ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRONICS AND COMMUNICATION
ENGINEERING

For

5 YEAR INTEGRATED DUAL DEGREE PROGRAM (I.D.P)

Leading to

(B.TECH. & M.Tech. / MBA)

(Applicable for the batches admitted from 2015-2016)

JNTUH COLLEGE OF ENGINEERING HYDERABAD
(Autonomous)
Kukatpally, Hyderabad – 500085
Telangana, India
5 Year Integrated Dual Degree Programme in Engineering & Technology (IDP)

JNTUH offers 5 Year (10 Semesters) Integrated Dual Degree (IDP) Programme, under Choice Based Credit System (CBCS) at its Constituent Autonomous College - JNTUH College of Engineering Hyderabad, with effect from the Academic Year 2015-16 onwards, in the following Branches of Engineering:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>UG Program</th>
<th>PG Program</th>
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<tbody>
<tr>
<td></td>
<td>M.Tech. (Specialization)</td>
<td>MBA (Specialization)*</td>
</tr>
<tr>
<td>1)</td>
<td>B.Tech. in Electronics &amp; Communication</td>
<td>M.Tech. (Communications &amp; Signal Processing)</td>
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<tr>
<td></td>
<td>Engineering</td>
<td></td>
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<tr>
<td>2)</td>
<td>B.Tech. in Computer Science &amp; Engineering</td>
<td>M.Tech. (Computer Science)</td>
</tr>
<tr>
<td>3)</td>
<td>B.Tech. in Electrical &amp; Electronics Engineering</td>
<td>M.Tech. (Power Electronics)</td>
</tr>
<tr>
<td>4)</td>
<td>B.Tech. in Mechanical Engineering</td>
<td>M.Tech. (Manufacturing Systems)</td>
</tr>
<tr>
<td>5)</td>
<td>B.Tech. in Civil Engineering</td>
<td>M.Tech. (Structural Engineering)</td>
</tr>
</tbody>
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(* A Minimum of 15 students is necessary for any specialization to be offered.)

A student would be conferred the B.Tech Degree and M.Tech or MBA Degree in this IDP, after the successful completion of all the requirements for 10 semesters of study and earning the appropriate credits.

Eligibility for Admission

2.1 Admission to the IDP shall be made either on the basis of the merit rank obtained by the qualifying candidate at an Entrance Test conducted by the Telangana State Government (EAMCET), OR the University, OR on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time.

2.2 The medium of instructions for the entire IDP in E&T will be ENGLISH only.

2.3 Students opting for the 5 year integrated IDP must specify their choice for M.Tech. (with in the specializations given above) or MBA as the case may be, after choosing the appropriate Branch of Engineering, at the time of Admissions only. Option thus exercised is final, and cannot be changed during the study period.
2.4 Students opting for 5 years integrated IDP have to study for the specified period, to earn the relevant credits for the award of both the B.Tech. and M.Tech./MBA Degrees, and they will not be permitted to have a choice for B.Tech. Degree alone after 4 years study.

3.0 IDP Structure

3.1 The IDP Programmes of JNTUH-CEH are of Semester Pattern, with 10 Semesters constituting 5 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of Examinations), with a minimum of 90 Instructional Days per Semester.

3.2 UGC/AICTE specified Definitions/Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations, which are as listed below.

3.3 Semester Scheme:
Each Semester having - ‘Continuous Internal Evaluation (CIE)’ and ‘Semester End Examination (SEE)’. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted by UGC.

3.4 Credit Courses:
All Subjects/Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject/Course in a L:T:P:C (Lecture Periods: Tutorial Periods: Practicals Periods: Credits) Structure, based on the following general pattern.

- One Credit - for One hour/Week/Semester for Theory/Lecture (L) Courses; and,
- One Credit - for Two hours/Week/Semester for Laboratory/Practical (P) Courses or Tutorials (T).

Other student activities like NCC, NSS, NSO, Study Tour, Guest Lecture etc., and identified Mandatory Courses will not carry Credits.

3.5 Subject/Course Classification:
All Subjects/Courses offered for the UGP are broadly classified as : (a) Foundation Courses (FnC), (b) Core Courses (CoC), and (c) Elective Courses (E/C).

- Foundation Courses (FnC) are further categorized as : (i) HS (Humanities and Social Sciences), (ii) BS (Basic Sciences), and (iii) ES (Engineering Sciences);
- Core Courses (CoC) and Elective Courses (E/C) are categorized as PS (Professional Subjects), which are further subdivided as – (i) PC (Professional/Departmental Core) Subjects, (ii) PE (Professional/Departmental Electives), (iii) OE (Open Electives); and (iv) Project Works (PW);
- Minor Courses (1 or 2 Credit Courses, belonging to HS/BS/ES/PC as per relevance); and
- Mandatory Courses (MC - non-credit oriented).

3.6 Course Nomenclature:
The Curriculum Nomenclature or Course-Structure Grouping for the each of the IDP E&T is as listed below:

<table>
<thead>
<tr>
<th>S.No</th>
<th>UG/PG Program</th>
<th>Group/Category/Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>UG</td>
<td>BS – Basic Sciences</td>
<td>Includes - Mathematics, Physics and Chemistry Subjects</td>
</tr>
<tr>
<td>2)</td>
<td>UG</td>
<td>ES - Engineering Arts and Sciences</td>
<td>Include fundamental engineering subjects</td>
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<tr>
<td>3)</td>
<td>UG</td>
<td>HS – Humanities and Social Sciences</td>
<td>Includes subjects related to Humanities, Social Sciences and Management</td>
</tr>
<tr>
<td>4)</td>
<td>UG</td>
<td>PC – Professional Core</td>
<td>Includes core subjects related to the parent discipline, department or branch of engineering</td>
</tr>
<tr>
<td>5)</td>
<td>UG</td>
<td>PE – Professional Electives</td>
<td>Includes Elective subjects related to the parent discipline, department or branch of engineering</td>
</tr>
<tr>
<td>6)</td>
<td>UG</td>
<td>OE – Open Electives</td>
<td>Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline, department or branch of engineering</td>
</tr>
<tr>
<td>7)</td>
<td>UG</td>
<td>Project</td>
<td>B.Tech. Project or UG Project or UG Major Project</td>
</tr>
<tr>
<td>8)</td>
<td>UG</td>
<td>Industrial Training/ Mini Project</td>
<td>Industrial Training/ Internship/ UG Mini Project/ Mini Project</td>
</tr>
<tr>
<td>9)</td>
<td>PG</td>
<td>PGC</td>
<td>PG Core Subjects related to the M.Tech. Specialization / MBA</td>
</tr>
<tr>
<td>10)</td>
<td>PG</td>
<td>PGE</td>
<td>PG Elective Subjects related to the M.Tech. Specialization / MBA</td>
</tr>
<tr>
<td>11)</td>
<td>PG</td>
<td>Project</td>
<td>PG Project M.Tech. / MBA</td>
</tr>
<tr>
<td>12)</td>
<td>PG</td>
<td>Seminar</td>
<td>Seminar / Colloquium at PG level, in M.Tech. / MBA</td>
</tr>
<tr>
<td>13)</td>
<td>PG</td>
<td>Comprehensive Viva</td>
<td>Comprehensive Viva based on all Subjects</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>254</td>
<td></td>
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</tbody>
</table>

### 4.0 Course Work

#### 4.1
A student, after securing admission, shall pursue the IDP (B.Tech+M.Tech or MBA) in a minimum period of 5 Academic Years, and a maximum period of 10 Academic Years (starting from the Date of Commencement of I Year).

The entire course of study is of five academic years, comprising of 10 semesters. **All the I, II, III, IV and V years are on two-semester pattern.**

#### 4.2
Each student shall Register for and Secure the specified number of Credits required for the completion of the IDP and Award of the B.Tech+M.Tech / MBA. Degree in respective Branch of Engineering.

#### 4.3
The student must secure a total of 260 credits for the IDP - 174 credits for the B.Tech. Degree Program, plus 86 credits for the M.Tech./ MBA Program.

#### 4.4
The course work and curriculum for first 3 years (6 Semesters) would be same as that the Regular B.Tech (4 year) in the relevant branch of Engineering.

### 5.0 Course Registration

#### 5.1
A ‘Faculty Advisor or Counselor’ shall be assigned to each student, who will advise him about the IDP, its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his competence, progress, pre-requisites and interest.

#### 5.2
Academic Section of the College invites ‘Registration Forms’ from students before the beginning of the Semester, through ‘ON-LINE SUBMISSIONS’, ensuring ‘DATE and TIME Stamping’. The ON-LINE Registration Requests for any ‘CURRENT SEMESTER’ shall be completed BEFORE the commencement of SEEs (Semester End Examiantions) of the ‘PRECEDING SEMESTER’.

#### 5.3
A Student can apply for ON-LINE Registration, ONLY AFTER obtaining the ‘WRITTEN APPROVAL’ from his Faculty Advisor, which should be submitted to the College Academic Section through the Head of Department (a copy of the same being retained with Head of Department, Faculty Advisor and the Student).
5.4 A Student may be permitted to Register for his Subjects/ Course of CHOICE upto III year II semester with a typical total of 24 Credits per Semester (Minimum being 20 C and Maximum being 28 C, permitted deviation being ±17%), based on his PROGRESS and SGPA/ CGPA, and completion of the ‘PRE-REQUISITES’ as indicated for various Subjects/ Courses, in the Department Course Structure and Syllabus contents. However, a MINIMUM of 20 Credits per Semester must be registered to ensure the ‘STUDENTSHIP’ in any Semester.

A Student may be permitted to Register for his Subjects/ Course of CHOICE in IV year I semester and V year I semester with a typical total of 30 Credits per Semester (Minimum being 26 C and Maximum being 34 C, permitted deviation being ±14%), based on his PROGRESS and SGPA/ CGPA, and completion of the ‘PRE-REQUISITES’ as indicated for various Subjects/ Courses, in the Department Course Structure and Syllabus contents. However, a MINIMUM of 26 Credits per Semester must be registered to ensure the ‘STUDENTSHIP’ in any Semester.

A Student may be permitted to Register for his Subjects/ Course of CHOICE in IV year II semester with a typical total of 28 Credits per Semester (Minimum being 24 C and Maximum being 32 C, permitted deviation being ±14%), based on his PROGRESS and SGPA/ CGPA, and completion of the ‘PRE-REQUISITES’ as indicated for various Subjects/ Courses, in the Department Course Structure and Syllabus contents. However, a MINIMUM of 24 Credits per Semester must be registered to ensure the ‘STUDENTSHIP’ in any Semester.

A Student must Register for his Subjects/ Course in V year II semester with a total of 22 Credits per Semester.

5.5 Open Electives: Students are to register One Open Elective (OE-I) during III Year I Semester, one (OE-II) during III Year II Semester, from the list of Open Electives given. However, Students can not opt for an Open Elective Subject offered by their own (parent) Department, if it is already listed under any category of the Subjects offered by parent Department in any Semester.

5.6 There shall be an Industry oriented Mini-Project, in collaboration with an Industry of the relevant specialization, to be registered immediately after III year II semester examinations, and taken up during the summer vacation for about eight weeks duration.

5.7 Each Student shall Register the UG Project Work during the IV Year II Semester, as per the instructions of the Project Guide/ Project Supervisor assigned by the Head of Department.

5.8 The PG Project shall start immediately after the completion of the IV Year II Semester, and shall continue through V Year I and II Semesters as per the instructions of the Project Guide/ Project Supervisor assigned by the Head of Department and registered after approval from PRC.

5.9 Choice for ‘additional Subjects/ Courses’ to reach the Maximum Permissible Limit of 28/32/34 Credits (above the typical 24/28/30 Credit norm) must be clearly indicated, which needs the specific approval and signature of the Faculty Advisor/ Counselor.

5.10 If the Student submits ambiguous choices or multiple options or erroneous entries - during ON-LINE Registration for the Subject(s) / Course(s) under a given/ specified Course Group/ Category as listed in the Course Structure, only the first mentioned Subject/ Course in that Category will be taken into consideration.

5.11 Subject/ Course Options exercised through ON-LINE Registration are final and CAN NOT be changed, and CAN NOT be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to
any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

5.12 Cancelation of Registration of Subjects/ Courses may be permitted, ONLY AFTER obtaining prior approval from the Faculty Advisor (subject to retaining a minimum of required credits) ‘within 15 Days of Time’ from the beginning of the current Semester.

6.0 Subjects/ Courses to be offered
6.1 A Subject/ Course may be offered to the Students, ONLY IF a Minimum of 1/3 of the class Strength opt for the same. The Maximum Strength of a class is limited to 80 (60 + 1/3 of the class Strength).

6.2 More than ONE TEACHER may offer the SAME SUBJECT (Lab./ Practicals may be included with the corresponding Theory Subject in the same Semester) in any Semester. However, selection choice for students will be based on - ‘FIRST COME FIRST SERVE Basis and CGPA Criterion’ (i.e., the first focus shall be on early ON-LINE ENTRY from the student for Registration in that Semester, and the second focus, if needed, will be on CGPA of the student).

6.3 If more entries for Registration of a Subject come into picture, then the concerned Head of Department shall take necessary action, whether to offer such a Subject/ Course for TWO (or multiple) SECTIONS or NOT .

6.4 In case of options coming from Students of other Departments/ Branches/ Disciplines (not considering OPEN ELECTIVES), PRIORITY shall be given to the student of the ‘Parent Department’ first.

7.0 Attendance Requirements
7.1 A student shall be eligible to appear for the End Semester Examinations upto III year II semester, if he acquires a minimum of 75% of attendance in aggregate of all the Subjects/ Courses (excluding Mandatory or Non-Credit Courses) for that Semester.

A student shall be eligible to appear for the End Semester Examinations in IV and V year, I Semester and II Semester, if he acquires a minimum of 75% of attendance in that subject.

7.2 Condoning of shortage of attendance is up to 10% (65% and above, and below 75%) in each Semester may be granted by the College Academic Committee on genuine and valid grounds, based on the student’s representation with supporting evidence.

7.3 A stipulated fee shall be payable towards condoning of shortage of attendance.

7.4 Shortage of Attendance below 65% shall in NO case be condoned.

7.5 Students, whose shortage of attendance is not condoned in any Semester, are not eligible to take their End Examinations of that Semester; they get detained and their registration for that Semester shall stand cancelled. They will not be promoted to the next Semester. They may seek re-registration for all those Subjects registered in that Semester in which he got detained, by seeking re-admission for that Semester as and when offered; in case if there are any Professional Electives and/or 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.
7.6 Students from IV year I semester onwards, whose shortage of attendance is not condoned in any Subject, are not eligible to take their End Examinations of that Subject; they get detained and their registration for that Subject shall stand cancelled. They may seek re-registration for all those Subjects registered in which they got detained, by seeking re-register for that Subjects as and when offered.

8.0 Academic Requirements
The following Academic Requirements have to be satisfied, in addition to the Attendance Requirements mentioned in Item No.7.

8.1 (a) UG Part

A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/Course, if he secures not less than 35% marks (25 out of 70 marks) in the End Semester Examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades, this implies securing P Grade or above in that Subject/Course.

A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Industry oriented Mini-Project/ Seminar, if he secures not less than 40% of the total marks (40 marks) to be awarded for each. The student would be treated as failed, if he - (i) does not submit a report on his Industry oriented Mini-Project, or does not make a presentation of the same before the Evaluation Committee as per schedule, or (ii) does not present the Seminar as required in the IV year II Semester, or (iii) secures less than 40% of marks (40 marks) in Industry oriented Mini-Project/ Seminar evaluations.

He may reappear once for each of the above evaluations, when they are scheduled again; if he fails in such ‘one reappearance’ evaluation also, he has to reappear for the same in the next subsequent Semester, as and when it is scheduled.

(b) PG Part

A Student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/Course, if he secures not less than 40% Marks (28 out of 70 Marks) in the End Semester Examination, and a minimum of 50% of Marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades, this implies securing B Grade or above in that Subject.

A Student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Seminar, and Comprehensive Viva-voce, if he secures not less than 50% of the total Marks to be awarded for each. The Student would be treated as failed, if he - (i) does not attend the Comprehensive Viva-voce as per the schedule given, or (ii) does not present the Seminar as required, or (ii) secures less than 50% of Marks (< 50 Marks) in Seminar/ Comprehensive Viva-voce evaluations.

He may reappear for comprehensive viva where it is scheduled again; For seminar, he has to reappear in the next subsequent Semesters, as and when scheduled.

8.2 A Student will not be promoted from I Year to II Year, unless he fulfills the Attendance and Academic Requirements and secures a total of 24 Credits out of 48 Credits of I Year, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.

8.3 A Student will not be promoted from II Year to III Year, unless he fulfills the Attendance and Academic Requirements and secures a total of 43 Credits out of 72 Credits upto II Year I Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
8.4 A Student will not be promoted from III Year to IV Year, unless he fulfils the Attendance and Academic Requirements and secures a total of 72 Credits out of 120 Credits up to III Year I Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.

A student shall be promoted from IV Year to V Year, if the student completes the UG Project satisfactorily and earns the prescribed number of credits for UG Project by the end of IV Year II Semester.

8.5 A Student shall register for all Subjects covering 254 Credits as specified and listed (with the relevant Course/Subject Classifications as mentioned) in the Course Structure, put up all the Attendance and Academic requirements for 254 Credits securing a minimum of P/B Grade (Pass Grade) or above in each Subject, and earn ALL 254 Credits securing SGPA ≥ 5.0 / 6.0 (in each Semester), and CGPA (at the end of each successive Semester) ≥ 5.0/ 6.0 , to successfully complete the UGP and PGP.

8.6 If a Student registers for some more ‘extra Subjects’ (in the parent Department or other Departments/Branches of Engg.) other than those listed Subjects totaling to 254 Credits as specified in the Course Structure of his Department, the performances in those ‘extra Subjects’ (although evaluated and graded using the same procedure as that of the required 254 Credits) will not be taken into account while calculating the SGPA and CGPA. For such ‘extra Subjects’ registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in Items 7 and 8.1 – 8.4 above.

8.7 Students who fail to earn 254 Credits as per the Course Structure, and as indicated above, within 10 Academic Years from the Date of Commencement of their I Year shall forfeit their seats in IDP Programme and their admissions shall stand cancelled.

8.8 When a Student is detained due to shortage of attendance in any Semester, he may be readmitted into that Semester, as and when offered, with the Academic Regulations of the Batch into which he gets readmitted. However, no Grade Allotments or SGPA/CGPA calculations will be done for that entire Semester in which he got detained.

8.9 When a Student is detained due to lack of Credits in any year, he may be readmitted in the next year, after fulfilment of the Academic Requirements, with the Academic Regulations of the Batch into which he gets readmitted.

8.10 A student 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 examination / SEE as and when conducted. In such cases, his Internal Marks assessed earlier for that Subject/Course will be carried over, and added to the Marks to be obtained in the supplementary examination/SEE, for evaluating his performance in that Subject.

9.0 Evaluation - Distribution and Weightage of Marks

(a) UG Part

9.1 The performance of a student in each Semester shall be evaluated Subject-wise (irrespective of Credits assigned) with a maximum of 100 marks for Theory or Practicals or Seminar or Drawing/Design or Industry oriented Mini-Project or Minor Course, etc; For all Subjects/Courses as mentioned above, the distribution shall be 30 marks for CIE, and 70 marks for the SEE. However, the UG Project Work (Major Project) will be evaluated for 200 Marks. These evaluations shall be based on 30% CIE (Continuous Internal Evaluation) and 70% SEE (Semester End Examination), and a Letter Grade corresponding to the % marks obtained shall be given.
9.2 a) For Theory Subjects (inclusive of Minor Courses), during the Semester, there shall be 2 mid-term examinations for 25 marks each. Each mid-term examination consists of one objective paper for 10 marks, plus one subjective paper for 15 marks, with a duration of 120 minutes (20 minutes for objective and 100 minutes for subjective papers). Further, there will be an allocation of 5 marks for Assignment. Objective paper may be set with multiple choice questions, True/False, fill-in the blanks, matching type questions, etc. Subjective paper shall contain 5 questions, out of which the Student has to answer 3 questions, each for 5 marks.

b) The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

c) First Assignment should be submitted before the conduct of the first mid-term examinations, and the Second Assignment should be submitted before the conduct of the second mid-term examinations. The Assignments shall be as specified by the concerned subject teacher.

d) The first mid-term examination Marks and first Assignment Marks shall make one set of CIE Marks, and the second mid-term examination Marks and second Assignment Marks shall make second set of CIE Marks; and the better of these two sets of marks shall be taken as the final marks secured by the Student towards Continuous Internal Evaluation in that Theory Subject.

9.3 For Practical Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 internal marks, and 70 marks are assigned for Lab./Practical End Semester Examination (SEE). Out of the 30 marks for internals, day-to-day work in the laboratory shall be evaluated for 20 marks; and for the remaining 10 marks - two internal practical tests (each of 10 marks) shall be conducted by the concerned laboratory teacher and the better of these two tests is taken into account. The SEE for Practicals shall be conducted at the end of the Semester by Two Examiners appointed by Head of the Department.

9.4 For the Subjects having Design and/or Drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation), the distribution shall be 30 marks for CIE (20 marks for day-to-day work, and 10 marks for internal tests) and 70 marks for SEE. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

9.5 The Industry oriented Mini-Project shall be submitted in a Report form, and a presentation of the same shall be made before a Committee, which evaluates it for 100 marks. The Committee shall consist of 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. The Mini-Project shall be evaluated in the IV Year I Semester.

9.6 Out of a total 200 marks allotted for the Project Work, 60 marks shall be for CIE (Continuous Internal Evaluation and 140 marks for the SEE (End Semester Viva-voce Examination). The Project Viva-voce shall be conducted by a Committee comprising of an External Examiner, Head of the Department, Senior faculty and Project Supervisor. Out of 60 marks allocated for CIE, 30 marks shall be awarded by the Project Supervisor (based on the continuous evaluation of student's performance throughout the Project Work period), and the other 30 marks shall be awarded by a Departmental Committee consisting of Head of the Department and Project Supervisor, based on the work carried out and the presentation made by the Student at the time of Viva-voce Examination.

9.7 For NCC/ NSS/ NSO types of Courses, and/or any other Mandatory Non-Credit Course offered in a Semester, a ‘Satisfactory Participation Certificate’ shall be issued to the Student from the concerned authorities, only after securing $\geq 65\%$ attendance in such a Course. No marks or Letter Grade shall be allotted for these activities.
(b) PG Part (M.Tech.)

9.8 The performance of a Student in each Semester shall be evaluated Subject-wise (irrespective of Credits assigned) with a maximum of 100 Marks for Theory or Practicals or Seminar or Drawing/Design or Comprehensive Viva-voce etc. These evaluations shall be based on 30% CIE (Continuous Internal Evaluation) and 70% SEE (Semester End Examination), and a Letter Grade corresponding to the % Marks obtained shall be given.

i) For Theory Subjects, CIE Marks shall comprise of - Mid-Term Examination Marks (for 25 Marks), and Assignment Marks (for 5 Marks).

ii) During the Semester, there shall be 2 Mid-Term examinations. Each Mid-Term examination shall be for 25 Marks (120 minutes duration). The better performance out of these two Mid-Term Examinations shall be considered for the award of 25 Marks.

9.9 For Practical Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 Internal Marks, and 70 Marks are assigned for Lab./Practicals End Semester Examination (SEE). Out of the 30 Marks for Internals, day-to-day work assessment in the laboratory shall be evaluated for 20 Marks; and the performance in an internal Lab./Practical Test shall be evaluated for 10 marks. The SEE for Lab./Practicals shall be conducted at the end of the Semester by the concerned Laboratory Teacher and another faculty member of the same Department as assigned by the Head of the Department.

9.10 There shall be a Seminar Presentation in V Year I Semester. For the Seminar, the Student shall collect the information on a specialized topic, prepare a Technical Report and submit to the Department at the time of Seminar Presentation. The Seminar Presentation (along with the Technical Report) shall be evaluated by Two Faculty Members assigned by Head of the Department, for 100 Marks. There shall be no SEE or External Examination for Seminar.

9.11 Each Student shall appear for a Comprehensive Viva-Voce at the end of the V Year II Semester. The Comprehensive Viva-Voce shall be conducted by a Committee, consisting of three senior faculty members of Department nominated by the Head of the Department, and the performance evaluation shall be for 100 Marks. There are no Internal Marks for the Comprehensive Viva-voce.

9.12 i) The PGP Project shall start immediately after the completion of the IV Year II Semester, and shall continue through V Year I and II Semesters after approval of PRC. The Student shall carry out the literature survey, select an appropriate topic and submit a Project Proposal within 6 weeks (immediately after his IV Year II Semester End Examinations), for approval by the Project Review Committee (PRC). The PRC shall be constituted by the Head of Department, and shall consist of the Head of Department, Project Supervisor, and a Senior Faculty Member of the Department. The Student shall present his Project Work Proposal to the PRC (PRC-I Presentation), on whose approval he can ‘REGISTER for the PG Project’. After Registration, the Student shall carry out his work, and continually submit ‘a fortnightly progress report’ to his Supervisor throughout the Project period. The PRC will monitor the progress of the Project Work and review, through PRC-II and PRC-III Presentations— one at the end of the V Year I Semester, and one before the submission of M.Tech. Project Work Report/ Dissertation.

ii) After PRC-III presentation, the PRC shall evaluate the entire performance of the Student and declare the Project Report as ‘Satisfactory’ or ‘Unsatisfactory’. Every Project Work Report/ Dissertation (that has been declared ‘satisfactory’) shall undergo ‘Plagiarism Check’ as per the University/ College norms to ensure content plagiarism below a specified level of 30%, and to become acceptable for submission. In case of
unacceptable plagiarism levels, the student shall resubmit the Project Work Report, after carrying out the necessary modifications/additions to his Project Work/Report as per his Supervisor’s advice, within the specified time, as suggested by the PRC.

iii) If any Student could not be present for PRC-II at the scheduled time (after approval and registration of his Project Work at PRC-I), his submission and presentation at the PRC-III time (or at any other PRC specified dates) may be treated as PRC-II performance evaluation, and delayed PRC-III dates for him may be considered as per PRC recommendations. Any Student is allowed to submit his M.Tech. Project Dissertation ‘only after completion of 40 weeks from the date of approval/registration’ of his Project, and after obtaining all approvals from the PRC.

iv) A total of 200 Marks are allotted for the M.Tech. Project Work, (out of which 100 Marks are allotted for internal evaluation and 100 Marks for external evaluation). For internal Evaluation of 100 marks, Project Supervisor shall evaluate for 60 marks based on the continuous Internal Evaluation(CIE) of the student’s performance and combined PRC-I, II & III performance evaluation will be for 40 marks (to be awarded by PRC, as SEE).

