MBA

I Semester

Total engineering Quality Management

II Semester

Basics of Banking and Capital Market

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

PRE REQUISITES:

- Probability and statistics
- Operation research
- Mathematics-I
- Environmental studies

Course Objectives: To enable the student to understand, with a practical insight,
- The importance of certain basic issues governing the business operations namely demand and supply, production function, cost analysis,
- analysis of markets, forms of business organizations,
- Significance of capital budgeting and financial accounting and financial analysis.

UNIT –I:
Introduction to Managerial Economics& Demand Analysis:

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT –II:
Production & Cost Analysis:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts (Opportunity cost vs outlay costs, Fixed, variable and semi variable costs, marginal cost vs average cost, out of pocket vs book cost, imputed cost, implicit & explicit cost, incremental and decremental cost, sunk vs future cost, separable and joint costs) Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT –III:
Markets & New Economic Environment:

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

UNIT-IV: Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and Conventions Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).Financial Analysis**:** Analysis and Interpretation of Liquidity Ratios (current ratio, quick ratio), Activity Ratios(inventory turnover ratio, debtors turnover ratio), and Capital structure Ratios(debt equity ratio, interest coverage ratio) and Profitability ratios(gross profit ratio, net profit ratio, operating profit ratio, P/E ratio, EPS). Du Pont Chart.

UNIT –V: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital, Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), Net Present Value Method (simple problems), IRR and PI method.

Outcomes: At the end of the course the students is expected
- To understand and enhance the knowledge regarding managerial economics concepts and obtaining optimal solutions.
- To get an idea of analysis of firm's financial position with the techniques of financial analysis and ratio analysis.

TEXT BOOKS:
1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
2. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
3. J.V.Prabhakar Rao & P.V.Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

REFERENCE BOOKS:
1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Kasi Reddy, Saraswathi, MEFA, PHI Learning, 2012.
10. Shailaja & Usha : MEFA, University Press, 2012.

ADVANCED COMMUNICATION SKILLS (ACS) LAB
(Common to all branches)

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educational English speakers and respond appropriately in different socio-cultural and professional contexts.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) lab:

1. **Activities on Fundamentals of inter-personal Communication and Building Vocabulary –** Starting a conversation – responding appropriately and relevantly – using the right body language - Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

3. **Activities on Writing Skills –** Structure and presentation of different types of writing – letter writing/ Resume writing/ e-correspondence/ Technical report writing / Portfolio writing – planning for writing – improving one's writing.

4. **Activities on Presentation Skills –** Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.
5. **Activities on Group Discussion and interview Skills –** Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video – conference and Mock Interviews.

Books Recommended:
1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D. Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. Mc Mahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press. 2009
7. Management Shapers Series by Universities Press (India) Pvt. Ltd. Himayatnagar, Hyderabad. 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanna Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen.PHI Learning Pvt. Ltd. New Delhi. 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanna Buckley Cengage Learning. 2008.
11. Job Hunting by Colm Downess, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill. 2009.
14. Books on TOEFL/GRE/GMAT/ICAT/IELTS by Barron's/DELTA/Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas Macmillan Publishers. 2009.

PERSONALITY DEVELOPMENT AND BEHAVIOURAL SKILLS

Course Objectives

- To enable students to communicate with outside and peer group members in an effective manner.
- To enable the students to give better presentation and explanation on their projects, posters and assignments - this makes them industry ready.
- To perform better during Campus Recruitment and various interviews they face in their career.

Course Outcomes

At the end of the course a student is expected:

- To communicate with more confidence using better spoken and written English
- To give better presentation and explanation with the use of digital inventions
- To perform well during Campus Drives and different Interviews

Course Outcomes

Unit – I
Personality Development: Definition - Various Aspects of Personality Development - Behavioural Traits. Importance of Soft skills-Soft skills for a future Entrepreneur - Qualities of a good leader - Stress Management - Success stories.

Unit – II
Non Verbal Communication: Kinesics Haptics Proxemics Vocalics Oculesics Body Language in Interviews.

Unit - III
Team Dynamics: Different Types of Teams-role of an individual - Communicating as a group or team leader - Individual Presentations/Team Presentation. Case Studies: Project Presentations.

UNIT-IV
Technical Report Writing: Formats - Effective Resume Preparation - Covering Letter - Statement of Purpose (SoP).

UNIT-V

Role of Multimedia in Communication: Communication in a Digital Edge (Video Conference Etc.)

E-Correspondence: Recent Trends in Professional Communication - Social Networking: Importance, Effects.

Blogging: Creating of Blogs - Technical and Non – technical blogs – Success Stories and Case Studies.