9.13 i) The Student shall be allowed to submit his Project Dissertation, only on the successful completion of all the prescribed PG Subjects (Theory and Labs.), Seminar, Comprehensive Viva-voce etc. (securing B Grade or above), and after obtaining all approvals from PRC. In such cases, the M.Tech. Dissertations will be sent to an External Examiner nominated by the Principal of the College, on whose ‘approval’, the Student can appear for the M.Tech. Project Viva-voce Examination, which shall be conducted by a Board, consisting of the PG Project Supervisor, Head of the Department, and the External Examiner who adjudicate the M.Tech. Project Work and Dissertation. The Board shall jointly declare the Project Work Performance as ‘satisfactory’, or ‘unsatisfactory’; and in successful cases, the External Examiner shall evaluate the Student’s Project Work presentation and performance for 100 Marks (SEE).

ii) If the adjudication report of the External Examiner is ‘not favourable’, then the Student shall revise and resubmit his Dissertation after one Semester, or as per the time specified by the External Examiner and/or the PRC. If the resubmitted report is again evaluated by the External Examiner as ‘not favourable’, then that Dissertation will be summarily rejected. Subsequent actions for such Dissertations may be considered, only on the specific recommendations of the External Examiner and/or PRC.

iii) In cases, where the Board declared the Project Work Performance as ‘unsatisfactory’, the Student is deemed to have failed in the Project Viva-voce Examination, and he has to reappear for the Viva-voce Examination as per the Board recommendations. If he fails in the second Viva-voce Examination also, he will not be considered eligible for the Award of the Degree, unless he is asked to revise and resubmit his Project Work by the Board within a specified time period (within 5 years from the date of commencement of his I Year I Semester).

(c) PG Part (MBA)

10.1 Theory Subjects are evaluated for 100 marks, and Practicals / Lab. Subjects are also evaluated for 100 marks.

10.2 PG Summer Internship, Seminar and Comprehensive Viva-voce shall be evaluated for 100 marks each.

10.3 There shall be a PG Summer Internship, preferably in an industry, to be taken up during the vacation, immediately after the IV year II Semester End Examinations. The Internship Activity shall be submitted in a Report form, and the student shall also deliver a Seminar (based on the PG Summer Internship) before the MBA Project Evaluation Committee (PEC); both the Report and the Seminar shall be evaluated for 100 marks each by the PEC, at the beginning
of the V Year I Semester. The PEC shall be constituted by the Head of Dept. or Principal/Director of the College/School, and shall consist of the Head of the Department, the Supervisor of PG Summer Internship Program/Seminar/PG Project and a Senior Faculty Member of the Department. There shall be no internal marks for this PG Summer Internship Program.

10.4 For theory subjects, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination. For the award of the 30 Internal (sessional) marks for theory subjects, there shall be 2 internal examinations during the Semester, one at the middle of the Semester and the other immediately after the completion of instructions; each of which shall be evaluated for 25 marks, and the better of these two internals shall be considered for awarding the 25 sessional marks. The remaining 5 sessional marks, will be awarded based on the student’s performance in the Assignments.

10.5 i) Every PGP Student shall be required to execute his MBA Project, under the guidance of the Supervisor assigned to him by the Head of Department. The PGP Project shall start immediately after the completion of the V Year I Semester, and shall continue through V Year II Semesters. The Student shall carry out the literature survey, select an appropriate topic and submit a Project Proposal within 6 weeks (immediately after his V Year I Semester End Examinations), for approval by the Project Review Committee (PRC). The PRC shall be constituted by the Head of Department, and shall consist of the Head of Department, Project Supervisor, and a Senior Faculty Member of the Department. The Student shall present his Project Work Proposal to the PRC (PRC-I Presentation), on whose approval he can ‘REGISTER’ for the PG Project. Every Student must compulsorily register for his MBA Project Work, within the 6 weeks of time-frame as specified above. After Registration, the Student shall carry out his work, and continually submit ‘a fortnightly progress report’ to his Supervisor throughout the Project period. The PRC will monitor the progress of the Project Work and review, through PRC-II and PRC-III Presentations – one at the end of the V Year II Semester, and one before the submission of MBA Project Work Report/Dissertation.

ii) After PRC-III presentation, the PRC shall evaluate the entire performance of the Student and declare the Project Report as ‘Satisfactory’ or ‘Unsatisfactory’. Every Project Work Report/Dissertation (that has been declared ‘satisfactory’) shall undergo ‘Plagiarism Check’ as per the University/College norms to ensure content plagiarism below a specified level of 30%, and to become acceptable for submission. In case of unacceptable plagiarism levels, the student shall resubmit the Project Work Report, after carrying out the necessary modifications/additions to his Project Work/Report as per his Supervisor’s advice, within the specified time, as suggested by the PRC.

iii) If any Student could not be present for PRC-II at the scheduled time (after approval and registration of his Project Work at PRC-I), his submission and presentation at the PRC-III time (or at any other PRC specified dates) may be treated as PRC-II performance evaluation, and delayed PRC-III dates for him may be considered as per PRC recommendations. Any Student is allowed to submit his MBA Project Dissertation ‘only after completion of 24 weeks from the date of approval/registration’ of his Project, and after obtaining all approvals from the PRC.

iv) A total of 200 Marks are allotted for the MBA Project Work, (out of which 100 Marks are allotted for internal evaluation and 100 Marks for external evaluation). For internal Evaluation of 100 marks, Project Supervisor shall evaluate for 60 marks based on the continuous Internal Evaluation(CIE) of the student’s performance and combined PRC-I, II & III performance evaluation will be for 40 marks (to be awarded by PRC, as SEE).

10.6 i) The Student shall be allowed to submit his Project Dissertation, only on the successful completion of all the prescribed PG Subjects (Theory and Labs.), Seminar, Comprehensive Viva-voce etc. (securing B Grade or above), and after obtaining all approvals from PRC. In such cases, the MBA. Dissertations will be sent to an External Examiner nominated by the Principal of the College, on whose ‘approval’, the
Student can appear for the MBA Project Viva-voce Examination, which shall be conducted by a Board consisting of the PG Project Supervisor, Head of the Department, and the External Examiner who adjudicated the MBA Project Work and Dissertation. The Board shall jointly declare the Project Work Performance as ‘satisfactory’, or ‘unsatisfactory’; and in successful cases, the External Examiner shall evaluate the Student’s Project Work presentation and performance for 100 Marks (SEE).

ii) If the adjudication report of the External Examiner is ‘not favourable’, then the Student shall revise and resubmit his Dissertation after one Semester, or as per the time specified by the External Examiner and/or the PRC. If the resubmitted report is again evaluated by the External Examiner as ‘not favourable’, then that Dissertation will be summarily rejected. Subsequent actions for such Dissertations may be considered, only on the specific recommendations of the External Examiner and/or PRC.

iii) In cases, where the Board declared the Project Work Performance as ‘unsatisfactory’, the Student is deemed to have failed in the Project Viva-voce Examination, and he has to reappear for the Viva-voce Examination as per the Board recommendations. If he fails in the second Viva-voce Examination also, he will not be considered eligible for the Award of the Degree, unless he is asked to revise and resubmit his Project Work by the Board within a specified time period (within 5 years from the date of commencement of his 1 Year 1 Semester).

10.7 There shall be a Comprehensive Viva at the end of the V year II Semester, for the award of 100 marks. The Comprehensive Viva-Voce shall be conducted by the PRC, with the addition of one more Senior Faculty Member of the Department/School. The Comprehensive Viva is aimed to assess the student’s understanding in various subjects studied during the PG part of Dual Degree Program. There are no internal marks for the Comprehensive Viva.

11.0 Grading Procedure

11.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals, 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 in Item 9 above, and a corresponding Letter Grade shall be given.

11.2 As a measure of the student’s performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed …
(a) For UG

<table>
<thead>
<tr>
<th>% of Marks Secured (Class Intervals)</th>
<th>Letter Grade (UGC Guidelines)</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% and above ((≥ 80%, ≤ 100%))</td>
<td>O (Outstanding)</td>
<td>10</td>
</tr>
<tr>
<td>Below 80% but not less than 70% ((≥ 70%, &lt; 80%))</td>
<td>A+ (Excellent)</td>
<td>9</td>
</tr>
<tr>
<td>Below 70% but not less than 60% ((≥ 60%, &lt; 70%))</td>
<td>A (Very Good)</td>
<td>8</td>
</tr>
<tr>
<td>Below 60% but not less than 55% ((≥ 55%, &lt; 60%))</td>
<td>B (Good)</td>
<td>7</td>
</tr>
<tr>
<td>Below 55% but not less than 50% ((≥ 50%, &lt; 55%))</td>
<td>B (above Average)</td>
<td>6</td>
</tr>
<tr>
<td>Below 50% but not less than 45% ((≥ 45%, &lt; 50%))</td>
<td>C (Average)</td>
<td>5</td>
</tr>
<tr>
<td>Below 45% but not less than 40% ((≥ 40%, &lt; 45%))</td>
<td>P (Pass)</td>
<td>4</td>
</tr>
<tr>
<td>Below 40% ((&lt; 40%))</td>
<td>F (FAIL)</td>
<td>0</td>
</tr>
<tr>
<td>Absent</td>
<td>Ab</td>
<td>0</td>
</tr>
</tbody>
</table>

(b) For PG

<table>
<thead>
<tr>
<th>% of Marks Secured (Class Intervals)</th>
<th>Letter Grade (UGC Guidelines)</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% and above ((≥ 80%, ≤ 100%))</td>
<td>O (Outstanding)</td>
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<td>8</td>
</tr>
<tr>
<td>Below 60% but not less than 55% ((≥ 55%, &lt; 60%))</td>
<td>B (Good)</td>
<td>7</td>
</tr>
<tr>
<td>Below 55% but not less than 50% ((≥ 50%, &lt; 55%))</td>
<td>B (above Average)</td>
<td>6</td>
</tr>
<tr>
<td>Below 50% ((&lt; 50%))</td>
<td>F (FAIL)</td>
<td>0</td>
</tr>
<tr>
<td>Absent</td>
<td>Ab</td>
<td>0</td>
</tr>
</tbody>
</table>

11.3 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.

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

11.5 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 (as listed in Items 8.8-8.9).

11.6 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
11.7 The Student passes the Subject/ Course only when he gets GP $\geq \frac{4}{6}$ (P Grade or above).

11.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points ($\Sigma CP$) secured from ALL Subjects/ Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

$$SGPA = \left( \frac{\Sigma_{i=1}^{N} C_i G_i}{\sum_{i=1}^{N} C_i} \right) \ldots \text{For each Semester,}$$

where ‘$i$’ is the Subject indicator index (takes into account all Subjects in a Semester), ‘$N$’ is the no. of Subjects ‘REGISTERED’ for the Semester (as specifically required and listed under the Course Structure of the parent Department), $C_i$ is the no. of Credits allotted to the $i$th Subject, and $G_i$ represents the Grade Points (GP) corresponding to the Letter Grade awarded for that $i$th Subject.

11.9 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

$$CGPA = \left( \frac{\sum_{j=1}^{M} C_j G_j}{\sum_{j=1}^{M} C_j} \right) \ldots \text{for all S Semesters registered}\$$

where ‘$M$’ is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has ‘REGISTERED’ from the 1$^{st}$ Semester onwards up to and inclusive of the Semester S (obviously $M > N$), ‘$j$’ is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), $C_j$ is the no. of Credits allotted to the $j$th Subject, and $G_j$ represents the Grade Points (GP) corresponding to the Letter Grade awarded for that $j$th Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

11.10 For Merit Ranking or Comparison Purposes or any other listing, ONLY the ‘ROUNDED OFF’ values of the CGPAs will be used.

11.11 For Calculations listed in Item 11.6 – 11.10, performance in failed Subjects/ Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/ Courses will also be included in the multiplications and summations. However, Mandatory Courses will not be taken into consideration.

11.12 Passing Standards:

i) A student shall be declared successful or ‘passed’ in a Semester, only when he gets a SGPA $\geq 5.00/6.00$ (at the end of that particular Semester); and a student shall be declared successful or ‘passed’ in the entire UGP, only when gets a CGPA $\geq 5.00/6.00$; subject to the condition that he secures a GP $\geq \frac{4}{6}$ (P Grade or above) in every registered Subject/ Course in each Semester (during the entire UGP/PGP) for the Degree Award, as required.

ii) In spite of securing P Grade or above in some (or all) Subjects/ Courses in any Semester, if a Student receives a SGPA $< 5.00/6.00$ and/or CGPA $< 5.00/6.00$ 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) -
(a) to go into the next subsequent Semester (subject to fulfilling all other attendance and academic requirements as listed under Items 7-8);

(b) to ‘improve his SGPA of such a Semester (and hence CGPA) to 5.00/ 6.00 or above’, by reappearing for ONE or MORE (as per Student’s choice) 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 he 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.

(iii) A Student shall be declared successful or ‘passed’ in any Non-Credit Subject/ Course, if he secures a ‘Satisfactory Participation Certificate’ for that Mandatory Course.

11.13 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.

12.0 Declaration of Results

12.1 Computation of SGPA and CGPA are done using the procedure listed in 11.6–11.10.

12.2 For Final % of Marks equivalent to the computed final CGPA, the following formula may be used ...

$$\text{% of Marks} = (\text{final CGPA} - 0.5) \times 10$$

13.0 Award of Degree

13.1 A Student who registers for all the specified Subjects/ Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes all the examinations prescribed in the entire IDP E&T Programme and secures the required number of 174 for UGP and 80 Credits for PGP (with CGPA ≥ 5.0/ 6.0), within 10 Academic Years from the Date of Commencement of the First Academic Year, shall be declared to have ‘QUALIFIED’ for the Award of the B.Tech.+M.Tech./MBA Degree (UGP and PGP) in the chosen Branch of Engineering as selected at the time of Admission.

13.2 A Student who qualifies for the Award of UG + PG Degree as listed in Item 13.1 shall be placed in the following Classes ...

13.3 Students with final CGPA (at the end of the IDP) for both UGP/ PGP ≥ 8.00/ 7.75, and fulfilling the following conditions -

(i) should have passed all the Subjects/Courses in ‘FIRST APPEARANCE’ within the first 5 Academic Years (or 10 Sequential Semesters) from the Date of Commencement of his First Academic Year,

(ii) should have secured a CGPA ≥ 8.00/ 7.75, at the end of each of the 10 Sequential Semesters, starting from the I Year I Semester onwards,

(iii) should not have been detained or prevented from writing the End Semester Examinations in any Semester due to shortage of attendance or any other reason, shall be placed in ‘FIRST CLASS with DISTINCTION’.

Students having final CGPA (at the end of IDP) for both UGP/ PGP ≥ 8.00/ 7.75, but not fulfilling the above conditions shall be placed in ‘FIRST CLASS’.
13.4 Students with final CGPA (at the end of the IDP) for UGP/ PGP \( \geq 6.50/ 6.75 \) but < 8.00/ 7.75, shall be placed in ‘FIRST CLASS’.

13.5 Students with final CGPA (at the end of the IDP) for both UGP/ PGP \( \geq 5.50/ 6.00 \) but < 6.50/ 6.75, shall be placed in ‘SECOND CLASS’.

13.6 All other Students who qualify for the Award of the Degree (as per Item 13.1), with final CGPA (at the end of the IDP) for UGP \( \geq 5.00 \) but < 5.50, shall be placed in ‘PASS CLASS’.

13.7 A student with final CGPA (at the end of the IDP) for UGP < 5.00 will not be eligible for the Award of the B. Tech Degree.

13.8 A student with final CGPA (at the end of the IDP) for PGP < 6.00 will not be eligible for the Award of the M. Tech / MBA Degree.

13.9 Students fulfilling the conditions listed under Item 13.1 alone will be eligible candidates for - ‘University Rank’ and ‘Gold Medal’ considerations.

14.0 Withholding of Results

14.1 If the student has not paid fees to University/ College at any stage, or has pending dues against his name due to any reason whatsoever, or if any case of indiscipline is pending against him, the result of the student may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

15.0 Transitory Regulations

15.1 Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the Degree Programme, may be considered eligible for readmission to the same Subjects/ Courses (or equivalent Subjects/ Courses, as the case may be), and same Professional Electives/ Open Electives (or from set/category of Electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 10 years from the Date of Commencement of his I Year I Semester).

16.0 Student Transfers

16.1 There shall be no Branch transfers after the completion of Admission Process.

16.2 There shall be no transfer among the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

17.0 Scope

i) Where the words “he”, “him”, “his”, occur in the write-up of regulations, they include “she”, “her”, “hers”.

ii) Where the words “Subject” or “Subjects”, occur in these regulations, they also imply “Course” or “Courses”.

iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.

iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor/ Principal is final.

v) The College may change or amend the Academic Regulations, Course Structure or Syllabi at any time, and the changes or amendments made shall be applicable to all Students with effect from the dates notified by the College Authorities.
MALPRACTICE RULES
The following Malpractice rules are applicable to both Internal Examinations/SEE/Supplementary Examinations:

<table>
<thead>
<tr>
<th>Nature of Malpractices</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the candidate:</td>
<td></td>
</tr>
<tr>
<td>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)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only.</td>
</tr>
<tr>
<td>1 (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.</td>
<td>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.</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>3 Impersonates any other candidate in connection with the examination.</td>
<td>The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all 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.</td>
</tr>
<tr>
<td>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.</td>
<td>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</td>
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<tr>
<td>5</td>
<td>Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.</td>
</tr>
<tr>
<td>6</td>
<td>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.</td>
</tr>
<tr>
<td>7</td>
<td>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</td>
</tr>
<tr>
<td>8</td>
<td>Possess any lethal weapon or firearm in the examination hall.</td>
</tr>
<tr>
<td>9</td>
<td>If student of the college, who is not a candidate for the particular</td>
</tr>
<tr>
<td>Clause</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>1</td>
<td>Examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.</td>
</tr>
<tr>
<td>10</td>
<td>Comes in a drunken condition to the examination hall.</td>
</tr>
<tr>
<td>11</td>
<td>Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.</td>
</tr>
<tr>
<td>12</td>
<td>If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the College / University for further action to award suitable punishment.</td>
</tr>
</tbody>
</table>
# Electronic and Communication Engineering

## Course Structure

(Applicable from the batch admitted from the Academic Year 2015-16 and onwards)

### I Year

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Group</th>
<th>Subject</th>
<th>L</th>
<th>T</th>
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NSS/NCC/NSO

| Total Credits | 17 | 2 | 12 | 24 |

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| Total Credits | 18 | 4 | 9 | 24 |

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| Total Credits | 20 | 2 | 9 | 24 |
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During Summer Vacation between III and IV Years: Industry Oriented Mini Project
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<td>Jet propulsion and Rocket Engineering</td>
<td>Mechanical Engineering</td>
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<td>Ergonomics</td>
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<td>Mechatronics</td>
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<td>Electronics and Communication</td>
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<td>Cyber Security</td>
<td>Computer Science and Engineering</td>
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<td>Database Management Systems</td>
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<td>Corrosion Engineering</td>
<td>Metallurgical Engineering</td>
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<td>Testing of Materials</td>
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<td>13</td>
<td>Solid Waste Management</td>
<td>Chemical Engineering</td>
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</table>
Professional Elective (PE) Subjects Lists

PE-I
1. Cellular and Mobile Communications
2. Computer Organization and Operating Systems
3. Digital Image Processing
4. Television Engineering

PE-II
1. Computer Networks
2. Digital System Design
3. Electronic Measurements and Instrumentation
4. Scripting Languages

PE-III
1. Radar Systems
2. Optical Communications
3. Satellite Communications
4. Artificial Neural Networks

PG Elective (PG E) Subjects List

PG E – I
1. Transform Techniques
3. RF Circuit Design

PG E – II
1. VLSI Technology and Design
2. Advanced Data Communications
3. Detection and Estimation Theory

PG E – III
1. Adhoc Wireless and Sensor Networks
2. Random Processes and Queuing Theory
3. TCP / IP and ATM Networks

PG E – IV
1. Adaptive Signal Processing
2. Embedded System Design
3. Network Security and Cryptography

PG E – V
1. Image and Video Processing
2. 4G Technologies
3. Multimedia and Signal Coding

PG E – VI
1. Coding Theory and Techniques
2. Software Defined Radio
3. Spread Spectrum Communications

PG E – VII
1. Digital Signal Processors and Architectures
2. Speech and Audio Signal Processing
3. Radar Signal Processing
### IV YEAR

#### I SEMESTER

<table>
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<tr>
<th>S.No.</th>
<th>Group</th>
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<td>PE-III (UG)</td>
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<td>EAC (UG)</td>
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**Total Credits** 30

#### II SEMESTER

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<td>Research Methodology and Statistical Analysis</td>
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<td>Business Law and Regulation</td>
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<td>PGC Lab</td>
<td>Statistical Analysis Lab using SPSS / Excel</td>
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**Total Credits** 28

### V YEAR

#### I SEMESTER

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**Total Credits** 30

#### II SEMESTER

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**Total Credits** 22
Core & Electives:

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<tr>
<th>Group</th>
<th>Marketing/HR/Finance/Systems</th>
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<td>PGC-I</td>
<td>Marketing Management</td>
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<tr>
<td>PGC-II</td>
<td>Human Resource Management</td>
</tr>
<tr>
<td>PGE-I</td>
<td>Sales and Distribution / Training and Development / Financial Management / Management Information System</td>
</tr>
<tr>
<td>PGC Lab</td>
<td>Soft Skills Lab</td>
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<tr>
<td>PGC-III core</td>
<td>Research Methodology &amp; Statistical Analysis</td>
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<td>PGC-IV core</td>
<td>Business Law &amp; Regulation</td>
</tr>
<tr>
<td>PGE-II</td>
<td>Integrated Marketing Communications / Management of Industrial Relations / Security Analysis and Portfolio Management / Enterprise Resource Planning</td>
</tr>
<tr>
<td>PGC Lab</td>
<td>Statistical Analysis Lab using SPSS / Excel</td>
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<tr>
<td>PGC –V Core</td>
<td>Strategic Management</td>
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<tr>
<td>PGE-III</td>
<td>Retailing Management / Compensation &amp; Reward Management / Strategic Investment and Financing Decisions/E-Business</td>
</tr>
<tr>
<td>PGE-IV</td>
<td>Services Marketing / Management of Change / International Financial Management/Cyber Security</td>
</tr>
<tr>
<td>PGE-V</td>
<td>International Marketing / Performance Management / Derivatives / Information System Control and Audit</td>
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</tbody>
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*Students are advised to take prior approval from the Mentor of the Department of H&SS before selecting and finalizing the Electives.*
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) I Year I-Sem

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MATHEMATICS – I
(Common to all Branches)

Pre Requisites: NIL

Course Objectives:
- To train the students thoroughly in mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical Concepts of differential and integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students’ abilities to formulate and modeling the problems, to think creatively and to synthesize information.

Course Outcomes:
At the end of the course, the student will be able to:
- Become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineering problems.
- Attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.

UNIT–I: Differential calculus
(12 lectures)
Rolle’s Mean value Theorem – Lagrange’s Mean Value Theorem – Cauchy’s mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.
Curve tracing – Equations given in Cartesian, polar and parametric forms.
Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints-Method of Lagrange multipliers.

UNIT–II: Improper Integrals, Multiple Integration
(12 lectures)
Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.
Multiple integrals – double and triple integrals – change of order of integration- change of variables (polar, cylindrical and spherical) . Finding the area of a region using Double integration and volume of a region in space using triple integration.

UNIT–III: Vector Calculus
(12 lectures)

UNIT–IV: First Order Ordinary Differential Equations
(10 lectures)
Linear and exact differential equations
Applications of first order differential equations – Newton’s Law of cooling, Law of natural growth and decay, orthogonal trajectories and electrical circuits

UNIT–V: Higher Order Ordinary Differential Equations
(10 lectures)
Linear, homogeneous and non- homogeneous differential equations of second and higher order with constant coefficients. Non-homogeneous term of the type $e^{ax}$, Sin ax, Cos ax, and $x^n$, $e^{ax}V(x)$, $x^n V(x)$. Method of variation of parameters. Applications: Bending of beams, Electrical circuits and simple harmonic motion.
Text books:
1) **HIGHER ENGINEERING MATHEMATICS BY B S GREWAL, KHANNA PUBLICATIONS.**
2) **ENGINEERING MATHEMATICS BY ERWIN KREYSZIG, WIELY PUBLICATIONS.**
3) **VECTOR ANALYSIS BY GHOSG & MAITY, NEW CENTRAL BOOK AGENCY.**

References:
1) Engineering Mathematics By Srimantapal & Subodh C. Bhunia, Oxford University Press.
2) **ADVANCED ENGINEERING MATHEMATICS BY PETER V O'NEIL, CENGAGE LEARNING.**
1. INTRODUCTION:
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students’ handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read the topics selected for discussion on their own in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material, etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

2. OBJECTIVES:
- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.
- To enable students to develop their listening skill so that they may appreciate its role in the LSWR skills approach to language and improve their pronunciation
- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.
- To make students aware of the role of speaking in English and its contribution to their success.
- To enable students to express themselves fluently and appropriately in social and professional contexts.
- To develop an awareness in the students about the significance of silent reading and comprehension.
- To develop the ability of students to guess the meanings of words from context and grasp the overall messages of the text, draw inferences etc.
- To develop an awareness in the students about writing an exact and formal skill.
- To equip them with the components of different forms of writing, beginning with the lower order ones.

LEARNING OUTCOMES:
1. Use of English Language - written and spoken.
2. Enrichment of comprehension and fluency
SYLLABUS:

Listening Skills:
Objectives
1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them, to distinguish between them, to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:
Objectives
1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: Skills Annexe–Functional English for Success)
- Just A Minute (JAM) Sessions.

Reading Skills:
Objectives
1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences, etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Scanning
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

NOTE: The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:
Objectives
1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
• Narration / description
• Note Making
• Formal and informal letter writing
• Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

For Detailed study: First Textbook: “Skills Annexe -Functional English for Success”, Published by Orient Black Swan, Hyderabad

For Non-detailed study
Second Textbook “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad.
• The course content and study material is divided into Five Units.

Unit –I
1. Chapter entitled ‘Wit and Humour’ from ‘Skills Annexe’ -Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘Mokshagundam Visvesvaraya’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad.