Reference Books

1. Barun, K Mitra, Personality Development and Soft Skills, Oxford University Press, 2nd Edition, 2016.
2. Gopalaswamy Ramesh, the Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education, 2013.
3. Krishna Mohan & Meera Banerji, Developing Communication Skills, Macmillan India Ltd, 2008.
4. Krishna Mohan & Meenakshi Raman, Effective English Communication, Tata McGraw-Hill Publishing Company Ltd, 2008.
5. Arati Gurav, 50 Mantra's of Personality Development, Buzzingstock Publishing House, 2013.
6. P. Kiranmai Dutt & Geetha Rajeevan, Basic Communication Skills, Cambridge University Pvt.   Ltd2007.
7. S.C. Sood, Mita Bose, Naresh Jain, Developing Language Skills, Manohar Publications, 2007, T.M. Farhathullah, Communication Skills for Technical Students, Orient Longman Pvt Ltd, 2002.

QUANTITATIVE METHODS & LOGICAL REASONING

Course Objectives:

1. The objective of this course is to enhance the problem solving skills in the areas of **'Quantitative Aptitude'** and **'Reasoning'** which will enable the students to better preparation for **Campus Placements** and competitive examinations.
2. To improve the logical thinking and mathematical ability of the students.

Course Outcomes:

At the end of the completion of the course a student is expected

1. To solve basic and complex mathematical problems in short time.
2. To perform well in various competitive exams and placement drives.

Quantitative Aptitude and Reasoning:

Unit – I

1. Number System:
Speed math's, Numbers, Factors, prime & Co primes, LCM & HCF, Divisibility rules, finding unit place digit and last two digits of an expression

2. Simple Equations:
Definition of Linear equation, word problems

3. Ratio, Proportion and Variations:
Definition of ratio, ratio of Proportion, Comparison of ratios, Compound ratio, Direct and indirect proportion

4. Percentages:
Converting fractions and decimal into percentages, successive percentage, populations, expenditure and savings

5. Profit and loss:
Relation between Cost price and selling price, Discount and Marked price, Gain or Loss percentages on selling price

6. Simple and Compound Interest:
Problems on interest (**I**), amount (**A**), Principal (**P**) and rate of interest(**R**)
Difference between the simple interest and compound interest for 2 and 3 years.

Unit-II

1. Partnership:
Relation between partners, period of investment and shares

2. Averages and Ages:
Average of different groups, change in averages by Adding, deleting and Replacement of objects, problems on ages.

3. Allegation and mixtures:
Allegation rule, Mean value of the mixture, Replacement of equal amount of quantity.

Time and Work:
Men and Days, Work and Wages, pipes and cisterns, hours and work, Alternate day's concept,

Time and Distance:
Difference between the average and Relative speeds, reaching the destination late and early, Stoppage time per hour, time and distance between two moving bodies

Trains, Boats and Streams:
Train crossing man, same and opposite directions, Speed of boat and stream,

Unit-III
1. Progressions:
Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their relations.

2. Quadratic Equations:
General form of Quadratic equation, finding the roots of Quadratic equation, Nature of the Roots.

3. Mensurations:
2D geometry- perimeter, areas, 3D geometry - surface areas, volumes

4. Permutation and Combination:
Fundamental rules, problems on permutations & combinations.

5. Probability
Definition of probability, notations and formulae, problems on probability.

6. Data Interpretation and Data Sufficiency:
Tabular and Pie-charts, Bar and Line graphs, Introduction to data sufficiency, problems on data sufficiency.

Unit-IV
1. Deductions:
Statements and conclusions using Venn diagram and Syllogism method

2. Connectives:
Definition of simple and compound statements, Implications and negations for compound statements.

3. Series completion:
Number series, Alphabet series, letter series.

4. Coding and Decoding:
Letter coding, Number coding, Number to letter coding, Matrix coding, Substitution, Mixed letter coding, Mixed number coding, Deciphering individual letter codes by analysis.

5. Analytical Reasoning Puzzles:
Problems on Linear, Double line-up and Circular arrangements, Selections and Comparisons.

6. Blood Relations:
Defining the various relations among the members of a family, Solving Blood Relation Puzzles by using symbols and notations. Problems on Coded relations.

Unit-V
1. Direction sense test:
Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

2. Clocks:
Relation between minute-hour hands, angle vs time, exceptional cases in clocks

3. Calendars:
Definition of a Leap Year, Finding the Odd days, Finding the day of any random calendar date, repetition of calendar years.

4. Cubes and Dices:
Finding the minimum and maximum number of identical pieces and cuts, painting of cubes and cuts, problems on dice.

5. Venn diagrams:
Circular representation of given words, Geometrical representation of certain class, set theory based problems.

6. Number, Ranking and Time sequence test:
Number test, Ranking test, Time sequence test.

Text Books:
1. GL Barrons, Mc Graw Hills, Thorpe's verbal reasoning, LSAT Material
2. R S Agarwal, S.chand, 'A modern approach to logical reasoning'
3. R S Agarwal, S.Chand, 'Quantitative Aptitude'

Reference Books:
1. Quantitative Aptitude-G.L BARRONS
2. Quantitative Aptitude-Abhijit Guha Mc Graw Hills.
3. Quantitative Aptitude-U.Mohan Rao SCITECH.