L - Listening for Sounds, Stress and Intonation
S - Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)
R - Reading for Subject/ Theme- The Palm Islands from Epitome of Wisdom is for Reading Comprehension
W - Writing Paragraphs
G - Types of Nouns and Pronouns
V - Homonyms, Homophones & Homographs

Unit –II
1. Chapter entitled “Cyber Age” from “Skills Annexe -Functional English for Success” Published by Orient Black Swan, Hyderabad.
2. Report Writing (First & Second Textbooks)
   L - Listening for themes and facts
   S - Apologizing, interrupting, requesting and making polite conversation
   R- Reading for theme and gist- The 1 Thing Every Business Executive Must Understand about Social Media by Dave Kerpen from Skills Annexe is for Reading Comprehension
   W - Describing people, places, objects, events
   G - Verb forms
   V - Noun, Verb, Adjective and Adverb

Unit –III
1. Chapter entitled ‘Risk Management’ from “Skills Annexe -Functional English for Success” Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘Leela’s Friend’ by R.K. Narayan from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad

L - Listening for main points and sub-points for note taking
S - Giving instructions and directions; Speaking of hypothetical situations
R - Reading for details- Sivakasi: Who to Blame for the Frequent Fire Accidents in India’s Largest Fireworks Industry Hub? by Amrutha Gayathri from Skills Annexe & Forensic Science from Epitome of Wisdom are for Reading Comprehension
W - Note-making, Information transfer, Punctuation
G - Present tense
V - Synonyms and Antonyms
Unit –IV

1. Letter Writing – Writing formal letters, letter of application along with curriculum vitae (First & Second Textbooks)
2. Chapter entitled ‘The Last Leaf’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad
3. Listening for specific details and information
4. Narrating, expressing opinions and telephone interactions
5. Reading for specific details and information- What I Cherish Most by V. S. Srinivasasastri from Skills Annexe & Choose How to Start Your Day from Epitome of Wisdom are for Reading Comprehension
6. Writing e-mails
7. Past and Future tenses
8. Vocabulary - Idioms and Phrasal verbs

Unit –V

1. Chapter entitled ‘Sports and Health’ from “Skills Annexe - Functional English for Success” Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘The Convocation Speech’ by N.R. Narayanmurthy’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad
3. Critical Listening and Listening for speaker’s tone/ attitude
4. Group discussion and Making presentations
5. Critical reading, reading for reference - Benefits of Physical Activity from Skills Annexe & What is meant by Entrepreneurship? from Epitome of Wisdom are for Reading Comprehension
6. Project proposals; Project Reports and Research Papers
7. Adjectives, Prepositions and Concord
8. Collocations and Technical vocabulary, Using words appropriately
  Exercises from the texts not prescribed shall be used for classroom tasks.

REFERENCES:
2. Murphy’s English Grammar with CD, Murphy, Cambridge University Press.
4. Technical Communication, Meenakshi Raman, Oxford University Press
5. Practical English Usage, Michael Swan, Oxford University Press
12. Everyday Dialogues in English, Robert J. Dixon, Prentice Hall India Pvt Ltd.,
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) I Year I-Sem

COMPUTER PROGRAMMING AND DATA STRUCTURES

Prerequisites:
There are no prerequisites for this course, except that anyone who wants to learn C should have analytical skills and logical reasoning.

Course Objectives:
• This course starts from the basics of computers and program development.
• It covers various concepts of C programming language
• It introduces searching and sorting algorithms
• It provides an understanding of data structures such as stacks and queues.

Course Outcomes:
At the end of the course, the student will be able to:
• Develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists.
• Implement searching and sorting algorithms

UNIT - I

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

UNIT – II
Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programs

UNIT – III
Arrays and Strings – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples. Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

UNIT - IV
Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.
Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

UNIT – V
Sorting and Searching selection sort, bubble sort, insertion sort, linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:
6. C Programming & Data Structures,E.Balagurusamy, TMH.
7. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) | Year I-Sem

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ENGINEERING GRAPHICS

Pre-requisites: Nil

Course objectives:
- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes:
At the end of the course, the student will be able to:
- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT – I
INTRODUCTION TO ENGINEERING DRAWING :

UNIT- II
ORTHOGRAPHIC PROJECTIONS:

UNIT – III
Projections of Regular Solids – Auxiliary Views.

UNIT – IV
Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.
Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone

UNIT – V
ISOMETRIC PROJECTIONS :
Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions
Auto CAD: Basic principles only

TEXT BOOKS:
1. Engineering Drawing N.D. Bhatt / Charotar

REFERENCE BOOKS:
1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand
IDP (B.Tech. ECE & M.Tech./MBA) | Year I-Sem

ENVIRONMENTAL SCIENCE

Prerequisites: NIL

Objectives:
- Creating the awareness about environmental problems among students.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating students to participate in environment protection and environment improvement.

Outcomes:
At the end of the course, it is expected that students will be able to:
- Identify and analyze environmental problems as well as the risks associated with these problems
- Understand what it is to be a steward in the environment
- Studying how to live their lives in a more sustainable manner

UNIT-I
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:
Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES:
- Renewable and non-renewable resources
- Natural resources and associated problems
- Forest resources
- Use and over – exploitation, deforestation, case studies
- Timber extraction
- Mining, dams and other effects on forest and tribal people
- Water resources
- Use and over utilization of surface and ground water
- Floods, drought, conflicts over water, dams
- benefits and problems
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies
- Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II
ECOSYSTEMS:
- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

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

UNIT-IV
Environmental Pollution:
- Definition, Cause, effects and control measures of:
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

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

**UNIT - V**


**FIELD WORK**: Visit to a local area to document environmental assets River / forest / grassland / hill / mountain - Visit to a local polluted site - Urban / Rural / industrial / Agricultural Study of common plants, insects, birds. - Study of simple ecosystems (pond, river, hill slopes, etc.).

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

**REFERENCE:**
1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
COMPUTER PROGRAMMING AND DATA STRUCTURES LAB

Week 1:
1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.

Week 2:
5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 3:
9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices

Week 4:
11. Write a C program that uses functions to perform the following operations:
   i) To insert a sub-string into a given main string from a given position.
   ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not
13. Write a C program that displays the position or index in the string S where the string T begins, or –1 if S doesn’t contain T.
14. Write a C program to count the lines, words and characters in a given text.

Week 5:
15. Write a C program to generate Pascal’s triangle.
16. Write a C program to construct a pyramid of numbers.
17. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
   \[1 + x + x^2 + x^3 + \ldots \ldots + x^n\]
For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 6:
18. 2’s complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2’s complement of 11100 is 00100. Write a C program to find the 2’s complement of a binary number.
19. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 7:
20. Write a C program that uses functions to perform the following operations:
i) Reading a complex number  
ii) Writing a complex number  
iii) Addition of two complex numbers  
iv) Multiplication of two complex numbers  
(Note: represent complex number using a structure.)

Week 8:
21. i) Write a C program which copies one file to another.  
     ii) Write a C program to reverse the first n characters in a file.  
     (Note: The file name and n are specified on the command line.)
22. i) Write a C program to display the contents of a file.  
     ii) Write a C program to merge two files into a third file (i.e., the contents of the first file followed 
         by those of the second are put in the third file)

Week 9:
23. Write a C program that uses functions to perform the following operations on singly linked list.:  
     i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 10:
24. Write C programs that implement stack (its operations) using  
     i) Arrays ii) Pointers  
25. Write C programs that implement Queue (its operations) using  
     i) Arrays ii) Pointers

Week 11:
26. Write a C program that implements the following sorting methods to sort a given list of integers in 
     ascending order  
     i) Bubble sort ii) Selection sort

Week 12:
27. Write C programs that use both recursive and non recursive functions to perform the following 
     searching operations for a Key value in a given list of integers:  
     i) Linear search ii) Binary search
The Language Lab focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives**
- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

**Learning Outcomes**
- Better Understanding of nuances of language through audio-visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

**SYLLABUS**

English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

**Exercise – I**
**CALL Lab**: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
**ICS Lab**: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

**Exercise – II**
**CALL Lab**: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

**Exercise - III**
**CALL Lab**: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.
**ICS Lab**: Descriptions- Narrations- Giving Directions and guidelines.
Sequence of Tenses, Question Tags and One word substitutes.

**Exercise – IV**
**CALL Lab**: Intonation and Common errors in Pronunciation.
**ICS Lab**: Extempore- Public Speaking
Active and Passive Voice, –Common Errors in English, Idioms and Phrases
Exercise – V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills
Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:
The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
   i) P – IV Processor
      a) Speed – 2.8 GHZ
      b) RAM – 512 MB Minimum
      c) Hard Disk – 80 GB
   ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab:
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T.V., a digital stereo – audio & video system and camcorder etc.

Suggested Software:
- Cambridge Advanced Learners’ English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley
- Punctuation Made Easy by Darling Kindersley
- Clarity Pronunciation Power – Part I
- Clarity Pronunciation Power – part II
- Oxford Advanced Learner’s Compass, 8th Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
- Raman, M & Sharma, S. 2011. Technical Communication, OUP

SUGGESTED READING:
4. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
10. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

**DISTRIBUTION AND WEIGHTAGE OF MARKS**

*English Language Laboratory Practical Examination:*

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 sessional marks and 70 semester-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

* * * * *
Pre-requisites: Practical skill

Objectives:
• To Study of different hand operated power tools, uses and their demonstration.
• To gain a good basic working knowledge required for the production of various engineering products.
• To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
• To develop a right attitude, team working, precision and safety at work place.
• It explains the construction, function, use and application of different working tools, equipment and machines.
• To study commonly used carpentry joints.
• To have practical exposure to various welding and joining processes.
• To understanding the computer hardware and practice the Assembly of computer parts.
• To practice the process of Installation of operating system windows.

Outcomes:
At the end of the course, the student will be able to:
• Better understanding the process of assembly of computer parts and installation of different software’s.
• Study and practice on machine tools and their operations
• Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
• Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
• Apply basic electrical engineering knowledge for house wiring practice.

I. TRADES FOR EXERCISES :
(Any six trades from the following with minimum of two exercises in each trade)
1. Carpentry
2. Fitting
3. Tin-Smithy
4. Black Smithy
5. House-wiring
6. Foundry
7. Plumbing

II. Trades for Demonstration & Exposure
1. Demonstration of power tools & wiring
2. Welding
3. Machine Shop

III. IT Workshop I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT Workshop II: Installation of operating system windows and Linux simple diagnostic exercises.
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MATHEMATICS – II
(Common to all Branches)

Pre Requisites: NIL

Course Objectives:
• Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

Course Outcomes:
At the end of the course, the student will be able to:
• gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.

UNIT–I: Linear ODE with variable coefficients and series solutions (8 lectures)
Equations reducible to constant coefficients-Cauchy’s and Legendre’s differential equations. Motivation for series solutions, Ordinary point and Regular singular point of a differential equation, Transformation of non-zero singular point to zero singular point. Series solutions to differential equations around zero, Frobenius Method about zero.

Unit-II: Special Functions (8 lectures)
Bessel’s Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function, Trigonometric expansions involving Bessel functions.

UNIT–III: Laplace Transform (8 lectures)
Definition of integral transform. Domain of the function and Kernel for the Laplace transforms, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by “t”. Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac’s delta function, Periodic function – Inverse Laplace transform by Partial fractions( Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by “s”, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem-solving differential equations by Laplace transforms

UNIT – IV: Fourier series and Fourier Transforms (8 lectures)

UNIT-V: Partial Differential Equations (10 lectures)

Text books:
1) HIGHER ENGINEERING MATHEMATICS BY B S GREWAL, KHANNA PUBLICATIONS.
2) ENGINEERING MATHEMATICS BY ERWIN KREYSZIG, WIELY PUBLICATIONS

References:
1) ENGINEERING MATHEMATICS BY SRIMANTAPAL & SUBODH C. BHUNIA, OXFORD UNIVERSITY PRESS.
2) ADVANCED ENGINEERING MATHEMATICS BY PETER V O’NEIL, CENGAGE LEARNING
Pre-requisite: Nil

Course Objectives:
• To introduce the concept of electrical circuits and its components.
• To introduce the characteristics of various electronic devices.
• To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

Course Outcomes:
At the end of the course, the student will be able to:
• To analyze and solve electrical circuits using network laws and theorems.
• To design & analyse various circuits using electronic components viz. diodes, transistors & other special purpose devices.

UNIT- I ELECTRICAL and SINGLE PHASE AC CIRCUITS
Electrical Circuits: R-L-C Parameters, Voltage and Current, Independent and Dependent Sources, Source Transformation – V-I relationship for passive elements, Kirchoff’s Laws, Network reduction techniques – series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis,

Single Phase AC Circuits: R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation.

UNIT- II RESONANCE and NETWORK THEOREMS
Resonance: Series resonance and Parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.
Network Theorems: Thevenin’s, Norton’s, Maximum Power Transfer, Superposition, Reciprocity, Tellegen’s, Millman’s and Compensation theorems for DC and AC excitations.

UNIT- III P-N JUNCTION DIODE & DIODE CIRCUITS
P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.
Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT- IV BIPOLAR JUNCTION TRANSISTOR
Transistor Biasing And Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in $V_{BE}$ and $\beta$, Bias Compensation using Diodes and Transistors.
Transistor Configurations: BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

UNIT- V JUNCTION FIELD EFFECT TRANSISTOR & SPECIAL PURPOSE DEVICES
**Special Purpose Devices:** Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

**TEXT BOOKS:**

**REFERENCES:**
1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal –
4. Wiley India Pvt. Ltd. 1/e 2009.
7. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
Prerequisites: Nil

Course Objectives:
The course primarily aims at understanding the behavior of matter in the condensed state and tries to explore the causes with reference to micro level mechanism of the solid matter. The objective of the first chapter is to study the micro level behavior of the quantum particles of the matter and their nature as wave and particle and hence to estimate the statistics of the phenomenon arising out of their nature of existence. The second chapter aims at to assess the drawbacks of the free electron theory leading to the introduction of the Band Theory of Solids. In the third, fourth, fifth, sixth, seventh and tenth chapters the different natures of the solid matter are taken as the main task discuss. In the eighth chapter, it is expected to understand the basic principles behind the coherent artificial light source (LASER) with reference to their construction, mechanism, operation and classification etc. The ninth chapter is explicitly aimed at to study an advanced communication system presently ruling the world throughout i.e. Fiber Optic communication system.

Course Outcomes:
The understanding of properties of matter is an essential part to utilize them in various applications in different walks of life. In most of the cases, the behavior of matter as solid material body purely depends upon the internal micro level nature, structure and characters. By studying first few chapters the students as graduates can acquire the knowledge of the connection between the micro level behavior of the matter as fundamental particles and the macro level real time characters of the material bodies. The quantum mechanism in phenomena can best be understood and analyzed by estimating the statistics of the phenomena. The study of chapters on Laser and fiber optics forms basis for understanding an advanced communication system. Other chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

UNIT-I


UNIT-II


UNIT-III
5. Dielectric Properties: Basic definitions, Electronic, Ionic (Quantitative) and Orientation Polarizations (Qualitative) and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro-electricity.

7. **Superconductivity:** Introduction to Superconductivity, Properties of Superconductors, Meissner Effect, BCS theory, Type-I and Type –II Superconductors, Magnetic Levitation and Applications of Superconductors.

**UNIT-IV**


**UNIT-V**

10. **Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-Gel, Precipitation, Combustion Methods; Top-Down Fabrication: Chemical Vapor Deposition, Physical Vapor Deposition, Characterization Techniques(XRD, SEM &TEM) and Applications of Nanotechnology.

**Text books:**
2. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
4. Solid State Physics by A J Dekker, MACMILLAN INDIA LTD.

**References:**
1. Modern Engineering Physics by Dr.K.Vijaya Kumar, Dr. S. Chandralingam, S.CHAND & COMPANY LTD
4. Introduction to Nanotechnology by Charles P.Poole, Jr.Frank J owns, John Wiley & sons
Prerequisites: Nil

Course objectives:
- To inculcate the basic concepts of Chemistry required to make the student to develop the innovative materials for the development of technological arena.
- The latest techniques and skills for the treatment of raw water, facing the endanger of corrosion of structures and producing the polymers in varied applications.

Course Outcomes:
At the end of the course, the student will be able to:
- Gain knowledge of various skills to control the corrosion of huge structures. The analysis of raw water and its treatment to provide soft water. The technologies to result polymers with multiple applications are understood. The principles of electrochemistry and batteries are clearly understood by the students.

Unit-I: Water and its treatment

Unit-II: Electrochemistry and corrosion


Unit-III: High Polymers
Definition – Classification of polymers with examples – Types of polymerisation – Chain growth (free radical addition mechanism), step growth polymerization, Plastics, fibres and elastomers - definition and characteristics. Plastics – thermoplastic and thermosetting plastics, compounding of plastics. Fibre reinforced plastics. Preparation, properties and Engineering applications of PVC, Teflon, Bakelite, Nylon 6:6 and terylene (Dacron); Rubber – Natural rubber , its processing and vulcanization. Elastomers: Preparation, properties and applications of Styrene butadiene, butyl and thiokol rubbers. Conducting polymers – Classification with examples; mechanism of conduction in trans-polyacetylene and applications of conducting polymers. Biodegradable polymers – concept and advantages - Polylactic acid and its applications.

Unit-IV: Chemistry of Energy sources
Fuels: Classification of fuels - characteristics of a good fuel . Solid fuels: Coal – Analysis of coal by proximate and ultimate methods. Liquid fuels- Petroleum and its refining. Characteristics and uses of

**Combustion** – Definition, calorific value, HCV and LCV. Calculation of air quantity required for combustion of a fuel - Numerical problems.

**Alternate Energy sources** : Biodiesel - trans-esterification - advantages of biodiesel, fuel cells (H2-O2 and Methanol –O2 fuel cell).

**Unit-V : Batteries and Materials**

**Batteries** : Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell). Secondary battery (lead acid, Ni-Cd and lithium ion cell)

**Liquid crystal polymers** : classification, characteristics and applications.

**Insulators** - Characteristics and applications of thermal and electrical insulators.

**Nanomaterials** : Introduction. Preparation of nanomaterials by top down and bottom up approaches. Carbon nano fibres, and fullerenes - Applications of nanomaterials.

**Text Books:**

**Reference Books:**
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) I Year II-Sem

ENGINEERING MECHANICS

Prerequisites: Nil

Course Objectives:
During this course, students should develop the ability to:

- Work comfortably with basic engineering mechanics concepts required for analyzing static structures.
- Identify an appropriate structural system to studying a given problem and isolate it from its environment.
- Model the problem using good free-body diagrams and accurate equilibrium equations.
- Identify and model various types of loading and support conditions that act on structural systems.
- Apply pertinate mathematical, physical and engineering mechanical principles to the system to solve and analyze the problem.
- Understand the meaning of centers of gravity (mass)/centroids and moments of Inertia using integration methods.
- Communicate the solution to all problems in an organized and coherent manner and elucidate the meaning of the solution in the context of the problem.

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

- solve problems dealing with forces in a plane or in space and equivalent force Systems.
- solve beam and cable problems and understand distributed force systems.
- solve friction problems and determine moments of Inertia and centroid using integration methods.
- understand and know how to solve three-dimension force and moment problems.
- understand and know how to use vector terminology.

UNIT – I

UNIT – II

UNIT – III

UNIT – IV
UNIT – V

TEXT BOOKS:

REFERENCES:
1. Engineering Mechanics (Statics and Dynamics) by Hibbler; Pearson Education.
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COMPUTATIONAL MATHEMATICS
(Common to all Branches)

Pre Requisites: NIL

Course Objectives:
- This course aims at providing the student with the concepts of matrices, numerical techniques and curve fitting.

Course Outcomes:
At the end of the course, the student will be able to:
- analyze engineering problems using the concepts of Matrices and Numerical Methods.

UNIT-I: Matrices and Linear Transformations
(8 lectures)

UNIT–II: Interpolation and Curve fitting
(5 lectures)

UNIT–III: Numerical techniques
(5 lectures)
Solution of Algebraic and Transcendental Equations and Linear system of equations.

UNIT- IV: Numerical Differentiation, Integration:
(5 lectures)

UNIT – V: Numerical solutions of First order differential equations
(5 lectures)

Text Books:
1) Introductory Methods Of Numerical Analysis By Ss Sastry
3) Numerical Methods, Principles, Analysis And Algorithms By Srimantapal & Subodh C. Bhunia, Oxford University Press.
References:
1) Advanced Engineering Mathematics By Alan Jeffery
3) Numerical Methods In Science And Engineering –A practical Approach By S.Rajasekharan, S.Chand Publications
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IDP (B.Tech. ECE & M.Tech. /MBA) I Year II-Sem

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

PART A: ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

- Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB’s
- Identification, Specifications and Testing of Active Devices, Diodes, BJT’s, Low power JFET’s, MOSFET’s, Power Transistors, LED’s, LCD’s, SCR, UJT.

  Study and operation of
  - Multimeters (Analog and Digital)
  - Function Generator
  - Regulated Power Supplies
  - CRO.

PART B: (For Laboratory examination – Minimum of 09 experiments to be conducted)

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator
3. Input & Output characteristics of Transistor in CB / CE configuration
4. Full Wave Rectifier with & without filters
5. Input and Output characteristics of FET in CS configuration
6. Measurement of h-parameters of transistor in CB, CE, CC configurations
7. SCR Characteristics.
8. Verification of KVL and KCL.
10. Verification of Superposition and Reciprocity theorems.
11. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
12. Experimental determination of Thevenin’s and Norton’s equivalent circuits and verification by direct test.
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LIST OF EXPERIMENTS:

1. Study of characteristics of LED and LASER sources.
2. Magnetic field along the axis of current carrying coil-Stewart and Gee’s method.
3. Study of characteristics of p-i-n diode detectors.
4. Determination of frequency of A.C Mains-Sonometer.
5. Torsional pendulum.
8. L-C-R circuit.
9. Time constant of an R-C Circuit.
10. Characteristics of solar cell
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) I Year II-Sem

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COMPUTATIONAL MATHEMATICS LAB
(Common to all Branches)

UNIT- I: Interpolation
Programming Tasks:
A) Write a program to determine y for a given x, if two arrays of x and y of same size are given (using Newton’s interpolation both forward and backward).
B) Write a program to determine y for a given x, if two arrays of x and y of same size are given. (using Lagrange’s interpolation).
C) Write a program to determine y for a given x, if two arrays of x and y of same size are given. (using Gauss interpolation).
(Selection criteria of the interpolation formula are important.)

UNIT- II: Curve fitting
Programming Tasks:
A) Write a program to find a line of best fit from the given two arrays of x and y of same size.
B) Write a program to find a curve of the form \( y = Ae^{Bx} \) from the given two arrays of x and y of same size.
C) Write a program to find a curve of the form \( y = Ax^B \) from the given two arrays of x and y of same size.
D) Write a program to find a curve of the form \( y = Ax^2 + Bx + C \) from the given two arrays of x and y of same size.

UNIT- III: Solution of Algebraic and Transcendental Equations
Programming Tasks:
A) Write a program to find the root of a given equation using bisection method. (Write this program such that the initial values given to the system are not usable, then the system should ask us to give new set of initial values).
B) Write a program to find the root of a given equation using method of false position (regula false position).
C) Write a program to find the root of a given equation using iteration method.
D) Write a program to find the root of a given equation using Newton Raphson method.

UNIT- IV: Linear system of equations
Programming Tasks:
A) Write a program to find the solution of given system of linear equations using L-U decomposition method.
B) Write a program to find the solution of given system of linear equations using jacobi’s method.
C) Write a program to find the solution of given system of equations using Gauss sidel iteration method.
D) Write a program to find the solution of given system of equations using Gauss Jordan elimination method.

UNIT-V: Numerical Differentiation, Integration and Numerical solutions of First order differential equations
Programming Tasks:
A) Write a program to evaluate definite integral using trapezoidal rule, Simpson’s 1/3rd rule and 3/8th rule.
B) Write a program to solve a given differential equation using Taylor’s series.
C) Write a program to solve a given differential equation Euler’s and modified Euler’s method.
D) Write a program to solve a given differential equation using Runge-Kutta method.
### JNTUH COLLEGE OF ENGINEERING HYDERABAD

**IDP (B.Tech. ECE & M.Tech. /MBA) II Year I-Sem**

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**MATHEMATICS – III**

**Pre Requisites:** Nil

**Course Objectives:**
- To enable the students to understand the concepts of probability distributions, statistical Inferences, and testing of hypothesis.
- To enable the students to understand the key concepts of Complex functions and the calculus of complex functions.

**Course Outcomes:**
- The student achieves the knowledge to testing the hypothesis and form the probability distributions to make inferences.
- The students can study some problems of engineering using the concepts of residue theorem, Laurent series of functions of complex variables.

**UNIT-I: Single Random variables and probability distributions.**

**UNIT-II: Multiple Random variables, Correlation & Regression**
- Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation -Coefficient of correlation, The rank correlation. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

**UNIT-III: Sampling Distributions and Testing of Hypothesis**
- Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.
- Parameter estimations – likelihood estimate, interval estimations.
- Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, Two sided test,

**Large sample tests:**
1. Test of Equality of means of two samples equality of sample mean and population mean (cases of known varience & unknown varience, equal and unequal variances)
2. Tests of significance difference between sample S.D and population S.D.
3. Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

**Small sample tests:**
- Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples
- Snedecor’s F- distribution and it’s properties. Test of equality of two population variances
- Chi-square distribution, it’s properties, Chi-square test of goodness of fit.

**UNIT-IV: Functions of Complex Variables**

UNIT – V: Contour Integration
Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

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

Conformal mapping.
Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations - Translation; Magnification and rotation; inversion and reflection, Transformations like \( e^z \), \( \log z \), \( z^2 \), and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given.

Text Books:
1) Fundamentals of mathematical statistics by s c gupta and v.k.kapoor
2) Probability and statistics for engineers and scientists by sheldon m.ross,academic press
3) Probability and statistics for engineering and the sciencec by jay l.devore.
4) Higher engineering mathematics by b s grewal.
5) Advanced engineering mathematics by peter v o’neil, cengage learning
6) Engineering mathematics by erwin kreyszig,10th edition wiely publications

References:
1) Mathematics for engineers series –probability statistics and stochastic process by k.b.datta and m.a s.srinivas,cengage publications
2) Probability, statistics and stochastic process by prof.a r prasad., wiely india
3) Advanced engineering mathematics by sahanaz bathul, phi publication
4) Probability and statistics by t.k.v.iyengar &b.krishna gandhi etel
5) Mathematics for engineers series- advanced mathematics for engineers by k.b.datta and m.a s.srinivas, cengage publications
6) Advanced engineering mathematics for engineers by prof.a r prasad., wiely india
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SIGNALS AND SYSTEMS

Prerequisite: Mathematics – II

Course Objectives:
- This gives the basics of Signals and Systems required for all Electrical Engineering related courses.
- This gives concepts of Signals and Systems and its analysis using different transform techniques.
- This gives basic understanding of random process which is essential for random signals and systems encountered in Communications and Signal Processing areas.

Course Outcomes:
Upon completing his course, the student will be able to
- Represent any arbitrary analog or Digital time domain signal in frequency domain.
- Understand the importance of sampling, sampling theorem and its effects.
- Understand the characteristics of linear time invariant systems.
- Determine the conditions for distortion less transmission through a system.
- Understand the concepts of Random Process and its Characteristics.
- Understand the response of linear time Invariant system for a Random Processes.

UNIT-I: Signal Analysis

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.

Fourier Series:
Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet’s conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

UNIT -II: Fourier Transforms and Sampling

Fourier Transforms:

Sampling:
Sampling theorem – Graphical and analytical proof for Band Limited Signals, Reconstruction of signal from its samples, Effect of under sampling – Aliasing.

UNIT -III: Laplace Transforms and Z-Transforms

Laplace Transforms:

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.
UNIT-IV: 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. Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms


TEXT BOOKS:
1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.

REFERENCE BOOKS:
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IDP (B.Tech. ECE & M.Tech. /MBA) II Year I-Sem

ELECTRICAL TECHNOLOGY

Pre-requisite: None

Course Objectives: Objectives of this course are

• To Know the basic principle of DC Generators and motors.
• To Know the basic principle of Single Phase Transformers.
• To Understand the basic principle of three-phase induction motor and alternators.
• To understand the basic principle of special motors and electrical instruments.

Course OUTCOMES: After this course, the student

• To analyze the performance of DC generators and motors.
• To analyze the performance of Transformers.
• To learn the in-depth knowledge on three phase induction motors.
• To analyze the performance of special motors and electrical instruments in real time applications.

UNIT I

D.C Generators and DC Motors: Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators, DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne’s test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT II


UNIT III


UNIT IV


UNIT V


TEXT BOOKS

REFERENCES
3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin
IDP (B.Tech. - ECE & M.Tech. /MBA) II Year I-Sem

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ANALOG ELECTRONICS

Pre Requisites: Basic Electrical and Electronics Engineering.

Course Objectives:
- To introduce circuit realizations with components such as diodes, BJTs and transistors studied earlier.
- To give understanding of various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
- To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

Course Outcomes:
Upon completion of the Course, the students will be able to:
- Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
- Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
- Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
- Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.

UNIT – I:
ANALYSIS AND DESIGN OF SMALL SIGNAL LOW FREQUENCY BJT AMPLIFIERS

UNIT – II: FET AMPLIFIERS

UNIT – III: POSITIVE & NEGATIVE FEEDBACK IN AMPLIFIERS

UNIT – IV:
LARGE SIGNAL AMPLIFIERS
UNIT – V:
TUNED AMPLIFIERS
Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading single Tuned amplifiers on Bandwidth, Effect of Cascading Double Tuned amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned amplifiers

TEXT BOOKS:
2. Electronic Devices and Circuits, S. Salivahanan, N.Suresh Kumar, A Vallvaraj, 2nd Edition, TMH.

REFERENCES:
1. Integrated Electronics, Jacob Millman, Christos C Halkias, TMH
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NETWORK ANALYSIS

Pre-requisite: Basic Electrical & Electronics Engineering

Course Objectives: Objectives of this course are
- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states in RLC circuits.
- To know the basic Laplace Transforms techniques in periods waveforms.
- To understand the two port network parameters.
- To understand the properties of LC networks and filters.

Course OUTCOMES: After this course
- Gains the knowledge on Basic network elements.
- Learns and analyze the RLC circuits behavior in detail.
- Analyze the performance of periodic waveforms.
- Learns and gain the knowledge in characteristics of two port network parameters ( Z,Y, ABCD, h & g).
- To analyze the filter design concepts in real world applications.

UNIT -I

UNIT -II
Steady state and transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 2nd order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves

UNIT -III
Network Analysis using Laplace transform techniques, step, impulse and exponential excitation, response due to periodic excitation, RMS and average value of periodic waveforms.

UNIT -IV
Two port network parameters, Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros.

UNIT V
Standard T, π, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network, T and π Conversion, LC Networks and Filters: Properties of LC Networks, Foster’s Reactance theorem, design of constant K, LP, HP and BP Filters, Composite filter design.

TEXT BOOKS

REFERENCES
4. Network Theory – Sudarshan and Shyam Mohan, TMH.
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GENDER SENSITIZATION LAB
(Common to All Branches)
(An Activity-based Course)

Objectives of the Course:
• To develop students’ sensibility with regard to issues of gender in contemporary India.
• To provide a critical perspective on the socialization of men and women.
• To introduce students to information about some key biological aspects of genders.
• To expose the students to debates on the politics and economics of work.
• To help students reflect critically on gender violence.
• To expose students to more egalitarian interactions between men and women.

Learning Outcomes:
➢ Students will have developed a better understanding of important issues related to gender in contemporary India.
➢ Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
➢ Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
➢ Students will acquire insight into the gendered division of labour and its relation to politics and economics.
➢ Men and women students and professionals will be better equipped to work and live together as equals.
➢ Students will develop a sense of appreciation of women in all walks of life.
➢ Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I: UNDERSTANDING GENDER
Gender: Why Should We Study It? (Towards a World of Equals: Unit -1)
Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2)

Unit-II: GENDER AND BIOLOGY
Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4)
Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10)
Two or Many? Struggles with Discrimination.

Unit-III: GENDER AND LABOUR
Housework: the Invisible Labour (Towards a World of Equals: Unit -3)
“My Mother doesn’t Work.” “Share the Load.”
Women’s Work: Its Politics and Economics (Towards a World of Equals: Unit -7)

Unit – IV: ISSUES OF VIOLENCE
Sexual Harassment: Say No! (Towards a World of Equals: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.
Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8)
Thinking about Sexual Violence (Towards a World of Equals: Unit -11)
Blaming the Victim-“I Fought for my Life…..” - Additional Reading: The Caste Face of Violence.
Unit – V: GENDER : CO-EXISTENCE
Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12)

Essential Reading: All the Units in the Textbook, “Towards a World of Equals: A Bilingual Textbook on Gender” written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyama, Deepa Sreenivas and Susie Tharu.
Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

Reference Books:
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ANALOG ELECTRONICS LAB - I

List of Experiments (Twelve experiments to be done):
Design (any six) and Simulation (any Ten) using Multisim or Pspice or Equivalent Simulation

Software:
1. Common Emitter Amplifier
2. Common Base Amplifier
3. Common Source amplifier
4. Two Stage RC Coupled Amplifier
5. Current Shunt and Voltage Series Feedback Amplifier
6. Cascode Amplifier
7. Wien Bridge Oscillator using Transistors
8. RC Phase Shift Oscillator using Transistors
9. Class A Power Amplifier (Transformer less)
10. Class B Complementary Symmetry Amplifier
11. Hartley and Colpitt’s Oscillator
12. Single Tuned Voltage Amplifier

Equipments required for Laboratories:
1. For software simulation of Electronic circuits
   i) Computer Systems with latest specifications
   ii) Connected in LAN (Optional)
   iii) Operating system (Windows XP)
   iv) Simulations software (Multisim / TINAPRO) Package

2. For Hardware simulations of Electronic Circuits
   i) RPSs
   ii) CROs
   iii) Functions Generators
   iv) Multimeters
   v) Components
PART – A

2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
6. Experimental determination of Thevenin’s and Norton’s equivalent circuits and verification by direct test.

PART – B

2. Swinburne’s Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
4. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Brake test on 3-phase Induction motor (performance characteristics).
6. Regulation of alternator by synchronous impedance method.

Note: Any TEN of the above experiments are to be conducted
BASIC SIMULATION LAB

Note:
- All the experiments are to be simulated using MATLAB or equivalent software
- Minimum of 15 experiments are to be completed

List of Experiments:
1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Sawtooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
17. Verification of Weiner-Khinchine Relations.
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IDP (B.Tech. ECE & M.Tech. /MBA) II Year II-Sem

SWITCHING THEORY AND LOGIC DESIGN

Prerequisite: Nil

Course Objectives:
This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

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

Course Outcomes:
Upon completion of the course, students should possess the following skills:

- Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

UNIT-I:
Number System and Boolean Algebra And Switching Functions: Review of number systems, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and Its Properties, Unit Distance Codes, Error Detecting and Correcting Codes.


UNIT-II:
Minimization and Design of Combinational Circuits:

UNIT-III:
Sequential Machines Fundamentals and Applications:

Registers and Counters: Shift Registers, Data Transmission in Shift Registers, Operation of Shift Registers, Shift Register Configuration, Bidirectional Shift Registers, Applications of Shift Registers, Design and Operation of Ring and Twisted Ring Counter, Operation Of Asynchronous And Synchronous Counters.
UNIT-IV:
Sequential Circuits-I:

UNIT-V:
Sequential Circuits-II:
Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.
Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

REFERENCE BOOKS:
4. Digital Logic Design - Ye Brian and HoldsWorth, Elsevier
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PULSE AND DIGITAL CIRCUITS

Prerequisite : Analog Electronics

Course Objectives:
• To explain the complete response of R-C and R-L-C transient circuits.
• To explain clipplers, clammers, switching characteristics of transistors and sampling gates.
• To construct various multivibrators using transistors, design of sweep circuits and sampling gates.
• To discuss and realize logic gates using diodes and transistors.

Course Outcomes:
At the end of the course, the student will be able to:
• Understand the applications of diode as integrator, differentiator, clipplers, clampler circuits.
• Learn various switching devices such as diode, transistor, SCR. Difference between logic gates and sampling gates.
• Design multivibrators for various applications, synchronization techniques and sweep circuits.
• Realizing logic gates using diodes and transistors.
• Understanding of time and frequency domain aspects.
• Importance of clock pulse and its generating techniques.

UNIT-I:
Linear Wave Shaping: High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe, RL and RLC Circuits and their response for Step Input &Ringing Circuit.

UNIT-II:
Non-Linear Wave Shaping: Diode clipplers, Transistor clipplers, Clipping at two independent levels, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of Diode Characteristics on Clamping Voltage, Synchronized Clamping.

UNIT-III:
Switching Characteristics of Devices: Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Temperature variation of Saturation Parameters, Transistor-switching times, Silicon-controlled-switch circuits.
Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits

UNIT-IV:
Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, Transistor Miller Time Base generator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, Methods of Linearity improvement.

UNIT-V:
Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuits, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.
Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML Logic Families and its Comparison.

TEXT BOOKS:
2. Solid State Pulse Circuits – David A. Bell, 4 Ed., 2002 PHI.

REFERENCE BOOKS:
1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Prerequisite: Nil

Course Objectives:
This is a structured foundation course, dealing with concepts, formulations and applications of Electromagnetic Theory and Transmission Lines, and is the basic primer for all electronic communication engineering subjects. The main objectives of the course are …

- To learn the Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields, and apply them to solve physics and engineering problems.
- To distinguish between static and time-varying fields, and understand the significance and utility of Maxwell's Equations and Boundary Conditions, and gain ability to provide solutions to communication engineering problems.
- To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media.
- To conceptually understand the UPW Polarization features and Poynting Theorem, and apply them for practical problems.
- To determine the basic Transmission Line Equations and telephone line parameters and estimate the distortions present.
- To understand the concepts of RF Lines and their characteristics, Smith Chart and its applications, acquire knowledge to configure circuit elements, QWTs and HWTs, and to apply the same for practical problems.

Course Outcomes: Having gone through this foundation course, the students would be able to …

- Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.
- Analyze the Wave Equations for good conductors and good dielectrics, and evaluate the UPW Characteristics for several practical media of interest.
- Establish the proof and estimate the polarization features, reflection and transmission coefficients for UPW propagation, distinguish between Brewster and Critical Angles, and acquire knowledge of their applications.
- Determine the Transmission Line parameters for different lines, characterize the distortions and estimate the characteristics for different lines.
- Analyze the RF Line features and configure them as SC, OC Lines, QWTs and HWTs, and design the same for effective impedance transformation.
- Study the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems.

UNIT–I:

UNIT–II:
Maxwell’s Equations (Time Varying Fields): Faraday’s Law and Transformer EMF, Inconsistency of Ampere’s Law and Displacement Current Density, Maxwell’s Equations in Different Final Forms and
Word Statements, Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Illustrative Problems.

UNIT–III:


UNIT–IV:

UNIT–V:
**Transmission Lines – II:** Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; λ/4, λ/2, λ/8 Lines – Impedance Transformations, Significance of $Z_{\text{min}}$ and $Z_{\text{max}}$, Smith Chart – Configuration and Applications, Single Matching, Illustrative Problems.

TEXT BOOKS:

REFERENCE BOOKS:
ANALOG COMMUNICATIONS

Prerequisite: Signals and Systems

Course Objectives:
- To develop ability to analyze system requirements of analog communication systems.
- To understand the need for modulation.
- To understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
- To acquire knowledge to analyze the noise performance of analog modulation techniques.
- To acquire theoretical knowledge of each block in AM and FM receivers.
- To understand the pulse modulation techniques.

Course Outcomes:
- Able to analyze and design various modulation and demodulation analog systems.
- Understand the characteristics of noise present in analog systems.
- Study of signal to Noise Ration (SNR) performance, of various Analog Communication systems.
- Analyze and design the various Pulse Modulation Systems.
- Understand the concepts of Multiplexing : Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM).

UNIT I
AMPLITUDE MODULATION
Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector, Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT II
SSB MODULATION

UNIT III
ANGLE MODULATION

UNIT IV
NOISE
Resistive Noise Source (Thermal), Arbitrary Noise Sources, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties.
Noise in Analog communication System, Noise in DSB and SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis.

UNIT V
RECEIVERS
Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

PULSE MODULATION
Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Division Multiplexing.

TEXTBOOKS

REFERENCES
3. Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005
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CONTROL SYSTEMS

Pre-requisite: Network Analysis

Course Objectives:
Objectives of course are

- To introduce the principles and applications of control systems in everyday life
- To introduce the basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems
- To understand different aspects of stability analysis of systems in frequency domain and time domain.

Course Outcomes: After this course, the student gets a thorough knowledge of

- Open loop and closed loop control systems.
- Modeling and transfer function derivations of translational and rotational systems.
- Represent transfer functions through block diagrams and signal flow graphs.
- Design a control systems using time domain and frequency domain techniques.
- Time response analysis, stability analysis, frequency response analysis of different ordered systems through their characteristic equation and time-domain specifications.
- Applications of concepts to electrical and electronics problems.

UNIT – I INTRODUCTION:
Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.
Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems.

TRANSFER FUNCTION EPRESENTATION:
Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples - Block diagram algebra – Representation by Signal flow graph - Reduction using mason’s gain formula.

UNIT-II TIME RESPONSE ANALYSIS:

UNIT – III STABILITY ANALYSIS:
The concept of stability - Routh stability criterion – qualitative stability and conditional stability.

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

Frequency Response Analysis:
Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT-IV STABILITY ANALYSIS IN FREQUENCY DOMAIN:
Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability – Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.
Classical Control Design Techniques:
Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers.

UNIT – V STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:
Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) II Year II-Sem

ANALOG COMMUNICATIONS LAB

Note:
• Minimum 12 experiments should be conducted:
• All these experiments are to be simulated first either using MATLAB, Comsim or any other simulation package and then to be realized in hardware

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and analysis of AM and FM Signals
6. Pre-emphasis & de-emphasis.
7. Time Division Multiplexing & De multiplexing
8. Frequency Division Multiplexing & De multiplexing
9. Verification of Sampling Theorem
10. Pulse Amplitude Modulation & Demodulation
11. Pulse Width Modulation & Demodulation
12. Pulse Position Modulation & Demodulation
14. AGC Characteristics.
15. PLL as FM Demodulator
PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

1. Linearwave Shaping
   a. RC Low Pass Circuit for different time constants
   b. RC High Pass Circuit for different time constants

2. Non-linear wave shaping
   a. Transfer characteristics and response of Clippers:
      i) Positive and Negative Clippers
      ii) Clipping at two independent levels
   b. The steady state output waveform of clampers for a square wave input
      i) Positive and Negative Clampers
      ii) Clamping at different reference voltage

3. Comparison Operation of different types of Comparators
4. Switching characteristics of a transistor
5. Design a Bistable Multivibrator and draw its waveforms
6. Design an Astable Multivibrator and draw its waveforms
7. Design a Monostable Multivibrator and draw its waveforms
8. Response of Schmitt Trigger circuit for loop gain less than and greater than one
9. UJT relaxation oscillator
10. The output-voltage waveform of Bootstrap sweep circuit
11. The output-voltage waveform of Miller sweep circuit
12. Pulse Synchronization of An Astable circuit
13. Response of a transistor Current sweep circuit
14. Sampling gates
   a. Response of Unidirectional gate
   b. Response of Bidirectional gate using transistors
15. Study of logic gates
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IDP (B.Tech. ECE & M.Tech. /MBA) II Year II-Sem

ANALOG ELECTRONICS LAB - II

List of Experiments (Twelve experiments to be done):

Hardware Testing in Laboratory:

Part A: Minimum of 6 out of the 10 experiments listed on breadboard.
   1. Current Shunt Feedback amplifier
   2. Voltage Series Feedback amplifier
   3. Cascode amplifier
   4. Darlington Pair
   5. RC Phase shift Oscillator
   6. Hartley and Colpitt’s Oscillators
   7. Class A power amplifier
   8. Class B Complementary symmetry amplifier

Part B: Testing of any 2 circuits designed and simulated out of the 4 experiments listed.
   1. Common Emitter Amplifier
   2. Common Source Amplifier
   3. Two Stage RC Coupled Amplifier
   4. Wien Bridge Oscillator using Transistors

Part C:
   1. Introduction to PCB fabrication methods
   2. Translation of any tested/designer and tested circuits on a PCB.
HUMAN VALUES AND PROFESSIONAL ETHICS

Prerequisite: Nil

Course Objectives:
1. To introduce the basic concepts of universal human values
2. To familiarize the students with desirable business and professional ethics, rights and responsibilities
3. To prepare students against possible gaps and unethical practices in contemporary times
4. To sensitize the students so that they can protect themselves and the organization from the possible professional crime malpractices

Course Outcomes:
1. The students learn about diverse ethical issues rooted in society, trade, business, and environment on local as well as a global platform.
2. The students appreciate their role as a responsible citizen, professional, and as managers, advisors, experts and consultants.
3. The students will reflect and learn major values and ethics from their observations of a spiritual discourse and a visit to a business organization as a practical part of this course.


Unit IV Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory compliances, Monitoring and control- Mini-Cases


Mini-projects
Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/youtube/social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.

Project 2: Visit any organization (including shops/ hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on professional ethics and human values.

References
1. Aryasri, Human Values and Professional Ethics, Maruthi Publications.
2. S B George, Human Values and Professional Ethics, Vikas Publishing.
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IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

LINEAR AND DIGITAL IC APPLICATIONS

Prerequisite: Pulse and Digital Circuits

Course Objectives:
The main objectives of the course are:
1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non-linear applications of operational amplifiers.
3. To introduce the theory and applications of analog multipliers and PLL.
4. To teach the theory of ADC and DAC.
5. To introduce the concepts of waveform generation and introduce some special function ICs.
6. To understand and implement the working of basic digital circuits

Course Outcomes:
On completion of this course, the students will have:
1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Understanding of the different families of digital integrated circuits and their characteristics.
3. Also students will be able to design circuits using operational amplifiers for various applications.

UNIT -I: Operational Amplifier

UNIT -II: Op-Amp, IC-555 & IC 565 Applications

UNIT -III: Data Converters
Introduction, Basic DAC techniques, Different types of DACs - 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 Dual Slope ADC, DAC and ADC Specifications.

UNIT -IV: Digital Integrated Circuits
Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing- TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT -V: Sequential Logic IC’s and Memories
Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.
Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.
TEXT BOOKS:

REFERENCE BOOKS:
3. Linear Integrated Circuits and Applications – Salivahana, TMH.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

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ANTENNAS AND WAVE PROPAGATION

Prerequisite : Electromagnetic Theory and Transmission Lines

Course Objectives: This can be termed a middle level course in the electronic communication engineering domain. The course deals with antenna basics, different types of antennas, some design features, antenna measurements and wave propagation, and has the following main objectives ...

- To understand the concept of radiation, antenna definitions and significance of antenna parameters, to derive and analyze the radiation characteristics of thin wire dipole antennas and solve numerical problems.
- To distinguish between UHF, VHF and Microwave Antennas, their requirements, specifications, characteristics and design relations.
- To analyze the characteristics of yagi-uda antennas, helical antennas, pyramidal horns, microstrip patch antennas and parabolic reflectors and identify the requirements to facilitate their design.
- To identify the antenna array requirements, to determine the characteristics of ULAs and estimate the patterns of BSA, EFA, and Binomial Arrays.
- To understand the concepts and set-up requirements for microwave measurements, and familiarize with the procedure to enable antenna measurements.
- To define and distinguish between different phenomenon of wave propagation (ground wave, space wave and sky wave), their frequency dependence, and estimate their characteristics, identifying their profiles and parameters involved.

Course Outcomes:
Having gone through this course on Antenna Theory and Techniques, and Wave Propagation, the students would be able to

- Explain the mechanism of radiation, distinguish between different antenna characteristic parameters, establish their mathematical relations, estimate them for different practical cases.
- Distinguish between short dipoles, half-wave dipoles, quarter-wave monopoles and small loops, configure their current distributions, derive their far fields and radiation characteristics and sketch their patterns.
- Characterize the antennas based on frequency, configure the geometry and establish the radiation patterns of folded dipole, Yagi-Uda Antenna, Helical Antennas, Horn Antennas, and to acquire the knowledge of their analysis, design and development.
- Analyse a microstrip rectangular patch antenna and a parabolic reflector antenna, identify the requirements and relevant feed structure, carry out the design and establish their patterns.
- Specify the requirements for microwave measurements and arrange a setup to carry out the antenna far zone pattern and gain measurements in the laboratory.
- Carry out the Linear Array Analysis, estimate the array factor and characteristics and sketch the pattern for 2-element array, N-element BSA, EFA, modified EFA, Binomial Arrays.
- Classify the different wave propagation mechanisms, identify their frequency ranges, determine the characteristic features of ground wave, ionospheric wave, space wave, duct and tropospheric propagations, and estimate the parameters involved.

UNIT -I:
Antenna Basics: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height, Illustrative Problems.

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Fields from Oscillating Dipole, Field Zones, Front-to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem

**Thin Linear Wire Antennas** – Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area and Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths, Illustrative Problems. Loop Antennas - Introduction, Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small Loops (Qualitative Treatment).

**UNIT -II:**


**UNIT -III:**


**UNIT -IV:**

**Antenna Arrays**: Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their Characteristics and Comparison, BSAs with Non-uniform Amplitude Distributions – General Considerations and Binomial Arrays, Illustrative Problems.

**Antenna Measurements**: Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors. Patterns to be Measured, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods)

**UNIT -V:**


**Wave Propagation – II**: Sky Wave Propagation – Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multi-hop Propagation.

**TEXT BOOKS:**

**REFERENCE BOOKS:**
DIGITAL COMMUNICATIONS

Prerequisite: Analog Communications

Course Objectives:
- To understand the functional block diagram of Digital communication system.
- To understand the need for source and channel coding.
- To study various source and channel coding techniques.
- To understand a mathematical model of digital communication system for bit error rate analysis of different digital communication systems.

Course Outcomes:
At the end of the course, the student will be able to:
- Design optimum receiver for Digital Modulation techniques.
- Analyze the error performance of Digital Modulation Techniques.
- Understand the redundancy present in Digital Communication by using various source coding techniques.
- Know about different error detecting and error correction codes like block codes, cyclic codes and convolution codes.

UNIT I:

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT II:
Digital Modulation Techniques: Introduction, ASK, ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Bandwidth and Frequency Spectrum of FSK, Non Coherent FSK Detector, Coherent FSK Detector, FSK Detection using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

UNIT III:

UNIT IV:
Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law; Trade-off between bandwidth and SNR.

UNIT V:
Error Control Codes
Linear Block Codes: Matrix Description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes.
Cyclic Codes: Algebraic Structure, Encoding, Syndrome Calculation, Decoding.
Convolution Codes: Encoding, Decoding using State, Tree and Trellis Diagrams, Decoding using Viterbi Algorithm, Comparison of Error Rates in Coded and Uncoded Transmission.
TEXT BOOKS:

REFERENCES:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Prerequisite: Nil.

Course Objective:
- To understand the concepts and importance of economics in managerial problems
- To understand the basic financial management concepts including the principles of financial analysis

Course Outcomes:
- Students will be able to apply the principles of economics for managerial decisions.
- The students will be able to analyze the financial position of a company with the techniques of financial accounting and ratio analysis


Unit IV Capital Budgeting: Methods and sources of raising capital - Capital Budgeting: Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).


TEXT BOOKS:
1. Aryasri: Managerial Economics and Financial Analysis, TMH,

REFERENCES:
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson,
3. Lipsey & Chrystel, Economics, Oxford University Press, Domnick Salvatore: Managerial Economics In a Global Economy, Thomson.,
LINEAR IC APPLICATIONS LAB

Note:
• Verify the functionality of the IC in the given application.

Design and Implementation of:
1. Inverting and Non-inverting Amplifiers using Op Amps.
4. Integrator Circuit using IC 741.
6. Active Filter Applications – LPF, HPF (first order)
7. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
11. IC 565 – PLL Applications.
12. Voltage Regulator using IC 723.
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IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

DIGITAL COMMUNICATIONS LAB

Design the following:

1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Time Division Multiplexing of 2 Band Limited Signals
5. Frequency Shift Keying: Generation and Detection
6. Phase Shift Keying: Generation and Detection
7. Amplitude Shift Keying: Generation and Detection
8. Study of the spectral characteristics of PAM
9. Study of the spectral characteristics of QAM
10. DPSK : Generation and Detection
11. QPSK : Generation and Detection
12. OFDM: Generation and Detection
Design and Implementation of the following experiments using Integrated Circuits (ICs):

1. Design a 16 x 4 priority encoder using two 8 x 3 priority encoder.
2. Design an 16 bit comparator using 4 bit Comparators.
3. Design a model to 53 counter using two decade counters.
4. Design a 450 KHz clock using NAND / NOR gates.
5. Design a 4 bit pseudo random sequence generator using 4 – bit ring counter.
6. Design a 16 x 1 multiplexer using 8 x 1 multiplexer.
7. Design a 16 bit Adder / Subtractor using 4 – bit Adder / Subtractor IC’s
8. Plot the transform Characteristics of 74H,LS,HS series IC’s.
9. Design a 4 – bit gray to Binary and Binary to Gray Converter.
10. Design a two Digit 7 segment display unit using this display the Mod counter output of experiment 3.
12. Design a 4 digit hex Counter using synchronous and Asynchronous one digit hex counters. Compute the display between Asynchronous counter and Synchronous counter.
CELLULAR AND MOBILE COMMUNICATIONS
(PE-I)

Prerequisite: Digital Communications

Course Objectives:
The course objectives are:
- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel.
- To provide the student with an understanding of Co-channel and Non-Co-channel interferences.
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of handoff.

Course Outcomes:
By the end of the course,
- The student will be able to analyze and design wireless and mobile cellular systems.
- The student will be able to understand impairments due to multipath fading channel.
- The student will be able understand the fundamental techniques to overcome the different fading effects.
- The student will be able to understand Co-channel and Non-Co-channel interferences.
- The student will be able to familiar with cell coverage for signal and traffic, diversity techniques and mobile antennas.
- The student will have an understanding of frequency management, Channel assignment and types of handoff.

UNIT-I:
Introduction to Cellular Mobile Radio Systems:
Fundamentals of Cellular Radio System Design:
Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems- Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT-II:
Co-Channel Interference:
Non-Co-Channel Interference:
Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Antenna Height Decrease, Effects of Cell Site Components.

UNIT-III:
Cell Coverage for Signal and Traffic:
Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope,
General Formula for Mobile Propagation Over Water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model.

**Cell Site and Mobile Antennas:**
Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

**UNIT-IV:**
**Frequency Management and Channel Assignment:**
Numbering And Grouping, Setup Access And Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

**UNIT-V:**
**Handoffs and Dropped Calls:**

**TEXT BOOKS:**

**REFERENCE BOOKS:**
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

COMPUTER ORGANIZATION AND OPERATING SYSTEMS
(PE-I)

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Prerequisite : Nil

Course Objectives:
The course objectives are:

- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system including cache memories and virtual memory.
- To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
- To implement a significant portion of an Operating System.

Course Outcomes:
Upon completion of the course, students will have thorough knowledge about:

- Basic structure of a digital computer
- Arithmetic operations of binary number system
- The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.
- Operating system functions, types, system calls.
- Memory management techniques and deadlock avoidance operating system's file system implementation and its interface.

UNIT-I:


Memory – Reference Instructions, Input – Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT -II:
Micro Programmed Control: Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control.

The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual99 Memories Secondary Storage, Introduction to RAID.

UNIT -III:

UNIT -IV:


UNIT -V:


TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

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DIGITAL IMAGE PROCESSING
(PE-I)

Prerequisite: Signals and Systems

Course Objectives:
- To comprehend the relation between human visual system and machine perception and processing of digital images.
- To provide a detailed approach towards image processing applications like enhancement, segmentation and compression.

Course Outcomes:
- Exploration of the limitations of the computational methods on digital images.
- Expected to implement the spatial and frequency domain image transforms on enhancement and restoration of images.
- Elaborate understanding on image enhancement techniques.
- Expected to define the need for compression and evaluate the basic compression algorithms.

UNIT-I:

UNIT-II:
Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT -III:

UNIT -IV:
Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation.
Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT -V:

TEXT BOOKS:
REFERENCE BOOKS:
5. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

TELEVISION ENGINEERING
(PE-I)

Prerequisite : Nil

Course Objectives:
• Study the different camera and picture tubes.
• Know about various standard TV channels.
• Study about TV receiver, sync separation, detector etc.,
• Study about color signal encoding ,decoding and receiver.

Course Outcomes:
• Expected to understand the concept of TV transmission and reception.
• Acquired knowledge about complete TV receiver.
• Expected to learn about color separation, color coding etc.,

UNIT–I:
Introduction:
TV transmitter and receivers, synchronization. Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal, TV standards. Camera tubes: image Orthicon, Plumbicon, vidicon, silicon Diode Array vidicon, Comparison of camera tubes, Monochrome TV camera,

TV Signal Transmission and Propagation:
Picture Signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT –II:
Monochrome TV Receiver:
RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM detection, FM Sound detectors, and typical applications.

UNIT –III:
Sync Separation and Detection:
TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection Oscillators: Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit, Deflection Oscillators, deflection drive Ics, Receiver Antennas, Picture Tubes.

UNIT–IV:
Color Television:
Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes.

Color Signal Encoding and Decoding:
NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder, chrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, U& V demodulators.

UNIT –V:
Color Receiver:
Introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.
Digital TV:
Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

COMPUTER NETWORKS
(PE-II)

Prerequisite: Digital Communications

Course Objectives:
- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.
- To have the concept of different routing techniques for data communications.

Course Outcomes:
- Students should understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

UNIT I:

UNIT II:
Data Link Layer: Introduction, Checksum, Framing, Flow and Error Control, Noiseless Channels, Noisy Channels, Random Access Controlled Access, Channelization, IEEE Standards, Ethernet, Giga-Bit Ethernet, Wireless LANs, SONET-SDH, Frame Relay and ATM.

UNIT III:

UNIT IV:
Transport Layer: Process to Process Delivery, UDP, TCP and SCTP Protocols, Congestion Control, Quality of Service.

UNIT V:

TEXT BOOKS:

REFERENCES:
3. Computer and Communication Networks, Nader F. Mir, Pearson Education
6. Data Communications and Computer Networks, P.C.Gupta, PHI.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

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DIGITAL SYSTEM DESIGN
(PE-II)

Prerequisite: Switching Theory and Logic Design

Course Objectives:
- To provide extended knowledge of digital logic circuits in the form of state model approach.
- To provide an overview of system design approach using programmable logic devices.
- To provide and understand of fault models and test methods.

Course Outcomes:
- To understands the minimization of Finite state machine.
- To exposes the design approaches using ROM’s, PAL’s and PLA’s.
- To provide in depth understanding of Fault models.
- To understands test pattern generation techniques for fault detection.
- To design fault diagnosis in sequential circuits.

UNIT- I: Minimization and Transformation of Sequential Machines
The Finite State Model – Capabilities and limitations of FSM – State equivalence and machine minimization – Simplification of incompletely specified machines.

UNIT- II: Digital Design
Digital Design Using ROMs, PALs and PLAs, BCD Adder, 32-bit adder, State graphs for control circuits, Scoreboard and Controller, A shift and add multiplier, Array multiplier, Keypad Scanner, Binary divider.

UNIT - III: SM Charts
State machine charts, Derivation of SM Charts, Realization of SM Chart, Implementation of Binary Multiplier, dice game controller.

UNIT - IV: Fault Modeling & Test Pattern Generation
Logic Fault model – Fault detection & Redundancy- Fault equivalence and fault location –Fault dominance – Single stuck at fault model – Multiple stuck at fault models – Bridging fault model.

UNIT- V: Fault Diagnosis in Sequential Circuits
Circuit Test Approach, Transition Check Approach – State identification and fault detection experiment, Machine identification, Design of fault detection experiment

TEXT BOOKS:
3. Logic Design Theory – N. N. Biswas, PHI

REFERENCE BOOKS:
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION  
(PE-II)

Prerequisite: Basic Electrical and Electronics Engineering

Course Objectives:
- It provides an understanding of various measuring systems functioning and metrics for performance analysis.
- Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
- Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

Course Outcomes:
On completion of this course student can be able to
- Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
- Measure various physical parameters by appropriately selecting the transducers.
- Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.

UNIT I:

UNIT II:
Signal Analyzers: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, Video Signal Generators, and Specifications

UNIT III:
Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT IV:
Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT V:
Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.
TEXT BOOKS:

REFERENCES:
Prerequisite : Nil

Course Objectives: The goal of the course is to study:

- The principles of scripting languages.
- Motivation for and applications of scripting.
- Difference between scripting languages and non-scripting languages.
- Types of scripting languages.
- Scripting languages such as PERL, TCL/TK, python and BASH.
- Creation of programs in the Linux environment.
- Usage of scripting languages in IC design flow.

Course Outcomes:
Upon learning the course, the student will have the:

- Ability to create and run scripts using PERL/TCl/Python in IC design flow.
- Ability to use Linux environment and write programs for automation of scripts in VLSI tool design flow.

Unit – 1: Linux Basics
Introduction to Linux, File System of the Linux, General usage of Linux kernel & basic commands, Linux users and group, Permissions for file, directory and users, searching a file & directory, zipping and unzipping concepts.

Unit – 2: Linux Networking

Unit – 3: Perl Scripting
Introduction to Perl Scripting, working with simple values, Lists and Hashes, Loops and Decisions, Regular Expressions, Files and Data in Perl Scripting, References & Subroutines, Running and Debugging Perl, Modules, Object – Oriented Perl.

Unit – 4: Tcl / Tk Scripting
Tcl Fundamentals, String and Pattern Matching, Tcl Data Structures, Control Flow Commands, Procedures and Scope, Eavel, Working with Unix, Reflection and Debugging, Script Libraries, Tk Fundamentals, Tk by examples, The Pack Geometry Manager, Binding Commands to X Events, Buttons and Menus, Simple Tk Widgets, Entry and List box Widgets Focus, Grabs and Dialogs.

Unit – 5: Python Scripting
Introduction to Python, using the Python Interpreter, More Control Flow Tools, Data Structures, Modules, Input and Output, Errors and Exceptions, Classes, Brief Tour of the Standard Library.

Text Books:
1. Python Tutorial by Guido Van Rossum, Fred L. Drake Jr. editor, Release 2.6.4
2. Practical Programming in Tcl and Tk by Brent Welch, Updated for Tcl 7.4 and Tk 4.0.
3. Teach Yourself Perl in 21 days by David Till.

Reference Books:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

MICROPROCESSORS AND MICROCONTROLLERS

Prerequisite: Computer Organization and Operating Systems

Course Objectives:
- To develop an understanding of the operations of microprocessors and micro controllers; machine language programming and interfacing techniques.

Course Outcomes:
- Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers.
- Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems.

UNIT -I:

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT -II:
Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT –III:
I/O And Memory Interface: LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to 8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232,USB.

UNIT –IV:
ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

Unit – V:

TEXT BOOKS:

REFERENCE BOOKS:
2. Introduction to Embedded Systems, Shibu K.V, TMH, 2009
4. ARM Reference Manuals
5. Digital Signal Processing and Applications with the OMAP-L138 Experimenter, Donald Reay,WILEY.
DIGITAL SIGNAL PROCESSING

Prerequisite: Signals and Systems

Course Objectives:
This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

• To provide background and fundamental material for the analysis and processing of digital signals.
• To familiarize the relationships between continuous-time and discrete time signals and systems.
• To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
• To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
• The impetus is to introduce a few real-world signal processing applications.
• To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

Course Outcomes:
On completion of this subject, the student should be able to:

• Perform time, frequency and Z-transform analysis on signals and systems.
• Understand the inter-relationship between DFT and various transforms.
• Understand the significance of various filter structures and effects of round off errors.
• Design a digital filter for a given specification.
• Understand the fast computation of DFT and appreciate the FFT processing.
• Understand the tradeoffs between normal and multi rate DSP techniques and finite length word effects.

Unit I:

Unit II:

Unit III:

Unit IV:
Unit V:
**Multirate Digital Signal Processing:** Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Conversion of Band Pass Signals, Concept of Resampling.

**Finite Word Length Effects:** Limit cycles, Overflow Oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round Off Noise, Methods to Prevent Overflow, Trade Off Between Round Off and Overflow Noise, Measurement of Coefficient Quantization Effects through Pole-Zero Movement, Dead Band Effects.

**TEXT BOOKS:**

**REFERENCES:**
ADVANCED ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

1. Introduction
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 organise 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.
- Taking part in social and professional communication.

2. 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 educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Learning Outcomes
- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

3. 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.
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.

4. **Minimum Requirement:**
The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- T. V, a digital stereo & Camcorder
- Headphones of High quality


6. **Suggested Software:**
The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner’s Compass**, 8th Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- **Lingua TOEFL CBT Insider**, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from ‘train2success.com’
  - Preparing for being Interviewed
  - Positive Thinking
  - Interviewing Skills
  - Telephone Skills
  - Time Management

7. **Books Recommended:**


**DISTRIBUTION AND WEIGHTAGE OF MARKS:**

*Advanced Communication Skills Lab Practicals:*

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

**Mini Project: As a part of Internal Evaluation**

1. Seminar/Professional Presentation

2. A Report on the same has to be prepared and presented.

   * Teachers may use their discretion to choose topics relevant and suitable to the needs of students.

   * Not more than two students to work on each mini project.

   * Students may be assessed by their performance both in oral presentation and written report.
The Programs shall be implemented in Software (Using MATLAB / Lab View / C Programming/ Equivalent) and Hardware (Using TI / Analog Devices / Motorola / Equivalent DSP processors).

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
3. To find DFT / IDFT of given DT Signal
4. To find Frequency Response of a given System given in Transfer Function/ Differential equation form.
5. Obtain Fourier series coefficients by formula and using FET and compare for half sine wave.
6. Implementation of FFT of given Sequence
7. Determination of Power Spectrum of a given Signal(s).
8. Implementation of LP FIR Filter for a given Sequence/Signal.
9. Implementation of HP IIR Filter for a given Sequence/Signal
10. Generation of Narrow Band Signal through Filtering
11. Generation of DTMF Signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D Sampling Rate Converters
15. Impulse Response of First order and Second Order Systems.

Note: - Minimum of 12 experiments has to be conducted.
Cycle 1: Using 8086 Processor Kits and/or Assembler (5 Weeks)

- Assembly Language Programs to 8086 to Perform
  1. Arithmetic, Logical, String Operations on 16 Bit and 32 Bit Data.
  2. Bit level Logical Operations, Rotate, Shift, Swap and Branch Operations.

Cycle 2: Using 8051 Microcontroller Kit (6 weeks)

- Introduction to Keil IDE
  1. Assembly Language Programs to Perform Arithmetic (Both Signed and Unsigned) 16 Bit Data Operations, Logical Operations (Byte and Bit Level Operations), Rotate, Shift, Swap and Branch Instructions
  2. Time delay Generation Using Timers of 8051.
  3. Serial Communication from / to 8051 to / from I/o devices.
  4. Program Using Interrupts to Generate Square Wave 10 KHZ Frequency on P2.1 Using Timer0 8051 in 8bit Auto reload Mode and Connect a 1HZ Pulse to INT1 pin and Display on Port0. Assume Crystal Frequency as 11.0592MHZ

Cycle 3: Interfacing I/O Devices to 8051 (5 Weeks)

1. 7 Segment Display to 8051.
2. Matrix Keypad to 8051.
3. Sequence Generator Using Serial Interface in 8051.
4. 8bit ADC Interface to 8051.
5. Triangular Wave Generator through DAC interfaces to 8051.

BOOKS:

2. The 8051 Microcontrollers: Architecture, Programming & Applications by Dr. K. Uma Rao,
MICROWAVE ENGINEERING

Prerequisite : Electromagnetic Theory and Transmission Lines ; Antennas and wave Propagation

Course Objectives:
This is a core course in Microwave Communications domain, and covers contents related to Microwave Theory and Techniques. The main objectives of the course are ....

• To get familiarized with microwave frequency bands, their applications and to understand the limitations and losses of conventional tubes at these frequencies.
• To develop the theory related to microwave transmission lines, and to determine the characteristics of rectangular waveguides, microstrip lines, and different types of waveguide components and ferrite devices.
• To distinguish between different types of microwave tubes, their structures and principles of microwave power generation, and to characterize their performance features and applications - at tube levels as well as with solid state devices.
• To impart the knowledge of Scattering Matrix, its formulation and utility, and establish the S-Matrix for various types of microwave junctions.
• To understand the concepts of microwave measurements, identify the equipment required and precautions to be taken, and get familiarized with the methods of measurement of microwave power and various other microwave parameters.

Course Outcomes :
Having gone through this course covering different aspects of microwave theory and techniques, the students would be able to

• To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical microwave transmission line problems.
• To distinguish between the different types of waveguide and ferrite components, explain their functioning and select proper components for engineering applications.
• To distinguish between the methods of power generation at microwave frequencies, derive the performance characteristics of 2-Cavity and Reflex Klystrons, Magnetrons, TWTs and estimate their efficiency levels, and solve related numerical problems
• To realize the need for solid state microwave sources, understand the concepts of TEDs, RWH Theory and explain the salient features of Gunn Diodes and ATT Devices.
• To establish the properties of Scattering Matrix, formulate the S-Matrix for various microwave junctions, and understand the utility of S-parameters in microwave component design.
• To set up a microwave bench, establish the measurement procedure and conduct the experiments in microwave lab for measurement of various microwave parameters.

UNIT I:

Rectangular Guides - Power Transmission and Power Losses, Impossibility of TEM Mode. Microstrip Lines– Introduction, \( Z_0 \) Relations, Effective Dielectric Constant, Losses, Q factor.

UNIT II:
Cavity Resonators – Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies, Q Factor and Coupling Coefficients, Illustrative Problems

UNIT III:

UNIT IV:
M-Type Tubes:

UNIT V:

TEXT BOOKS:

REFERENCES:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

RADAR SYSTEMS
(PE -III)

Prerequisite : Microwave Engineering

Course Objectives:
This is a system oriented course and needs the knowledge of Signal and Systems, EM Theory and Transmission Lines, Antennas and Wave Propagation, and Microwave Engineering. The main objectives of this course are …

• To understand the working principle of a radar, identify the frequency bands, and formulate the complete radar range equation, listing out all the losses to be accounted for.
• To identify the need for modulation and Doppler effect; to get acquainted with the working principles of CW radar, FM-CW radar.
• To impart the knowledge of functioning of MTI radar and its variants; to establish the DLC features and to bring out the MTI radar performance limitations.
• To establish the principle of Tracking Radar and differentiate between different types of tracking radars, identifying their principle of operation with necessary schematics.
• To explain the concept of a Matched Filter in radar receiver, and to configure its response characteristics; to impart the working knowledge of different receiver blocks – dupplexers, displays, phased array antennas, their requirements and utilities.

Course Outcomes :
Having gone through this course on Radar Systems, the students would be able to …...

• Explain the working principle of a pulse radar and establish the complete radar range equation, identifying the significance and choice of all parameters involved, and solve numerical problems to establish the radar characteristics.
• Account for the need and functioning of CW, FM-CW and MTI radars, identifying the complete block diagrams and establishing their characteristics.
• Illustrate the DLC characteristics, account for the range gated Doppler filter bank, and estimate the MTI radar performance characteristics and limitations.
• Distinguish between Sequential Lobing, Conical Scan, Monopulse type of Tracking Radars, specify their requirements and compare their characteristic features.
• Derive the matched filter response characteristics for radar applications and account for correlation receivers; to distinguish between different radar displays and dupplexers.
• Account for the electronic scanning principle, and implement the same through phased array antennas, knowing their requirements and utilities.

UNIT–I:


UNIT–II:

UNIT-III:

UNIT –IV:
Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking Radar – Amplitude Comparison Mono pulse (one- and two- coordinates), Phase Comparison Mono pulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT –V:
Radar Receivers – Noise Figure and Noise Temperature, Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

OPTICAL COMMUNICATIONS
(PE - III)

Prerequisite Subject: None

Course Objectives:
The objectives of the course are:
1. To realize the significance of optical fibre communications.
2. To understand the construction and characteristics of optical fibre
cable.
3. To develop the knowledge of optical signal sources and power launching.
4. To identify and understand the operation of various optical detectors.
5. To understand the design of optical systems and WDM.

Course Outcomes:
1. At the end of the course, the student will be able to:
2. Understand and analyze the constructional parameters of optical fibres.
3. Be able to design an optical system.
4. Estimate the losses due to attenuation, absorption, scattering and bending.
5. Compare various optical detectors and choose suitable one for
different applications.

UNIT -I:
Overview of Optical Fiber Communication: - Historical development, The general system,

UNIT -II:

UNIT -III:
Optical Sources- LEDs, Structures, Materials, Quantum Efficiency, Power, Modulation, Power Bandwidth Product, Injection Laser Diodes- Modes, Threshold Conditions, External Quantum Efficiency, Laser Diode Rate Equations, Resonant Frequencies, Reliability of LED & ILD.
Source to Fiber Power Launching: - Output Patterns, Power Coupling, Power Launching, Equilibrium Numerical Aperture, Laser Diode to Fiber Coupling.

UNIT -IV:

UNIT -V:
Optical System Design: Considerations, Component Choice, Multiplexing, Point-to- Point Links, System Considerations, Link Power Budget with Examples, Overall Fiber Dispersion in Multi-Mode and Single Mode Fibers, Rise Time Budget with Examples.
Transmission Distance, Line Coding in Optical Links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye Pattern.

**TEXT BOOKS:**

**REFERENCE BOOKS:**
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

SATELLITE COMMUNICATIONS
(PE-III)

Prerequisite: Analog Communications and Digital Communications

Course Objectives:
The course objectives are:

- To prepare students to excel in basic knowledge of satellite communication principles
- To provide students with solid foundation in orbital mechanics and launches for the satellite communication
- To train the students with a basic knowledge of link design of satellite with a design examples.
- To provide better understanding of multiple access systems and earth station technology
- To prepare students with knowledge in satellite navigation and GPS & and satellite packet communications.

Course Outcomes:
At the end of the course,

- Students will understand the historical background, basic concepts and frequency allocations for satellite communication
- Students will demonstrate orbital mechanics, launch vehicles and launchers
- Students will demonstrate the design of satellite links for specified C/N with system design examples.
- Students will be able to visualize satellite sub systems like Telemetry, tracking, command and monitoring power systems etc.
- Students will understand the various multiple access systems for satellite communication systems and satellite packet communications.

UNIT I:


UNIT II:

UNIT III:

Multiple Access: Frequency Division Multiple Access (FDMA), Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA), Frame Structure, Examples, Satellite Switched TDMA Onboard Processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.
Unit IV:
**Earth Station Technology:** Introduction, Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Primary Power Test Methods.

Unit V:
**Low Earth Orbit and Geo-Stationary Satellite Systems:** Orbit Considerations, Coverage and Frequency Consideration, Delay & Throughput Considerations, System Considerations, Operational NGSO Constellation Designs.


**TEXT BOOKS:**

**REFERENCES:**
ARTIFICIAL NEURAL NETWORKS
(PE - III)

Prerequisite Subject: None

Course Objectives:
1. To understand the biological neural network and to model equivalent neuron models.
2. To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

Course Outcomes:
By completing this course the student will be able to:
1. Create different neural networks of various architectures both feed forward and feed backward.
2. Perform the training of neural networks using various learning rules.
3. Perform the testing of neural networks and do the perform analysis of these networks for various pattern recognition applications.

UNIT-I:
Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT-II:
Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment

UNIT-III:
Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT-IV:
Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self-Organization Map, SOM Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Pattern Classification

UNIT-V:
Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm

Hopfield Models – Hopfield Models, Computer Experiment

TEXT BOOKS:

REFERENCE BOOKS:
1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Intelligence, Li Min Fu TMH 2003
ADVANCED DIGITAL SIGNAL PROCESSING (PGC – I)

Course Objectives:

The objectives of this course are to make the student

1. Understand the design of various types of digital filters and implement them using various implementation structures and study the advantages & disadvantages of a variety of design procedures and implementation structures.

2. understand the concept and need for Multirate signal Processing and their applications in various fields of Communication & Signal Processing

3. understand difference between estimation & Computation of Power spectrum and the need for Power Spectrum estimation.

4. Study various Parametric & Non parametric methods of Power spectrum estimation techniques and their advantages & disadvantages

5. Understand the effects of finite word/register length used in hardware in implementation of various filters and transforms using finite precision processors.

Course Outcomes:

On completion of this course student will be able to

1. Design and implement a filter which is optimum for the given specifications.

2. Design a Mutirate system for the needed sampling rate and can implement the same using Polyphase filter structures of the needed order.

3. Estimate the power spectrum of signal corrupted by noise through a choice of estimation methods: Parametric or Non Parametric.

4. Can calculate the output Noise power of different filters due to various finite word length effects viz: ADC Quantization, product quantization, and can calculate the scaling factors needed to avoid Limit cycles: Zero input, overflow. Also they can decide the stability of the system by studying the effect due to coefficient quantization while implementing different filters and transforms.

UNIT –I:
Review of DFT, FFT, IIR Filters and FIR Filters.

UNIT -II:
Non-Parametric Methods:
Estimation of spectra from finite duration observation of signals, Non-parametric Methods: Bartlett, Welch & Blackman-Tukey methods, Comparison of all Non-Parametric methods

UNIT - III:
Parametric Methods:
UNIT -IV:  
**Multi Rate Signal Processing:** Introduction, Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Multistage Implementation of Sampling Rate Conversion, Filter design & Implementation for sampling rate conversion. Examples of up-sampling using an All Pass Filter.

UNIT -V:  
**Applications of Multi Rate Signal Processing**

TEXT BOOKS:
2. Discrete Time signal processing - Alan V Oppenheim & Ronald W Schaffer, PHI.

REFERENCE BOOKS:
TRANSFORM TECHNIQUES
(PG E - I)

Prerequisite: None

Course Objectives:
1. To learn basics of two dimensional transform.
2. Understand the various two dimensional transform definition, properties and applications.
3. Understand the design of filter Bank structure.
4. To learn the fundamentals of wavelet transform and special wavelets.

Course Outcomes:
1. The student will learn basics of two dimensional transforms.
2. Understand the definition, properties and applications of various two dimensional transform.
3. Understand the basic concepts of wavelet transform.
4. Understand the special topics such as wavelet packets, Bi-orthogonal wavelets e.t.c.

UNIT -I: Fourier Analysis
Vector space, Hilbert spaces, Fourier basis, FT- Limitations of Fourier Analysis, Need for time-frequency analysis, DFT, 2D-DFT: Definition, Properties and Applications, IDFT, Hilbert Transform, STFT.

UNIT -II: Transforms
Walsh, Hadamard, Haar and Slant Transforms, DCT, DST, KLT,— definition, properties and applications

UNIT -III: Continuous Wavelet Transform (CWT)
Short comings of STFT, Need for wavelets, Wavelet Basis- Concept of Scale and its relation with frequency, Continuous time wavelet Transform Equation- Series Expansion using Wavelets- CWT-Tiling of time scale plane for CWT. Important Wavelets: Haar, Mexican Hat, Meyer, Shannon, Daubechies.

UNIT -IV: Multi Rate Analysis and DWT:
Need for Scaling function – Multi Resolution Analysis, Two-Channel Filter Banks, Perfect Reconstruction Condition, Relationship between Filter Banks and Wavelet Basis, DWT, Structure of DWT Filter Banks, Daubechies Wavelet Function, Applications of DWT.

UNIT -V: Special Topics:
Wavelet Packet Transform, Multidimensional Wavelets, Bi-orthogonal basis- B-Splines, Lifting Scheme of Wavelet Generation, Multi Wavelets

TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

BIOMEDICAL SIGNAL PROCESSING
(PG E - I)

Prerequisite: Advanced Digital Signal Processing

Course Objectives:
The main objectives of the course are:
1. To use basic probability theory to model random signals in terms of Random Processes.
2. To derive the noise power Spectral Density of Random signals and its analysis.
3. To understand lossless and lossy compression techniques related to ECG data.
4. To understand various cardiological signal processing techniques and noise cancellation techniques.
5. To understand estimation of signals using Prony’s and least square and linear prediction methods.
6. To analyze evoked potentials.
7. To comprehend EEG signals, modeling and sleep stages.

Course Outcomes:
After studying the course, each student is expected to be able to:
1. Use probability theory to model random processes.
2. Analyze random signals using power spectral densities.
3. Compare various lossless and lossy techniques.
4. Compare various ECG processing and noise cancellation techniques.
5. Analyze evoked potentials.
6. Model and estimate EEG signals and various sleep stages.

UNIT -I:
Random Processes
Stationary random process, Ergodicity, Power spectral density and autocorrelation function of random processes. Noise power spectral density analysis, Noise bandwidth and noise figure of systems.

UNIT -II:
Data Compression Techniques: Lossy and Lossless data reduction Algorithms. ECG data compression using Turning point, AZTEC, CORTES, Huffman coding, vector quantisation, DICOM Standards

UNIT -III:

UNIT -IV:

UNIT -V:
TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

RF CIRCUIT DESIGN
(PG E – I)

L T P C
4 0 0 4

Perquisite : None

Course Objectives:
The course objectives are:
1. To educate students fundamental RF circuit and system design skills.
2. To introduce students the basic transmission line theory, single and multiport networks, RF component modeling.
3. To offer students experience on designing matching and biasing networks & RF transistor amplifier design.

Course Outcomes:
Upon completion of the course, the students will be able to:
1. Explore fundamental RF circuit and system design skills.
2. Understand the basic transmission line theory, single and multiport networks, RF component modeling.
3. Design matching and biasing networks & RF transistor amplifiers.

UNIT I: Introduction:

Review of Transmission Lines:

UNIT II: Single and Multi-Port Networks:

RF Filter Design:

UNIT III: Active RF Component Modelling:

UNIT IV: Matching and Biasing Networks:
Impedance Matching Using Discrete Components: Two Component Matching Networks, Forbidden Regions, Frequency Response and Quality Factor, T and Pi Matching Networks-Amplifier Classes of Operation and Biasing Networks: Classes of Operation and Efficiency of Amplifiers, Biasing Networks for BJT, Biasing Networks for FET.

UNIT V: RF Transistor Amplifier Design:
Stabilization Methods-Unilateral and Bilateral Design for Constant Gain- Noise Figure Circles- Constant VSWR Circles.

RF Oscillators and Mixers:

TEXT BOOKS:

REFERENCES:
1. Radio Frequency and Microwave Electronics – Illustrated by Matthew M. Radmanesh – PEI.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

VLSI TECHNOLOGY AND DESIGN
(PG E - II)

Prerequisite: VLSI

Course Objectives:
1) Students from other engineering background to get familiarize with large scale integration technology.
2) To expose fabrication methods, layout and design rules.
3) Learn methods to improve Digital VLSI system’s performance.
4) To know about VLSI Design constraints.
5) Visualize CMOS Digital Chip Design.

Course Outcomes:
1) Review of FET fundamentals for VLSI design.
2) To acquires knowledge about stick diagrams and layouts.
3) Enable to design the subsystems based on VLSI concepts.

UNIT –I:
Review of Microelectronics and Introduction to MOS Technologies:
MOS, CMOS, BiCMOS Technology. Basic Electrical Properties of MOS, CMOS & BiCMOS Circuits: Ids – Vds relationships, Threshold Voltage VT, Gm, Gds and ωo, Pass Transistor, MOS, CMOS & Bi CMOS Inverters, Zpu/Zpd, MOS Transistor circuit model, Latch-up in CMOS circuits.

UNIT –II:
Layout Design and Tools:
Transistor structures, Wires and Vias, Scalable Design rules, Layout Design tools.
Logic Gates & Layouts:
Static Complementary Gates, Switch Logic, Alternative Gate circuits, Low power gates, Resistive and Inductive interconnect delays.

UNIT –III:
Combinational Logic Networks:
Layouts, Simulation, Network delay, Interconnect design, Power optimization, Switch logic networks, Gate and Network testing.

UNIT –IV:
Sequential Systems:
Memory cells and Arrays, Clocking disciplines, Design, Power optimization, Design validation and testing.

UNIT –V:
Floor Planning:
Floor planning methods, Global Interconnect, Floor Plan Design, Off-chip connections.

TEXT BOOKS:

REFERENCE BOOKS:
ADVANCED DATA COMMUNICATIONS
(PG E - II)

Prerequisite: Digital Communication

Course Objectives:
1. To learn about basics of Data Communication networks, different protocols, standards and layering concepts.
2. To study about error detection and correction techniques.
3. To understand link layer protocol and point to point protocols.
4. To study Medium Access Control sub layer protocols.
5. To know about Switching circuits, Multiplexing and Spectrum Spreading techniques for data transmission.
6. To study Wired LANs different Ethernet standards.

Course Outcomes:
At the end of the course, the student will be able to:
1. Understand the concepts of Data Communication networks, different protocols, standards and layering.
2. Acquire the knowledge of error detection, forward and reverse error correction techniques.
3. Analyze link layer protocol and point to point protocols.
4. Explain and compare the performance of different MAC protocols like Aloha, CSMA, CSMA/CA, TDMA, FDMA & CDMA.
5. Understand the features and the significance of Switching circuits, Multiplexing and Spectrum Spreading for data transmission.
6. Understand the characteristics of Wired LANs and also the operation and applications of Connecting Devices.
7. Understand the services and functions of Network layer protocols.

Unit I
Data Communications, Networks and Network Types, Internet History, Standards and Administration, Protocol Layering, TCP/IP protocol suite, OSI Model. Digital Data Transmission, DTE-DCE interface.

Data Link Layer
Introduction, Data Link Layer, Nodes and Links, Services, Categories of Links, sub layers, Link Layer Addressing, Address Resolution Protocol.

Unit II
Error Detection and Correction: Types of Errors, Redundancy, detection versus correction, Coding Block Coding: Error Detection, Vertical redundancy checks, longitudinal redundancy checks, Error Correction, Error correction single bit, Hamming code.
Cyclic Codes: Cyclic Redundancy Check, Polynomials, Cyclic Code Encoder Using Polynomials, Cyclic Code Analysis, Advantage of Cyclic Codes, Checksum
Data Link Control: DLC Services, Data Link Layer Protocols, HDLC, Point to Point Protocol

Unit III
Media Access Control (MAC) Sub Layer
Random Access, Aloha, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), Controlled Access- Reservation, Polling- Token Passing, Channelization - Frequency Division Multiple Access (FDMA), Time - Division Multiple Access (TDMA), Code - Division Multiple Access (CDMA).

Unit IV
Switching: Introduction to Switching, Circuit Switched Networks, Packet Switching, Structure of switch
Multiplexing and Spectrum Spreading: Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Spread Spectrum -Frequency Hopping Spread Spectrum and Direct Sequence Spread Spectrum.

Unit V
Wired LANS: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet
Connecting Devices: Hubs, Link Layer Switches, Routers
Networks Layer: Packetizing, Routing and Forwarding, Packet Switching, Network Layer Performance, IPv4 Address, Address Space, Classful Addressing, Classless Addressing, Dynamic Host Configuration Protocol (DHCP), Network Address Resolution (NATF), Forwarding of IP Packets, Forwarding based on Destination Address, Forwarding based on Label, Routing as Packet Switches.

TEXT BOOKS:
1. Data Communications and Networking - B. A. Forouzan, 5th, 2013, TMH.

REFERENCE BOOKS:
1. Data Communications and Computer Networks - Prakash C. Gupta, 2006, PHI.
2. Data Communications and Networking - B. A. Forouzan, 2nd, 2013, TMH.
DETECTION AND ESTIMATION THEORY
(PG E-II)

Prerequisite: RP& QT

Course Objectives:
1. The main objective of this course is to provide basic estimation and detection background for engineering applications.
2. This course provides the main concepts and algorithms for detection and estimation theory.

Course Outcomes:
1. Students will understand the basic detection methods.
2. Learn about basic estimation methods.
3. Gain ability to apply estimation method for real time engineering problems.

UNIT –I:

UNIT –II:
Detection Theory: Basic Detection Problem, Maximum A posteriori Decision Rule, Minimum Probability of Error Classifier, Bayes Decision Rule, Multiple-Class Problem (Bayes)- minimum probability error with and without equal a priori probabilities, Neyman-Pearson Classifier, General Calculation of Probability of Error, General Gaussian Problem, Composite Hypotheses.

UNIT –III:
Linear Minimum Mean-Square Error Filtering: Linear Minimum Mean Squared Error Estimators, Nonlinear Minimum Mean Squared Error Estimators. Innovations, Digital Wiener Filters with Stored Data, Real-time Digital Wiener Filters, Kalman Filters.

UNIT –IV:

UNIT –V:

TEXT BOOKS:

REFERENCE BOOKS:
3. Introduction to Statistical Signal Processing with Applications – Srinath, Rajasekaran, Viswanathan, 2003, PHI.
AD-HOC WIRELESS AND SENSOR NETWORKS
(PG E - III)

Prerequisite: Computer Networks

Course Objectives:
1. To study the fundamentals of wireless Ad-Hoc Networks.
2. To study the operation and performance of various Adhoc wireless network protocols.
3. To study the architecture and protocols of Wireless sensor networks.

Course Outcomes:
1. Students will be able to understand the basis of Ad-hoc wireless networks.
2. Students will be able to understand design, operation and the performance of MAC layer protocols of Adhoc wireless networks.
3. Students will be able to understand design, operation and the performance of routing protocol of Adhoc wireless network.
4. Students will be able to understand design, operation and the performance of transport layer protocol of Adhoc wireless networks.
5. Students will be able to understand sensor network Architecture and will be able to distinguish between protocols used in Adhoc wireless network and wireless sensor networks.

UNIT - I:
Wireless LANs and PANs

AD HOC WIRELESS NETWORKS
Introduction, Issues in Ad Hoc Wireless Networks.

UNIT - II:
MAC Protocols

UNIT - III:
Routing Protocols

UNIT – IV:
Transport Layer Protocols
UNIT – V:
Wireless Sensor Networks

TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) IV Year I-Sem

RANDOM PROCESSES AND QUEUING THEORY
(PG E – III)

Prerequisite: Probability Theory & Stochastic Processes

Course Objectives:
1. To expose the students to the random process and queuing theory related topics for their subsequent study of Computer Networks and wireless communication and Networks.

Course Outcomes: Students will be able to:
1. Understand Random variables as an intrinsic need for the analysis of random phenomena.
2. Evaluate and apply moments and Characteristics functions.
3. Understand the concept of random process spectral density of stationary process.
4. Understand the concepts of Markov Chains and queuing theory.
5. Understand the concepts of M|M|1, M|M|1|K, M|G|1 queuing Process.
6. Understand the modeling of telecommunication networks using appropriate queuing process.

UNIT I: RANDOM VARIABLE
Random Variables-Basic Definitions and properties, Sum of independent random variables, Minimum and Maximum of random variables, Comparisons between random variables, Moments of the random variables, Random variables in the field of telecommunications, Transformations of random variables-The probability generating function, the characteristic function of a pdf, The Laplace Transform of a pdf, Methods for the generation of random variables- Method of the inverse of the distribution function, Method of the transformation.

UNIT II: RANDOM PROCESSES

UNIT III: Markov Chains and Queuing Theory
Queues, Poisson arrival process- Sum of independent Poisson processes, Random splitting of a Poisson process, Compound Poisson processes, Birth death Markov chains, Formulation of Hidden Markov Model (HMM), building, evaluation and decoding of HMM, Notations for Queuing systems, The Little Theorem, M/M/1 queue analysis, M/M/1/K queue analysis, M/M/S queue analysis, M/M/S/S queue analysis, The M/M/∞ queue analysis, Distribution of the queuing delays in the FIFO case-M/M/1 case, M/M/S case.

UNIT IV: M/G/1 Queuing Theory
M/G/1 queue, M/G/1 system delay distribution in the FIFO case, Laplace Transform numerical inversion method, Generalizations of the M/G/1 theory, Different imbedding instants in the M/G/1 theory, M/G/1 with geometrically distributed messages.

UNIT V: Local Area Network Analysis
TEXTBOOK

REFERENCE BOOKS:
TCP/IP AND ATM NETWORKS
(PG E - III)

Course Objectives:
1. To study Network Layer Protocols, Next Generation IP protocols
3. To understand techniques to improve QoS
4. To learn about the features of ATM networks.
5. To study the various Interconnection Networks

Course Outcomes:
At the end of the course, the student will be able to:
2. Understand and analyze about UDP, TCP AND SCTP protocols, flow and error control techniques.
3. Learn congestion control mechanisms and techniques to improve Quality of Service in switched networks
4. To understand features of Virtual circuit networks like ATM networks and their applications
5. Design and analyze various types of Interconnection Networks, understand the functioning of Folding, Benes, Lopping bit allocation algorithms and their significance.

Unit I
Network Layer Protocols: Internet Protocol (IP), ICMPv4, Mobile IP
Next Generation IP: IPv6, Addressing IPv6 Protocol, ICMPV6 Protocol, Transition from IPV4 to IPV6

Unit II
User Datagram Protocol: User Datagram, UDP Services, UDP Applications
Transmission Control Protocol: TCP Services, TCP Features, Segments, TCP Connection, State Transition Diagram, Windows in TCP, Flow and Error Control, TCP Congestion Control, TCP Timers,

Unit III
Congestion Control and Quality of Service: Data Traffic, Congestion, Congestion Control, Quality of Service, Techniques to Improve QoS, Integrated Services, Differentiated Services, QoS in Switched Networks
Queue Management: Passive-Drop trial, Drop front, Random drop, Active- early Random drop, Random Early detection.

Unit IV
SONET/SDH: Architecture, SONET Layers, SONET Frames, STS Multiplexing, SONET Networks
Unit V
Interconnection Networks
Introduction, Banyan Networks, Properties, Crossbar switch, Three stage Class networks, Rearrangeble Networks, Folding algorithm, Benes Networks, Lopping algorithm, Bit allocation algorithm.

TEXT BOOKS:
2. High Performance TCP/IP Networking – Mahabub Hassan and Raj Jain, PHI, 2005

REFERENCE BOOKS:
2. Data Communications and Computer Networks - Prakash C. Gupta, 2006, PHI.
MICROWAVE ENGINEERING LAB
PC (UG)

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Impedance of a given Load
7. Measurement of Scattering Parameters of a Magic Tee
8. Measurement of Scattering Parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement
11. Antenna Pattern Measurements.
12. Study of HFSS.
13. Simulation of Radiation Patterns for some Standard Antennas
   a) Dipole
   b) Rectangular Patch
   c) Circular Patch
ADVANCED DIGITAL SIGNAL PROCESSING LAB
(PGC – lab)

Note:
A. Minimum of 10 Experiments have to be conducted
B. All Experiments may be Simulated using MATLAB and to be verified theoretically.

1. Basic Operations on Signals, Generation of Various Signals and finding its FFT.
2. Program to verify Decimation and Interpolation of a given Sequences.
3. Program to Convert CD data into DVD data
4. Generation of Dual Tone Multiple Frequency (DTMF) Signals
5. Plot the Periodogram of a Noisy Signal and estimate PSD using Periodogram and Modified Periodogram methods
6. Estimation of Power Spectrum using Bartlett and Welch methods
7. Verification of Autocorrelation Theorem
8. Parametric methods (Yule-Walker and Burg) of Power Spectrum Estimation
9. Estimation of data series using Nth order Forward Predictor and comparing to the Original Signal
10. Design of LPC filter using Levinson-Durbin Algorithm
11. Computation of Reflection Coefficients using Schur Algorithm
12. To study Finite Length Effects using Simulink
13. ECG signal compression
14. Design and verification of Matched filter
15. Adaptive Noise Cancellation using Simulink
16. Design and Simulation of Notch Filter to remove 60Hz Hum/any unwanted frequency component of given Signal (Speech/ECG)
OBJECTIVE
The course introduces the basic concepts of Management Science and Operations Management and its application to business. The topics include human resource management, project and strategic management; the course develops problem solving and spreadsheet skills, an invaluable tool for modern business.

LEARNING OUTCOME
- To enable students to gain an insight into different managerial decisions using standard techniques and problem structuring methods
- Students will be able to gain an understanding of the core concepts of Management Science and Operations Management;
- To understand the management issues in different functional areas of management namely operations and Human resources, strategy, marketing and project management.

UNIT I INTRODUCTION TO MANAGEMENT & ORGANISATION:

UNIT II OPERATIONS & MARKETING MANAGEMENT:

UNIT III HUMAN RESOURCES MANAGEMENT (HRM):

UNIT IV PROJECT MANAGEMENT (PERT/CPM):
Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT V STRATEGIC MANAGEMENT AND CONTEMPORARY STRATEGIC ISSUES:

TEXTBOOKS:
REFERENCES:
ADVANCED COMPUTER NETWORKS

Prerequisite: Computer Networks

Course Objectives:
1. To study the WLAN and WPAN architecture and protocols
2. To know about WiMAX services, 802.16 standard, cellular telephony & satellite networks.
3. To study the techniques to improve QoS in Networks
4. To learn about the basic concepts of Ad hoc wireless Networks
5. To know about various Routing Protocols in Ad hoc Networks.
6. To learn the concepts of Wireless Sensor Networks, architecture and various data dissemination and data gathering techniques

Course Outcomes:
At the end of the course, the student will be able to:
1. Acquire the knowledge about Wireless LANs, Bluetooth and WiMAX standards, architecture and their sub-layers.
2. Understand congestion control mechanisms and techniques to improve Quality of Service in switched networks
3. Get the basic concepts of Ad hoc wireless networks and its protocols and issues related to QoS, energy management, scalability and Security.
4. Explain about Wireless Sensor Network architecture, data dissemination & data gathering techniques and will be able to address the issues and challenges in designing Sensor Networks.

Unit I
Bluetooth: Architecture, Bluetooth Layers

Unit II
Congestion Control and Quality of Service: Data Traffic, Congestion, Congestion Control, Quality of Service, Techniques to Improve QoS, Integrated Services, Differentiated Services, QoS in Switched Networks
Queue Management: Passive-Drop trial, Drop front, Random drop, Active early Random drop, Random Early detection.

Unit III

Unit IV
Quality of Service in Ad Hoc Wireless Networks:

Unit V
Wireless Sensor Networks

TEXT BOOKS:
2. Data Communications and Networking - B. A.Forouzan, 5th, 2013, TMH.

REFERENCE BOOKS:
1. Data Communications and Computer Networks - Prakash C. Gupta, 2006, PHI.
ADAPTIVE SIGNAL PROCESSING
(PG E – IV)

Prerequisite: Digital Signal Processing

Course Objectives:
The main objectives of the course are:
1. This course focuses on problems algorithms and solutions for processing signals in an manner that is responsive to a changing environment.
2. To develop systems on recursive, model based estimation methods taking the advantage of the statistical properties of the received signals.
3. To analyze the performance of adaptive filters and considers the application of the theory to a variety of practical problems such as beam forming and echo cancellation signal.
4. To understand innovation process, Kalman filter theory and estimation of state using the innovation process, concept of Kalman Gain and Filtering.

Course Outcomes:
After studying the course, the student is expected to be able to:
1. Design and apply optimal minimum mean square estimators and in particular linear estimators.
2. Understand and compute their expected performance and verify it. Design, implement and apply Wiener Filters (FIR, non-casual, causal) and evaluate their performance.
3. To understand innovation process, Kalman filter theory and estimation of state using the Innovation Process, concept of Kalman Gain and Filtering.
4. Design, implement and apply LMS, RLS and Kalman filters to given applications.

UNIT –I:
Introduction to Adaptive Systems

UNIT –II:
Development of Adaptive Filter Theory & Searching the Performance surface:
Searching the performance surface – Methods & Ideas of Gradient Search methods - Gradient Searching Algorithm & its Solution - Stability & Rate of convergence - Learning Curves.

UNIT –III:
Steepest Descent Algorithms
Gradient Search by Newton’s Method, Method of Steepest Descent, Comparison of Learning Curves.

UNIT –IV:
LMS Algorithm & Applications
UNIT –V:

TEXT BOOKS:

REFERENCE BOOKS:
EMBEDDED SYSTEM DESIGN
(PG E – IV)

Prerequisite : None

Course Objectives:
1. To provide an overview of Design Principles of Embedded System.
2. To provide clear understanding about the role of firmware, operating systems in correlation with hardware systems.

Course Outcomes:
1. Expected to understand the selection procedure of Processors in the Embedded domain.
2. Design Procedure for Embedded Firmware.
3. Expected to visualize the role of Real time Operating Systems in Embedded Systems
4. Expected to evaluate the Correlation between task synchronization and latency issues

UNIT -I:
Introduction to Embedded Systems

UNIT -II:
Typical Embedded System:
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICS, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT -III:
Embedded Firmware:
Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT -IV:
RTOS Based Embedded System Design:
Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT -V:
Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:
1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

REFERENCE BOOKS:
1. Embedded Systems - Raj Kamal, TMH.
4. An Embedded Software Primer - David E. Simon, Pearson Education.
Prerequisite: None

Course Objectives:
1. Understand the basic concept of Cryptography and Network Security, their mathematical models
2. To provide deeper understanding of application to network security, threats/vulnerabilities to networks and countermeasures
3. To create an understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works
4. To provide familiarity in Intrusion detection and Firewall Design Principles

Course Outcomes:
1. Describe computer and network security fundamental concepts and principles
2. Identify and assess different types of threats, malware, spyware, viruses, vulnerabilities
3. Encrypt and decrypt messages using block ciphers
4. Describe the inner-workings of today’s remote exploitation and penetration techniques
5. Describe the inner-workings of popular encryption algorithms, digital signatures, certificates, anti-cracking techniques, and copyright protections
6. Demonstrate the ability to select among available network security technology and protocols such as IDS, IPS, firewalls, SSL, SSH, IPSec, TLS, VPNs, etc.
7. Analyze key agreement algorithms to identify their weaknesses


Modern Techniques : Simplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Block Cipher Design Principles.


Conventional Encryption
Placement of Encryption function, Traffic confidentiality, Key distribution, Random Number Generation.

UNIT - III: Public Key Cryptography
Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptography.

Number Theory
Prime and Relatively prime numbers, Modular arithmetic, Fermat’s and Euler’s theorems, Testing for primality, Euclid’s Algorithm, the Chinese remainder theorem, Discrete logarithms.

UNIT- IV: Message Authentication and Hash Functions
Authentication requirements and functions, Message Authentication, Hash functions, Security of Hash functions and MACs.

Hash and Mac Algorithms
MD File, Message digest Algorithm, Secure Hash Algorithm.

Authentication Applications
Kerberos, Electronic Mail Security: Pretty Good Privacy, S/MIME.
UNIT – V: IP Security
Intruders, Viruses and Worms: Intruders, Viruses and Related threats.
Fire Walls: Fire wall Design Principles, Trusted systems.

TEXT BOOKS:

REFERENCE BOOKS:
1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
5. Introduction to Cryptography, Buchmann, Springer.
ADVANCED COMPUTER NETWORKS LAB
(PGC Lab)

1. Simulation and analysis of MAC Layer protocols.
2. Simulation and analysis of various topologies.
3. Simulation and analysis of wired routing protocols.
4. Simulation and analysis of wireless routing protocols.
5. Simulation and analysis of various security attacks.
6. Analysis of log files and provide the intruder statistics.
7. Simulation of Queue Management Schemes.
8. Evaluation of DES, AES and Triple-DES.
10. Error correcting coding in CDMA Mobile communication system.
11. Capturing and tracking of GOLD sequence in CDMA system.
12. Study of Satellite Azimuth & Elevation using sky Plot Window.
WIRELESS COMMUNICATIONS AND NETWORKS
(PGC – III)

Prerequisite: Digital Communications

Course objectives:
The course objectives are:
• To provide the students with the fundamental treatment about many practical and theoretical concepts that forms basic of wireless communications.
• To equip the students with various kinds of wireless networks and its operations.
• To prepare students to understand the concept of frequency reuse, and be able to apply it in the design of mobile cellular system.
• To prepare students to understand various modulation schemes and multiple access techniques that are used in wireless communications,
• To provide an analytical perspective on the design and analysis of the traditional and emerging wireless networks, and to discuss the nature of, and solution methods to, the fundamental problems in wireless networking.
• To train students to understand the architecture and operation of various wireless wide area networks such as GSM, IS-95, GPRS and SMS.
• To train students to understand wireless LAN architectures and operation.
• To prepare students to understand the emerging technique OFDM and its importance in the wireless communications.

Course Outcomes:
Upon completion of the course, the student will be able to:
• Understand the principles of wireless communications.
• Understand fundamentals of wireless networking
• Understand cellular system design concepts.
• Analyze various multiple access schemes used in wireless communication.
• Understand wireless wide area networks and their performance analysis.
• Demonstrate wireless local area networks and their specifications.
• Familiar with some of the existing and emerging wireless standards.
• Understand the concept of orthogonal frequency division multiplexing.

UNIT –I:
The Cellular Concept-System Design Fundamentals

UNIT –II:
Mobile Radio Propagation: Large-Scale Path Loss
UNIT –III:
Mobile Radio Propagation: Small –Scale Fading and Multipath
Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke’s model for flat fading, spectral shape due to Doppler spread in Clarke’s model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT -IV:
Equalization and Diversity

UNIT -V:
Wireless Networks
Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper Lan, WLL.

TEXT BOOKS:

REFERENCE BOOKS:
1. Wireless Digital Communications – Kamilo Feher, 1999, PHI.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) V Year I-Sem

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IMAGE AND VIDEO PROCESSING
(PG E – V)

Prerequisite: Digital Signal Processing

Course Objectives:
1. The student will be able to understand the quality improvement methods of Image.
2. To study the basic digital image and video filter operations.
3. Understand the fundamentals of Image Compression.
4. Understand the representation of video.
5. Understand the principles and methods of motion estimation.

Course Outcomes:
1. The students will learn image representation, filtering, compression.
2. Students will learn the basics of video processing, representation, motion estimation.

UNIT – I:
Fundamentals of Image Processing and Image Transforms
Basic steps of Image Processing System Sampling and Quantization of an image, Basic relationship between pixels.
Image Segmentation
Segmentation concepts, Point, Line and Edge Detection, Thresholding, Region based segmentation.

UNIT – II:
Image Enhancement
Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters.
Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

UNIT – III:
Image Compression
Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy & Lossless, Huffman coding, Bit plane coding, Transform coding, Predictive coding, Wavelet coding, Lossy Predictive coding, JPEG Standards.

UNIT - IV:
Basic Steps of Video Processing

UNIT – V:
2-D Motion Estimation
Optical flow, General Methodologies, Pixel Based Motion Estimation, Block- Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multi resolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Video coding.
TEXT BOOKS:

REFERENCE BOOKS:
4G TECHNOLOGIES
(PG E - V)

Prerequisite: None.

Course Objectives:
1. To know about Second Generation and Third Generation Cellular technologies
2. To study the Evolution Generation(2.5G) technology platforms,
3. To learn about OFDM modulation technique and their evaluation parameters.
4. To understand UWB wireless channels, data modulation and its features.
5. To study the 4G technology.

Course Outcomes:
At the end of the course, the student will be able to:
1. Explain and compare Second and Third Generation technologies and their architectures.
2. Understand improved version of 2G technology i.e., evolution Generation (2.5G) and data transmission using GPRS, EDGE, HSCSD.
3. Get the knowledge of Orthogonal Frequency Division Multiplexing and evaluate the performance using channel model and SNR, issues regarding OFDM.
4. Acquire the knowledge about UWB wireless channels, data modulation and their features.

UNIT I: 2G and 3G technology
Second Generation (2G) - Overview, Enhancements over 1G Systems, Integration with Existing 1G Systems, GSM, IS-136 System Description, IS-95 System Description, iDEN (Integrated Dispatch Enhanced Network), CDPD

UNIT II: The Evolution Generation (2.5G)
What Is 2.5G?, Enhancements over 2G, Technology Platforms, General Packet Radio Service, (GPRS), Enhanced Data Rates for Global Evolution (EDGE), High-Speed Circuit Switched Data (HSCSD), CDMA2000 (1XRTT), WAP, Migration Path from 2G to 2.5G to 3G,

UNIT III: OFDM

UNIT IV: UWB
UWB Definition and Features, UWB Wireless Channels, UWB Data Modulation, Uniform Pulse Train.

UNIT V: 4G Cellular technology :

Text books:
1. 3G Wireless Networks, 2nd ed., Clint Smith, P.E , Daniel Collins

Reference Books:
1. 3G Networks Architecture, Protocols and Procedures, Sumith Kaseara, Nishit Narang
MULTI-MEDIA AND SIGNAL CODING
(PG E-V)

Prerequisite: Artificial Neural Networks and Fuzzy Systems.

Course Objectives:
This course makes the students to Understand
1. Various image & video processing algorithms.
2. Various video compression techniques.
3. Various audio compression techniques.

Course Outcomes:
On completion of this course the students will be able to
1. Represent and convert various colour models.
2. Simulate various video compression image techniques and can suggest the appropriate video compression techniques for specific application.
3. Simulate various audio compression techniques and can suggest the appropriate audio compression method for specific application.

UNIT -I:

UNIT -II:
Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT -III:
Compression Algorithms:
Lossless Compression Algorithms: Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression.
Lossy Image Compression Algorithms: Transform Coding: KLT And DCT Coding, Wavelet Based Coding.

UNIT -IV:
Video Compression Techniques: Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and Inter-Frame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

UNIT -V:
TEXT BOOKS:

REFERENCE BOOKS:
CODING THEORY AND TECHNIQUES
(PG E - VI)

Prerequisite: Digital Communications

Course Objectives:
1. To acquire the knowledge in measurement of information and errors.
2. To study the generation of various code methods.
3. To study the various application of codes.

Course Outcomes:
1. Learning the measurement of information and errors.
2. Obtain knowledge in designing various codes like block codes, cyclic codes, convolution codes, turbo codes and space codes

UNIT – I:
Coding for Reliable Digital Transmission and storage
Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT - II:
Cyclic Codes: Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding, Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT – III:
Convolutional Codes: Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority-logic decoding of Convolutional codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT – IV:
Turbo Codes
LDPC Codes- Codes based on sparse graphs, Decoding for binary erasure channel, Log-likelihood algebra, Brief propagation, Product codes, Iterative decoding of product codes, Concatenated convolutional codes- Parallel concatenation, The UMTS Turbo code, Serial concatenation, Parallel concatenation, Turbo decoding

UNIT - V:
Space-Time Codes
Introduction, Digital modulation schemes, Diversity, Orthogonal space-Time Block codes, Alamouti’s schemes, Extension to more than Two Transmit Antennas, Simulation Results, Spatial Multiplexing: General Concept, Iterative APP Preprocessing and Per-layer Decoding, Linear Multilayer Detection, Original BLAST Detection, QL Decomposition and Interface Cancellation, Performance of Multi-Layer Detection Schemes, Unified Description by Linear Dispersion Codes.

TEXT BOOKS:
REFERENCE BOOKS:
2. Digital Communications-Fundamental and Application - Bernard Sklar, PE.
4. Introduction to Error Control Codes-Salvatore Gravano-oxford
SOFTWARE DEFINED RADIO
(PG E-VI)

Prerequisite: TCP/IP, Digital Signal Processing

Course Objectives:
The objectives of this course is
1. To provide fundamentals and state of the art concepts in software defined radio.

Course Outcomes:
On completion of this course, the students:
1. Understand the design principles of software defined radio.
2. Understand the analog RF components as front end block in implementation of SDR.
3. Understand digital hardware architectures and development methods.
4. Understand the radio recourse management in heterogeneous networks.
5. Understand the object oriented representation of radio and network resources.


UNIT -II: Profile and Radio Resource Management: Communication Profiles- Introduction, Communication Profiles, Terminal Profile, Service Profile, Network Profile, User Profile, Communication Profile Architecture, Profile Data Structure, XML Structure, Distribution of Profile Data, Access to Profile Data, Management of Communication Profiles, Communication Classmarks, Dynamic Classmarks for Reconfigurable Terminals, Compression and Coding, Meta Profile Data


UNIT -IV: Reconfiguration of the Network Elements: Introduction, Reconfiguration of Base Stations and Mobile Terminals, Abstract Modelling of Reconfigurable Devices, the Role of Local Intelligence in Reconfiguration, Performance Issues, Classification and Rating of Reconfigurable Hardware, Processing Elements, Connection Elements, Global Interconnect Networks, Hierarchical Interconnect Networks, Installing a New Configuration, Applying Reconfiguration Strategies, Reconfiguration Based on Comparison, Resource Recycling, Flexible Workload Management at the Physical Layer, Optimised Reconfiguration, Optimisation Parameters and Algorithms, Optimization Algorithms, Specific Reconfiguration Requirements, Reconfiguring Base Stations, Reconfiguring Mobile Terminals


TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) V Year I-Sem

L  T  P  C
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SPREAD SPECTRUM COMMUNICATIONS
(PG E – VI)

Prerequisite: Communication

Course Objectives:
The objectives of this course are to make the student
1. Understand the concept of Spread Spectrum and study various types of Spread spectrum sequences and their generation.
2. Understand the principles of Code Division Multiple Access (CDMA) and use of Spread spectrum concept in CDMA
3. Understand various Code tracing loops for optimum tracking of wideband signals viz spread spectrum signals
4. Understand the procedure for synchronization of receiver for receiving the Spread spectrum signal.
5. Study the performance of spread spectrum systems in Jamming environment, systems with Forward Error Correction and Multiuser detection in CDMA cellular radio.

Course Outcomes:
On completion of this course student will be able to
1. Generate various types of Spread spectrum sequences and can simulate CDMA system (Both Transmitter & Receiver).
2. Analyze the performance of Spread spectrum systems in Jamming environment and systems with Forward Error Correction.
3. Can provide detection and cancellation schemes for Multiusers in CDMA cellular radio.

UNIT -I:

UNIT -II:
Binary Shift Register Sequences for Spread Spectrum Systems: Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

UNIT -III:
Initial Synchronization of the Receiver Spreading Code: Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

UNIT -IV:

UNIT -V:

TEXT BOOKS:

REFERENCE BOOKS:
Prerequisite: Digital Signal Processing

Course Objectives
The objectives of the course are:
- To recall digital transform techniques.
- To introduce architectural features of programmable DSP Processors of TI and Analog Devices.
- To give practical examples of DSP Processor architectures for better understanding.
- To develop the programming knowledge using Instruction set of DSP Processors.
- To understand interfacing techniques to memory and I/O devices.

Course Outcomes
Upon completion of the course, the student
- Be able to distinguish between the architectural features of General purpose processors and DSP processors.
- Understand the architectures of TMS320054xx and ADSP 2100 DSP devices.
- Be able to write simple assembly language programs using instruction set of TMS32OC54xx.
- Can interface various devices to DSP Processors.

UNIT –I
Introduction to Digital Signal Processing
Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FET), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations
Number formats for signals and coefficients in DSP systems. Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT —II
Architectures for Programmable DSP Devices
Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT —III
Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS32OC54XX DSPs, Data Addressing modes of TMS32OC54XX Processors, Memory space of TMS32OC54XX Processors, Program Control, TMS32OC54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS32OC54XX processors, Pipeline Operation of TMS32OC54XX Processors.

UNIT -IV
Analog Devices Family of DSP Devices
Analog Devices Family of DSP Devices —ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor — The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.
UNIT -V
Interfacing Memory and I/O Peripherals to Programmable DSP Devices
Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface,
Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS

REFERENCE BOOKS
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI
**SPEECH AND AUDIO SIGNAL PROCESSING**  
*(PG E - VII)*

**Prerequisite:** Advanced Digital Signal Processing

**Course Objectives:**
The objectives of this course are to make the student
1. Understand the anatomy and Physiology of Speech Production system and perception model and to design an electrical equivalent of Acoustic model for Speech Production.
2. To understand the articulatory and acoustic interpretation of various phonemes and their allophones.
3. To analyze the speech in time domain and extract various time domain parameters which can be used for various applications like pitch extraction, end point detection, Speech Compression, Speech Synthesis etc.,
4. To study the concept of Homomorphic system and its use in extracting the vocal tract information from speech using Cepstrum which is a byproduct of Homomorphic processing of Speech.
5. To study various Speech Signal Processing applications viz: Speech Enhancement, Speech Recognition, Speaker Recognition.
6. To study various Audio coding techniques based on perceptual modeling of the human ear.

**Course Outcomes:**
On completion of this course student will be able to
1. Model an electrical equivalent of Speech Production system.
2. Extract the LPC coefficients that can be used to Synthesize or compress the speech.
3. Design a Homomorphic Vocoder for coding and decoding of speech.
4. Enhance the speech and can design an Isolated word recognition system using HMM.
5. Can extract the features for Automatic speaker recognition system which can used for classification.
6. Can design basic audio coding methods for coding the audio signal.

**Unit – I :**
**Fundamentals of Digital Speech Processing:**

**Unit – II :**
**Time Domain models for Speech Processing:**
Introduction – Window considerations, Short time energy, average magnitude, average zero crossing rate, Speech vs Silence discrimination using energy and zero crossing, pitch period estimation using a parallel processing approach, the short time autocorrelation function, average magnitude difference function, pitch period estimation using the autocorrelation function.

**Linear Predictive Coding (LPC) Analysis :**
Unit – III:  
**Homomorphic Speech Processing:**  
**Speech Enhancement:**  

Unit – IV:  
**Automatic Speech Recognition:**  
Basic pattern recognition approaches, parametric representation of Speech, Evaluating the similarity of Speech patterns, Isolated digit Recognition System, Continuous word Recognition system. Elements of HMM, Training & Testing of Speech using HMM.  
**Automatic Speaker Recognition:**  
Recognition techniques, Features that distinguish speakers, MFCC, delta MFCC, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System, Performance Metrics.

Unit – V:  
**Audio Coding:**  

**TEXT BOOKS:**  

**REFERENCE BOOKS:**  
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) V Year I-Sem

Radar Signal Processing
(PG E- VII)

Prerequisite: Radar Systems

Course Objectives:
1. This course emphasis on the principles of Radar Systems and Signal Processing techniques.
2. Ability to understand the various parameters of Radar like pdf , prf.
3. Acquire knowledge about pulse compression Radar.
4. To study the phase coding Techniques.

Course Outcomes:
Upon the completion of this course, the student will be able to
1. Understand the principles of Radar Systems.
2. Learn the appropriate model, calculate system performance parameters and assess the limitations of particular systems.
3. Understand the concepts of pulse compression Radar.

UNIT -I:
Introduction

UNIT –II:
Radar Equation

UNIT –III:
Waveform Selection

UNIT -IV:
Pulse Compression in Radar Signals
Introduction, Significance, Types, Linear FM Pulse Compression – Block Diagram, Characteristics, Reduction of Time Side lobes, Stretch Techniques, Generation and Decoding of FM Waveforms.

UNIT –V:
Phase Coding Techniques
Principles, Binary Phase Coding, Barker Codes, Maximal Length Sequences (MLS/LRS/PN), Block Diagram of a Phase Coded CW Radar.

TEXT BOOKS:

REFERENCE BOOKS:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

DISASTER MANAGEMENT
OPEN ELECTIVE-I

L T P C
3 0 0 3

Pre Requisites: NIL

Course Objectives:
The subject provide different disasters, tools and methods for disaster management

Course Outcomes:
Estimate, perform quantity survey & valuate various engineering works

UNIT 1: Understanding Disaster
Concept of Disaster
Different approaches
Concept of Risk
Levels of Disasters
Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerability
Natural and man-made hazards; response time, frequency and forewarning levels of different hazards
Characteristics and damage potential or natural hazards; hazard assessment
Dimensions of vulnerability factors; vulnerability assessment
Vulnerability and disaster risk
Vulnerabilities to flood and earthquake hazards

UNIT 2: Disaster Management Mechanism
Concepts of risk management and crisis managements
Disaster Management Cycle
Response and Recovery
Development, Prevention, Mitigation and Preparedness
Planning for Relief

UNIT 3: Capacity Building
Capacity Building: Concept
Structural and Nonstructural Measures
Capacity Assessment; Strengthening Capacity for Reducing Risk
Counter-Disaster Resources and their utility in Disaster Management
Legislative Support at the state and national levels

UNIT 4: Coping with Disaster
Coping Strategies; alternative adjustment processes
Changing Concepts of disaster management
Industrial Safety Plan; Safety norms and survival kits
Mass media and disaster management

UNIT 5: Planning for disaster management
Strategies for disaster management planning
Steps for formulating a disaster risk reduction plan
Disaster management Act and Policy in India
Organizational structure for disaster management in India
Preparation of state and district disaster management plans
Text Books

References
IDP (B.Tech. - ECE & M.Tech. /MBA) III Year I-Sem

L T P C
3 0 0 3

NON CONVENTIONAL POWER GENERATION
OPEN ELECTIVE-I

Pre-requisite: Nil.

Objectives:
• To introduce various types of renewable technologies available.
• The technologies of energy conversion from these resources and their quantitative analysis.

Outcomes:
• The student will be able analyse solar thermal and photovoltaic systems and related technologies for energy conversion.
• Wind energy conversion and devices available for it.
• Biomass conversion technologies.
• Geo thermal resources and energy conversion principles and technologies.
• Power from oceans (thermal, wave, tidal) and conversion and devices.
• Fundamentals of fuel cells and commercial batteries.

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

TEXT BOOKS
REFERENCE BOOKS
2. F.C. Treble, Generating Electricity from Sun.
4. S.P. Sukhatme, Solar Energy Principles and Application - TMH
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

ELECTRICAL ENGINEERING MATERIALS
OPEN ELECTIVE-I

L T P C
3 0 0 3

Pre-requisites: Nil

Objectives: To understand the importance of various materials used in electrical engineering and obtain a qualitative analysis of their behavior and applications.

OUTCOMES: Will be able to
1. Understand various types of dielectric materials, their properties in various conditions.
2. Evaluate magnetic materials and their behavior.
3. Evaluate semiconductor materials and technologies.
4. Materials used in electrical engineering and applications.

UNIT – I
DIELECTRIC MATERIALS: Dielectric as Electric Field Medium, leakage currents, dielectric loss, dielectric strength, breakdown voltage, breakdown in solid dielectrics, flashover, liquid dielectrics, electric conductivity in solid, liquid and gaseous dielectrics, Ferromagnetic materials, properties of ferromagnetic materials in static fields, spontaneous, polarization, curie point, anti-ferromagnetic materials, piezoelectric materials, pyroelectric materials.

UNIT – II
MAGNETIC MATERIALS: Classification of magnetic materials, spontaneous magnetization in ferromagnetic materials, magnetic Anisotropy, Magnetostriction, diamagnetism, magnetically soft and hard materials, special purpose materials, feebly magnetic materials, Ferrites, cast and cermet permanent magnets, ageing of magnets, factors effecting permeability and hysteresis.

UNIT – III
SEMICONDUCTOR MATERIALS: Properties of semiconductors, Silicon wafers, integration techniques, Large and very large scale integration techniques (VLSI).

UNIT – IV
MATERIALS FOR ELECTRICAL APPLICATIONS: Materials used for Resistors, rheostats, heaters, transmission line structures, stranded conductors, bimetals fuses, soft and hard solders, electric contact materials, electric carbon materials, thermocouple materials. Solid, Liquid and Gaseous insulating materials, Effect of moisture on insulation.

UNIT – V
SPECIAL PURPOSE MATERIALS: Refractory Materials, Structural Materials, Radioactive Materials, Galvanization and Impregnation of materials, Processing of electronic materials, Insulating varnishes and coolants, Properties and applications of mineral oils, Testing of Transformer oil as per ISI.

TEXT BOOKS
3. TTTI Madras: Electrical Engineering Materials
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech./MBA) III Year I-Sem

NANO-TECHNOLOGY
OPEN ELECTIVE-I

Pre-requisites: Nil

OBJECTIVES:
To enable the student to understand fundamentals of nano materials and technologies for these materials and their manufacturing, applications in various fields.

OUTCOMES:
• To evaluate electronic structural studies of nano materials and different synthesis methods to obtain nano structures.
• Understand characterization techniques through various measurements to study electrical, mechanical,thermal properties of nano materials.
• Applications of nano materials for specific purposes like MEMS, NEMS, nano electronics, energy storage.

UNIT - I
Background of Nanotechnology: Scientific Revolutions, Nanotechnology and Nanomachines - The Periodic Table, Atomic Structure, Molecules and Phases, Energy, Molecular and Atomic size, Surfaces and Dimensional Space, Top down and Bottom up approach.

UNIT - II

UNIT - III
Nanopowders and Nanomaterials: Preparation, Plasma arcing, chemical vapor deposition, Sol-gels, Electrodeposition, Ball milling, using natural nanoparticles, Applications of nanomaterials.

UNIT - IV
Nanoelectronics: Approaches to nanoelectronics, Fabrication of integrated circuits, MEMS, NEMS, Nano circuits, Quantum wire, Quantum well, DNA-directed assembly and application in electronics.

UNIT - V

TEXT BOOKS
1. Introduction to Nanoscience and Nanotechnology Gabor L. Hornyak, NanoThread, Inc., Golden, Colorado, USA; H.F. Tibbals, University of Texas Southwestern Medical Center, Dallas, USA; Joydeep Dutta, Asian Institute of Technology, Pathumthani, Thailand; John J. Moore, Colorado School of Mines, Golden, USA
2. Introduction to Nanotechnology by Charles P. Poole Jr and Frank J. Owens Wiley India Pvt Ltd.
3. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya. K.K., and Banerjee A.N.
4. Introduction to nano tech by phani kumar
5. Introduction to Nano Technology by Charles P. Poole Jr and Frank J. Owens. Wiley India Pvt Ltd.
IDP (B.Tech. ECE & M.Tech. / MBA) III Year I-Sem

OPERATIONS RESEARCH
OPEN ELECTIVE-I

Prerequisites: None

Objectives:
Understanding the mathematical importance of development of model in a particular optimization model for the issue and solving it.

Outcomes:
Understanding the problem, identifying variables & constants, formulas of optimization model and applying appropriate optimization Techniques

UNIT – I


UNIT – II


UNIT – III
SEQUENCING – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through ‘m’ machines-graphical model

REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.

UNIT – IV

INVENTORY: Introduction – Single item, Deterministic models – Types - Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand discrete variable or continuous variable – Single Period model with no setup cost.

UNIT – V

DYNAMIC PROGRAMMING:

TEXT BOOK :
2. Operations Research/A.C.S.Kumar/Yesdee

REFERENCE BOOKS :
1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspan and Lawrence Friedman
4. Introduction to O.R/Hillier & Libermann (TMH).
5. Introduction to O.R /Taha PHI
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

BASICS OF THERMODYNAMICS
OPEN ELECTIVE-I

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Pre-requisite: Engineering Chemistry and Physics

Course Objective: To understand the treatment of classical Thermodynamics and to apply the First and Second laws of Thermodynamics to engineering applications

Course Outcomes:
At the end of the course, the student should be able to
- Understand and differentiate between different thermodynamic systems and processes
- Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes
- Understand and analyze the Thermodynamic cycles

UNIT – I
Introduction: Basic Concepts:

UNIT II

UNIT – III

UNIT IV
Atmospheric air - Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation ,Psychrometric chart.

UNIT - V
Power Cycles : Otto, Diesel cycles - Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis
Refrigeration Cycles:
Bell-Coleman cycle, Vapour compression cycle-performance Evaluation.

TEXT BOOKS :
1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Thermodynamics / C.P.Arora.

REFERENCE BOOKS:
1. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
3. Thermodynamics – J.P.Holman / McGrawHill
4. Engineering Thermodynamics – Jones & Dugan
Prerequisites: Nil

Objectives:
Understand the philosophies of various Manufacturing process.

Outcomes:
For given product, one should be able identify the manufacturing process.

UNIT – I
Casting: Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.
Methods of Melting - Crucible melting and cupola operation – Defects in castings;

UNIT – II
Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting, Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.
Inert Gas Welding _ TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non-destructive testing of welds.

UNIT – III
Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth.
Types of presses and press tools. Forces and power requirement in the above operations.

UNIT – IV
Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

UNIT – V

TEXT BOOKS:
1. Manufacturing Technology / P.N. Rao/TMH

REFERENCE BOOKS:
1. Production Technology / R.K. Jain
2. Metal Casting / T.V Ramana Rao / New Age
4. Welding Process / Parmar /
5. Production Technology /Sarma P C /
ELECTRONIC MEASURING INSTRUMENTS
OPEN ELECTIVE-I

Note: No detailed mathematical treatment is required.

Prerequisite : Nil

Course Objectives:
- It provides an understanding of various measuring systems functioning and metrics for performance analysis.
- Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
- Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

Course Outcomes:
On completion of this course student can be able to
- Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
- Measure various physical parameters by appropriately selecting the transducers.
- Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.

Unit-I:

Unit-II:
Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, and Specifications.

Unit-III:

Unit-IV:
Recorders: X-Y Plotter, Curve tracer, Galvanometric Recorders, Servo transducers, pen driving mechanisms, Magnetic Recording, Magnetic recording techniques.

Unit-V:
Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

TEXT BOOKS:

REFERENCES:
Prerequisites
1. A course on “Computer Programming & Data Structures”

Objectives
1. Introduces object oriented programming concepts using the Java language.
2. Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
3. Introduces the implementation of packages and interfaces
4. Introduces exception handling, event handling and multithreading
5. Introduces the design of Graphical User Interface using applets and swings

Outcomes
1. Develop applications for a range of problems using object-oriented programming techniques
2. Design simple Graphical User Interface applications

UNIT I:
Object oriented thinking and Java Basics - Need for OOP paradigm, summary of OOP concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT II:
Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.
Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring java.io.

UNIT III:
Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
String handling,Exploring java.util.Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter-thread communication, thread groups, daemon threads, Enumerations, auto boxing, annotations, generics.

UNIT IV:
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.
UNIT V:
**Applets** – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.


**TEXT BOOKS:**
1. Java the complete reference, 7th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

**REFERENCES:**
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

COMPUTER GRAPHICS
OPEN ELECTIVE-I

Prerequisites
1. Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.
2. A course on "Computer Programming and Data Structures"

Objectives
1. The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
2. Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

Outcomes
1. Acquire familiarity with the relevant mathematics of computer graphics.
2. Be able to design basic graphics application programs, including animation
3. Be able to design applications that display graphic images to given specifications

UNIT-I:
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices
Output primitives: Points and lines, line drawing algorithms (Bresenham’s and DDA Algorithm), mid-point circle and ellipse algorithms
Filled area primitives: Scan-line polygon fills algorithm, boundary-fill and flood-fill algorithms

UNIT-II:
2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm, Polygon Filling

UNIT-III:
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV:
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V:
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.
Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods
Text Books:
3. Computer Graphics, Steven Harrington, TMH

References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year I-Sem

ENGINEERING MATERIALS
OPEN ELECTIVE-I

Pre requisites: Nil

Course Objectives:
1. To gain an knowledge about the uses and application of various ferrous metals and alloys.
2. To gain an knowledge about the uses and application of various non ferrous alloys.
3. To gain an knowledge about the uses and application of various ceramics, polymers and composites for different engineering applications.

Course Outcomes:
At the end of the course, student would be able to recommend
1. Ferrous metals and alloys for a given engineering applications and service condition.
2. Non ferrous alloys for a given engineering applications and service condition.
3. Ceramics, Polymers and composites for a given engineering applications and service condition.

UNIT-I

UNIT-II
NONFERROUS ALLOYS: Introduction, properties and applications, Aluminum Alloys, Magnesium Alloys, Copper Alloys and Titanium Alloys.

UNIT-III
CERAMIC MATERIALS: Introduction, Properties and Applications of Ceramics, Glasses and Refractories.

UNIT-IV
POLYMERS: Introduction, Classification of Polymers, Polymerization, Degree of Polymerization, Typical Thermoplastics and Thermosets.

UNIT-V
COMPOSITES: Introduction, Classification, Properties and Applications of Polymer matrix, Metal Matrix Ceramic Matrix and Laminar composites.

TEXT / REFERENCE BOOKS:
METALLURGY FOR NON METALLURGISTS
OPEN ELECTIVE-I

Pre requisites: Nil

Course Objectives:
1. To describe the basic principles of metallurgy and the importance of metallurgy in various
discipline of engineering.
2. Gain a thorough knowledge about heat treatment of steels.
3. Gain a knowledge about properties and uses of cast irons and non ferrous metals.
4. Gain a working knowledge of basic testing methods for metals.

Course Outcomes:
At the end of the course Student would be able
1. To use and apply metallurgy in his own branch of engineering.
2. The student will be able to justify the various testing methods adopted for metals.

UNIT-I
Introduction: Crystal structure and defects, Crystal structure of metals, Classification of steels,
Carbon steels

UNIT-II
Heat Treatment of Steels: The Iron carbon systems, Common phases in steels, Annealing,
Normalizing, Hardening and tempering

UNIT-III
Cast irons: Properties and applications of Ductile irons, Malleable irons, Compacted graphite iron.

UNIT-IV
Non Ferrous Metals: Properties and applications of Light Metals (Al, Be, Mg, Ti), Super alloys

UNIT-V

TEXT BOOKS
1. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R.
2. Introduction to Physical Metallurgy – SH Avner, TATA Mc GRAW HILL,1997
3. Metallurgy for Engineers- Clark and Varney
4. Mechanical Metallurgy – G. E. Dieter

REFERENCE BOOKS
1. Engineering Physical Metallurgy and Heat treatment – Y Lakhtin
Wiley, NJ, USA,2006
   Foundations of Materials Science and Engineering – WF Smith
Objective:
To expose the students to various types of industrial pollutions and controlling techniques.

OUTCOME:
The student will be able learn the sources of air, water pollution and also their treatment methods

UNIT-I
Introduction to industrial pollution and types of pollution from chemical industries, Effects of pollution as environment and ecosystems-global warming-green house effect; Environmental legislatures-standards and guidelines.

UNIT –II
Air pollution- Meteorological aspects of pollution dispersion-adiabatic lapse rate-Environmental lapse rate-Turbulence and stability of atmosphere, Richardson number-Plume raise-plume behavior and characteristics, effective stack height. Major air pollutants and their sources, measurement of air pollutants

UNIT -III

UNIT -IV
Introduction to water pollution – water pollutants classification – characteristics of liquid effluents from fertilizer, pulp & paper and petroleum industries, estimation of oxygen demands – DO, BOD, COD, TOC – BOD curves, oxygen sag curve – modeling of BOD curves


UNIT -V

Text books:
1. Pollution control in process industries by S.P. Mahajan TMH.,1985

References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

ESTIMATION, QUANTITY SURVEY & VALUATION
OPEN ELECTIVE -II

L T P C
3 0 0 3

Pre Requisites:
Concrete Technology, RC Design, Design of Steel Structure

Course Objectives:
The subject provides the process of estimations required for various work in construction. To have knowledge of using SOR & SSR for analysis of rates on various works.

Course Outcomes:
Able to provide control steps for disaster mitigation steps

UNIT – I

UNIT – II
Detailed Estimates of Buildings - Reinforcement bar bending and bar requirement schedules

UNIT – III
Earthwork for roads and canals.

UNIT – IV
Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT – V

NOTE: NUMBER OF EXERCISES PROPOSED:
1. Three in flat Roof & one in Sloped Roof
2. Exercises on Data – three Nos.

Text Books:
2. Estimating and Costing by G.S. Birdie

Reference books:
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech./MBA) III Year II-Sem

DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS
OPEN ELECTIVE-II

Pre-requisite: Power systems-I and Power Systems-II

Objectives:
Objectives of this course are

• To emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
• To design and estimation of wiring,
• To design overhead and underground distribution lines, substations and illumination design.

OUTCOMES:
Students are in a position to Understand the design considerations of electrical installations.

• To design electrical installation for buildings and small industries.
• To identify and design the various types of light sources for different applications.

UNIT - I
DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT - II
ELECTRICAL INSTALLATION FOR DIFFERENT TYPES OF BUILDINGS AND SMALL INDUSTRIES: Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT - III
OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports for transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT - IV
SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substations – Floor mounted type.

UNIT – V
DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes LED, CFL and OCFL differences.

TEXT BOOKS
2. Design of Electrical Installations, Er. V. K. Jain, Er. Amitabh Bajaj, University Science Press.
REFERENCE BOOKS
Objectives:
Objectives of this course are
- To enable the student to understand the need for energy storage, devices and technologies available and their applications.

OUTCOMES: After this course, the student
- Can analyze the characteristics of energy from various sources and need for storage
- Can classify various types of energy storage and various devices used for the purpose
- Can apply the same concepts to real time problems.

UNIT - I
Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT - II

UNIT - III
Features of Energy Storage Systems: Classification of EES systems, Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES), Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2), Synthetic natural gas (SNG).

UNIT - IV
Types of Electrical Energy Storage systems: Electrical storage systems, Double-layer capacitors (DLC), Superconducting magnetic energy storage (SMES), Thermal storage systems, Standards for EES, Technical comparison of EES technologies.

UNIT - V
Applications: Present status of applications, Utility use (conventional power generation, grid operation & service), Consumer use (uninterruptable power supply for large consumers), New trends in applications, Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems, Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA-aggregation of many dispersed batteries.

TEXT BOOKS
REFERENCE BOOKS:
UNIT – I
INTRODUCTION: Definition – Trends - Control Methods: Standalone , PC Based ( Real Time Operating Systems, Graphical User Interface , Simulation) - Applications: identification of sensors and actuators in Washing machine, Automatic Camera, Engine Management, SPM, Robot, CNC, FMS, CIM.


UNIT – II
PRECISION MECHANICAL SYSTEMS: Modern CNC Machines – Design aspects in machine structures, guideways, feed drives, spindle and spindle bearings, measuring systems, control software and operator interface, gauging and tool monitoring.

ELECTRONIC INTERFACE SUBSYSTEMS: TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC’s - Protection schemes – circuit breakers, over current sensing, resetable fuses, thermal dissipation - Power Supply - Bipolar transistors / MOSFETs

UNIT – III
ELEKTROMECHANICAL DRIVES: Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM’s - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.


UNIT – IV

UNIT – V

TEXT BOOKS
2. Mechatronics by M.D.Singh, J.G.Joshi PHI.
3. Mechatronics HMT

REFERENCE BOOKS
2. Michel B. Histand and David G. Alciatore,
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

JET PROPULSION AND ROCKET ENGINEERING
OPEN ELECTIVE-II

Prerequisites: None

Course outcomes:
After doing this course, student should be in position to
1. Understand Turbo Jet Propulsion System
2. Analyze the flight performance
4. Learn the Aero thermo chemistry of the combustion products
5. Understand the physics of Solid propellant rocket engine, Liquid Rocket Propulsion System & Ramjet and Integral Rocket Ramjet Propulsion System:

Unit - I:
Turbo Jet Propulsion System:
Gas turbine cycle analysis – layout of turbo jet engine. Turbo machinery- compressors and turbines, combustor, blade aerodynamics, engine off design performance analysis.
Flight Performance:
Forces acting on vehicle – Basic relations of motion – multi stage vehicles.

Unit - II:
Principles of Jet Propulsion and Rocketry:
Fundamentals of jet propulsion, Rockets and air breathing jet engines – Classification – turbo jet, turbo fan, turbo prop, rocket (Solid and Liquid propellant rockets) and Ramjet engines.
Nozzle Theory and Characteristics Parameters:
Theory of one dimensional convergent – divergent nozzles – aerodynamic choking of nozzles and mass flow through a nozzle – nozzle exhaust velocity – thrust, thrust coefficient, $A_c / A_t$ of a nozzle, Supersonic nozzle shape, non-adapted nozzles, summer field criteria, departure from simple analysis – characteristic parameters – 1) characteristic velocity, 2) specific impulse 3) total impulse 4) relationship between the characteristic parameters 5) nozzle efficiency, combustion efficiency and overall efficiency.

Unit - III: Aero Thermo Chemistry of The Combustion Products:
Solid Propulsion System:

Unit - IV:
Solid propellant rocket engine – internal ballistics, equilibrium motor operation and equilibrium pressure to various parameters. Transient and pseudo equilibrium operation, end burning and burning grains, grain design. Rocket motor hard ware design. Heat transfer considerations in solid rocket motor design. Ignition system, simple pyro devices.
Liquid Rocket Propulsion System:
Liquid propellants – classification, Mono and Bi propellants, Cryogenic and storage propellants, ignition delay of hypergolic propellants, physical and chemical characteristics of liquid propellant. Liquid propellant rocket engine – system layout, pump and pressure feed systems, feed system components. Design of combustion chamber, characteristic length, constructional features, and chamber wall stresses. Heat transfer and cooling aspects. Uncooled engines, injectors – various
types, injection patterns, injector characteristics, and atomization and drop size distribution, propellant tank design.

Unit - V: Ramjet and Integral Rocket Ramjet Propulsion System:
Fuel rich solid propellants, gross thrust, gross thrust coefficient, combustion efficiency of ramjet engine, air intakes and their classification – critical, super critical and sub-critical operation of air intakes, engine intake matching, classification and comparison of IIRR propulsion systems.

TEXT BOOKS:

REFERENCE BOOKS:
1. Rocket propulsion –Sutton
2. Gas Turbines /Cohen, Rogers & Sarvana Muttoo/Addision Wesley & Longman.
3. Gas Turbines-V.Ganesan /TMH.
Prerequisites: None

Objectives:
Provide a broad based introduction to ergonomic principles and their application in the design of work, equipment and the workplace. Consideration is given to musculo-skeletal disorders, manual handling, ergonomic aspects of the environment as well as to the social and legal aspects.

Course Outcomes:
On completing this course successfully the student will be able to:
• understand and apply ergonomic principles to the creation of safer, healthier and more efficient and effective activities in the workplace;
• understand ergonomic risk assessments and appropriate control measures;
• understand the causes of upper limb disorders and how to reduce them;
• appreciate workplace layout and equipment design;
• appreciate environmental aspects of good ergonomic design.

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

Text books
1. Introduction to Ergonomics(Third Edition)/ R.S.Bridger/CRC Press , Taylor & Francis Group

References
1. Human factors in Engineering and Design/E.J.McCormick/ TMH Edison
MECHATRONICS
OPEN ELECTIVE-II

Pre-requisites: None.

Course objectives:
• They should be able to link up mechanical and electronics.

Outcomes:
• Develop a relationship between mechanical elements and electronics elements for proper functioning of mechanical systems.

UNIT – I
INTRODUCTION: Definition – Trends - Control Methods: Standalone , PC Based ( Real Time Operating Systems, Graphical User Interface , Simulation ) - Applications: identification of sensors and actuators in Washing machine, Automatic Camera, Engine Management, SPM, Robot, CNC, FMS, CIM.


UNIT – II
PRECISION MECHANICAL SYSTEMS :
Modern CNC Machines – Design aspects in machine structures, guideways, feed drives, spindle and spindle bearings, measuring systems, control software and operator interface, gauging and tool monitoring.
Note: (text book: Mechatronics HMT – chapter 5)

ELECTRONIC INTERFACE SUBSYSTEMS :
TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC’s - Protection schemes – circuit breakers , over current sensing , resetable fuses , thermal dissipation - Power Supply - Bipolar transistors / mosfets

UNIT – III
ELECTROMECHANICAL DRIVES :
Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM’s - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.


UNIT – IV
PROGRAMMABLE LOGIC CONTROLLERS :

UNIT – V
Interpolation, PTP, Linear, Circular - Core functionalities – Home, Record position, GOTO Position - Applications: SPM, Robotics.

TEXT BOOKS:
2. Mechatronics/M.D.Singh/J.G.Joshi PHI.

REFERENCE:
2. Michel B. Histand and David G. Alciatore, "
3. Introduction to Mechatronics and Measurement systems, "Tata MC Graw hill
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

PRINCIPLES OF ELECTRONIC COMMUNICATIONS
OPEN ELECTIVE-II

Prerequisite : Nil

Course Objectives:
The objective of this subject is to:
• Introduce the students to modulation and various analog and digital modulation schemes.
• They can have a broad understanding of satellite, optical, cellular, mobile, wireless and telecom concepts.

Course Outcomes:
By completing this subject, the student can
• Work on various types of modulations.
• Should be able to use these communication modules in implementation.
• Will have a basic understanding of various wireless and cellular, mobile and telephone communication systems.

Unit 1:
Introduction: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels.

Unit 2:

Unit 3:
Telecommunication Systems: Telephones Telephone system, Paging systems, Internet Telephony.
Networking and Local Area Networks: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

Unit 4:
Satellite Communication: Satellite Orbits, satellite communication systems, satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems.

Unit 5:
Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA, WCDMA.
Wireless Technologies: Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.

Text Books:
2. Kennady, Davis, Electronic Communications systems, 4e, TMH, 1999

Reference Books:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

CYBER SECURITY
OPEN ELECTIVE -II

Prerequisites
1. A Course on “Network Security and Cryptography”

Objectives
1. The purpose of the course is to educate on cyber security and the legal perspectives of cyber crimes and cyber offenses.
2. Introduce tools and methods for enhancing cyber security.
3. Topics include- cyber crimes, cyber offenses, cyber crimes on mobile and wireless devices, tools and methods to prevent cyber crimes, legal perspectives of cyber crimes and cyber security, computer forensics, Intellectual Property Rights and cyber terrorism

Outcomes
1. Demonstrate the knowledge of cyber security and understand the Indian and Global Act concerning cyber crimes
2. Employ security and privacy methods in the development of modern applications such that personal data is protected; and provide safe Internet usage.

UNIT-I
Introduction to Cybercrime:
Introduction, Cybercrime and Information security, who are cyber criminals, Classification of Cyber crimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cyber crimes.

Cyber offenses : How Criminals Plan Them

UNIT-II
Cybercrime: Mobile and Wireless Devices

Tools and Methods Used in Cyber Crime:
Introduction, Proxy services and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.

UNIT III
Cyber crimes and Cyber Security: the Legal Perspectives Introduction
Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment Cyber law, Technology and Students: Indian Scenario.

Understanding Computer Forensics
Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques Forensics Auditing
UNIT IV
Cyber Security: Organizational Implications
Introduction, cost of cyber crimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cyber crimes the psychology, mindset and skills of hackers and other cyber criminals

UNIT V
Cybercrime: Illustrations, Examples and Mini-Cases
Examples:
Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases:
The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios.

Text book:

Reference book:
Prerequisites
1. A course on “Advanced Data Structures”

Objectives
1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Outcomes
1. Gain knowledge of fundamentals of DBMS, database design and normal forms
2. Master the basics of SQL for retrieval and management of data.
3. Be acquainted with the basics of transaction processing and concurrency control.
4. Familiarity with database storage structures and access techniques

UNIT I:
Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT II:
Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity’s, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT III:
Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT IV:
UNIT V:

Text Books:

References:
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J. Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
Pre-requisites: NIL

Course Objectives:
1. To demonstrate electrometallurgy principles in deposition winning and the efficiency of the bath.
2. To determine corrosion rate/ resistance of metals and alloys.
3. To explain corrosion protection methods and tests.

Course Outcomes:
At the end of the course the student will be able:
1. To gain knowledge in various types of electrolytic cells and the processes taking place in them.
2. To obtain knowledge about the importance of controlling corrosion and its prevention measures.
3. The course is useful for higher studies, R&D, and also for getting into jobs in industries.

UNIT - I
Introduction, Electro Chemistry principles, electrochemical reactions, Polarization, passivity, environmental effects (oxygen, oxidizers, velocity, temperature, corrosive concentration, Galvanic coupling).

UNIT - II

UNIT - III
Intergranular corrosion: Sensitization, weld decay, Knife-Line attack, Stress corrosion cracking: crack morphology, stress effects, environmental factors, metallurgical factors, Erosion corrosion: cavitation damage, fretting corrosion, Corrosion fatigue.

UNIT - IV

UNIT - V
Modern theory and applications of corrosion: Introduction, free energy, cell potentials, emf series, applications of thermodynamics to corrosion, Corrosion rate expressions and measurements, corrosion testing.

Text / Reference Books:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. /MBA) III Year II-Sem

TESTING OF MATERIALS
OPEN ELECTIVE-II

L T P C
3 0 0 3

Pre-requisites: NIL

Course Objectives:
1. To gain and understanding of the response of various metals under the application of stress and/or temperature.
2. To build necessary theoretical background of the role of lattice defects in governing both elastic and plastic properties of metals will be discussed.
3. Obtain a working knowledge of various hardness testing machines BHN, VHN, RHN
4. Obtain a working knowledge of creep and fatigue and analysis of data.

Course Outcomes:
At the end of the course the student will be able to:
1. Classify mechanical testing of ferrous and non-ferrous metals and alloys.
2. Recognize the importance of crystal defects including dislocations in plastic deformation.
3. Identify the testing methods for obtaining strength and hardness.
4. Examine the mechanisms of materials failure through fatigue and creep

UNIT – I
Introduction, Importance of testing
Hardness Test: Methods of hardness testing – Brinell, Vickers, Rockwell hardness tests.
The Impact Test: Notched bar impact test and its significance, Charpy and Izod Tests, fracture toughness testing - COD and CTOD tests, significance of transition temperature curve.

UNIT - II

UNIT - III

UNIT – IV
Creep and Stress Rupture: Introduction, The creep curve, Stress-rupture test, Structural changes during creep, Mechanism of creep deformation, theories of creep. Fracture at elevated temperature.

UNIT – V
NDT: Principle, Operation, Advantages and Limitations of Liquid Penetrant, Magnetic Particle, Radiography and Ultrasonic tests.

TEXT / REFERENCE BOOKS:
1. Mechanical Metallurgy – G. E. Dieter
2. Mechanical behavior - Ed. Wulf.
Objectives:
- To know the Classification of solid waste and characterization of the same
- Understand the sense of onsite handling storage and collection systems including transportation
- Understand the different processing technologies of solid waste.

Outcomes:
The student will be able to
- Apply the knowledge of characterization of waste and develop a suitable management plan
- Assess the cost of transportation and laboratory processing of solid waste
- Identify hazardous nature of waste if any and can suggest suitable dumping methods.
- Suggest processing waste for material for energy recovery.

Unit I


Unit II

Unit III

Unit IV


Unit V
Case studies: Major industries and management methods used in typical industries – Coal fired power stations, textile industry, oil refinery, distillery, sugar industry, and radioactive waste generation units.

Text Books:

Reference Books:
Course Aim: The aim of the Marketing Management Course is to provide students the marketing skills and enable them.

- To understand the basic marketing trends through case studies.
- To familiarise with basic concepts of marketing mix and strategies.
- To get oriented to the tools required to help develop and implement marketing strategies.

Learning outcome:
The students would be able to describe key marketing concepts, theories and techniques for analyzing a variety of marketing situations
By reading text and relating the concepts through cases the student would be able to understand the importance and role of marketing in a global environment.
They will be able to analyze markets and design customer driven strategies and will be able to communicate the decisions towards business development with superior customer value.

   Case 1: Bata (Rajendra.P Maheshwari page no: 03)
   Case 2: Mahindra Scooters (Arun Kumar page no: 89).
   Case 3: Ready Meal Manufactures (Adrian palmer, page no: 70).
   Case 4: Santoor –(lamb Hair– page no : 238).
   Case 5: Drawing on data, searching for insight (Adrian palmer – Page no: 175).

   Case 1: Small New Phones (Adrian palmer- page no: 296).

   Case 1: (Segmentation) Zee TV (lamb, Hair page no 212).
   Case 2: (Targeting) Kellogg’s (lamb, Hair page no 300).
   Case 3: (Positioning) Nimbooz (S. Neelamegham page no 225).

4. Distribution Decisions, Promotion & Communication Strategies : Marketing Channels, Channel intermediates and functions, channel structure, channel for consumer products, business and industrial products, alternative channel, channel strategy decisions. The promotional mix, advertising, public relations, sales promotion, personal selling, marketing communication- communication process, communication promotion mix, factors effecting the promotion mix.
   Case 1: Barista (Arun Kumar – page no:33).
   Case 2: Nano Car (lamb, Hair – page no:52)
   Case 4: TESCO (Adrian palmer page no : 388)
Case 5: Hero Motor Corp (lamb, Hair Page no:446)

5. Pricing Decisions & Personal Communication - Importance of price, cost determinant of price, markup pricing, profit maximization pricing, break even pricing, pricing strategy, ethics of pricing strategy, product line pricing, WOM, Rural marketing, BOP, relationship Marketing, Digital marketing, Social marketing, post modern marketing, market sustainability and ethics, Global marketing.
   Case 1: Coca Cola(lamb, Hair – page no: 112).
   Case 4: Compact car (Arun Kumar page no :369)
   Case 5: Chick (lamb, Hair Page no:650)
   Case 6: Nokia (Neelamegham page no– 645).
   Case 8: Airtel (Arun – page no: 901)
   Case 9: Beer Marketing (Adrian palmer page no:529)

Textbook:
   Journal : MICA Communications Review – A Marketing Communications Journal, Mudra Institute of Communications, Ahmedabad.

Business Game
Music2Go Marketing: (Marketing Management Simulation Game), TMH, 2013. You can play on any computer with internet (Rs.150/- per year-better buy and play).
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) IV Year I-Sem

HUMAN RESOURCE MANAGEMENT
PG CORE-II

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(Students must read textbook. Faculty are free to choose any other cases)

Course Aim:
To understand various terms in HRM and be able to manage the human resources of an organization effectively and efficiently.

Learning Outcome:
Students should be able to understand the basic HR concepts. They will be able to understand the process of recruitment, selection, performance appraisal, training & development, compensation and employee retention approaches and strategies.

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Unit-I:

Case: Social Surveyors in Flood-hit Areas (Gary Dessler page no 160)
Case: Finding people who are passionate about what they do (Gary Dessler page no 195)
Case: HR, CULTURE and Business Results Success at Google, Scripps and UPS (Robert L Mathis P.No. 35)
Case: Religious Accommodation (Robert L Mathis P. No. 118)
Case: Mitsubishi Believes in EEO-Now (Robert L Mathis P. No. 119)


Case: Reinventing the wheel at apex door Company (Gary Dessler page no 309)
Case: Xerox Focuses on HR (Robert L Mathis P. No. 79)
Case: where do you find the Bodies? (Robert L Mathis P. No. 79)
Case: The Reluctant Receptionist (Robert L Mathis P. No. 159)
Case: Accenture –Retaining for Itself (Robert L Mathis P. No.193)
Case: Recruiting at Kia (Robert L Mathis P. No. 231)
Case: Strategic Selection: A Review of Two Companies (Robert L Mathis P. No.267)

Unit-III:

Case: Training Crucial for Hotels (Robert L Mathis P. No. 307)
Case: performance management improvements for Bristol-Myers Squibb (Robert L Mathis P. No. 393)
Case: Just Another Job (Robert L Mathis P. No. 647)
Case: The Dilemma Within (Robert L Mathis P. No. 667)
Case: Performance Appraisal at Cola Magic Drinks (Robert L Mathis P. No. 671)
Case: Appraising the secretaries at Sweet water U? (Gary Dessler page no 349)


Case: Salary inequities at ACME Manufacturing (Gary Dessler page no 429)
Case: HR Contributes at CSSCO (Robert L Mathis P. No. 36)
Case: Compensation changes at JC Penny (Robert L Mathis P. No. 435)
Case: Benefiting Connie (Robert L Mathis P. No. 507)


Case: The New Safety and Health Program (Gary Dessler page no 623)
Case: Full Disclosure on Sex Offenders? (Robert L Mathis P. No. 231)
Case: Wal-Mart and Watching Its “Union Prevention” (Robert L Mathis P. No. 629)

REFERENCES:
(Students must read textbook. Faculty are free to choose any other cases)

Aim: The aim of this course is to enable students to the sales and distribution processes with particular focus on Sales Management and Sales Personnel, the role of Distribution Channels and enabling them to manage Channel partners.

To expose students to the tools and strategies necessary for designing, motivating and evaluating sales & distribution management systems.

Learning outcomes:

- The student should be able to manage the sales force and distribution processes through sales planning and Budgeting.
- The Students should be able to understand & appreciate the diverse variables affecting the sales & distribution function and analyse their impact on the sales and distribution processes.

1. Introduction to Sales Management: Evolution of Sales Management, importance of Sales Management, types of Selling, difference between Selling and Marketing, Modern Day Sales Activities, Selling Skills, Selling Strategies, Selling Process.
   Case: United air flow manufacturer of households appliances sales persons job. (Richard R. Still page no 115 to 118)

2. Sales Planning and Budgeting: Sales planning process, sales forecasting methods, sales budgeting process, methods used for deciding sales budget, types of quotas and quota setting procedure, reasons for establishing or revising sales territories, routing and scheduling sales persons, market cost analysis.
   Case: Augsberg Wiesel Ltd, manufacturer of table ware, establishment of sales territories (Richard R Still, Page no 603 to 605)
   Case: Midland office engineering, establishment of sales budgeting program, (Richard R Still, page no 588 to 589)

3. Sales Force Management: Recruitment and selection of the sales force, training the sales force, sales force motivation, sales force compensation, sales force control and evaluation.
   Case: 1 Adjusting Compensation Plan to Motivate Sales Representatives (K.Sridhara Batt, page no 576 to 577)
   Case: 2 Sales Force Strategy at Life Insurance Corporation (K.Sridhara Batt, page no 579)

4. Introduction to Distribution Management
   Definition of Distribution Management, need for Distribution Channels, Distribution Channels for Rural Markets, designing the Marketing Channels, Motivating and Evaluating Channel Members, Capturing the Customer requirements
   Case: 1 FedEx’s Value Chain Solutions, (K.Sridhara Batt page no 618 to 620)
   Case: 2 The National Handloom Development Corporation. (Tapan K. Panda, Sunil Sahadev page no. 504)
5. Managing Channel Institutions
Managing Channel Information Systems, Managing Retailers, Wholesalers, Franchisers, Designing Channel Systems, reasons for Channel Conflicts, Managing Conflict, Managing International Channel of Distribution, Ethical issues in Sales and Distribution Management

Case: 1 Kinetic Engineering Company, Handling Channel Conflict, (Krishna K Havalidar, Vasant page no 461)
Case: 2 Indian Ayurveda Pharmacy Limited, (Tapan K. Panda, Sunil Sahad page no 719)

Textbook

Journal : MICA Communications Review – A Marketing Communications Journal, Mudra Institute of Communications, Ahmedabad.

Business Game : Music2Go Marketing: (Marketing Management Simulation Game), TMH, 2013. You can play on any computer with internet (Rs.150/- per year-better buy and play).
Music2Go is a Principles of Marketing/Marketing Management simulation game, where the students are required to formulate and implement their own Sales and Marketing Campaign. This helps the students to have a hands – on business experience in the classroom – experiential learning at its best.
Course Objectives:
1. To provide the students information on the Career opportunities in training, important concepts and meanings, Integrating strategy and training.
2. To enable the students to understand the design of training, implementation
3. To introduce the knowledge of evaluation of training programs in the organization.

Learning Outcome:
1. The student will be familiar with how to do training need analysis
2. Students will be able to learn various training methods, design training programs, implement training programs.
3. They also gain the knowledge to evaluate the effectiveness of training programs.

1. Training in organizations: Trends in training, Career opportunities in training, important concepts and meanings, Integrating OD, strategy and training, understand motivation and performance, aligning training design with learning process.
   Case : Taking Charge at Domtar : What it takes for a turnaround? (Nick Blanchard)
   Case : LG Electronics ((Nick Blanchard)
   Case : The wilderness training lab((Nick Blanchard)

2. Need Analysis and Training design: The Training Need Analysis (TNA) Model, TNA and Design, organizational constraints, developing objectives, Facilitation of learning and training transfer to the job, design theory.
   Case : Developing a training package at westcan (Nick Blanchard)
   Case : The Training program (Fabrics Inc.) (Nick Blanchard)

3. Training methods: Matching methods with outcomes, lectures and demonstrations , games and simulations, OJT, computer based training.(CBT).
   Case : Training & Development at Godrej. (Nick Blanchard)

4. Implementation & Evaluation of Training: Development of training, implementation, transfer of training, major players in training & development, rational for evaluation, resistance to training evaluation, types of evaluation.
   Case : Jack goes to training. (Nick Blanchard)
   Case 3 : Training designed to change behavior and attitude. (Nick Blanchard)

5. Areas of organizational Training: Orientation training, diversity training, sexual harassment training, team training, cross functional teams, cross cultural training, training for talent management and competency mapping.
   Case 4: The competent employee. (Nick Blanchard)

Textbook:

References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) IV Year I-Sem

FINANCIAL MANAGEMENT
PG Elective-I (Finance)

(L Students must read textbook. Faculty are free to choose any other cases)
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Course Aim: To give an overview of the functions of a financial manager in the commercial world with a particular focus on the concepts and theories of corporate finance.

Learning Outcome: The students will gain skills to understand, evaluate and resolve the problems confronted by the financial managers. They will gain in insight into the decision making process of a financial manager based on timely, relevant and reliable financial and non-financial information. This course will further help the students to understand the diligent use of resources efficiently, effectively and economically.

1. The Finance Function: Nature and Scope; Evolution of finance function – Its new role in the contemporary scenario – Goals of finance function – maximizing vs. satisfying; Profit vs. Wealth vs. Welfare; the Agency relationship and costs; Risk-Return trade off; Concept of Time Value of Money – Future Value and Present value and the basic valuation model.

2. The Investment Decision: Investment decision process- Project generation, project evaluation, project selection and project implementation. Developing Cash Flow; Data for New Projects; Capital Budgeting Techniques –Traditional and DCF methods. The NPV vs. IRR Debate; Approaches for reconciliation. Capital budgeting decision under conditions of risk and uncertainty. Cost of capital: Concept and measurement of cost of capital, Debt vs. Equity, cost of equity, preference shares, equity capital and retained earnings, weighted average cost of capital and marginal cost of capital. Importance of cost of capital in capital budgeting decisions.


4. Dividend Decisions: Dividends and value of the firm - Relevance of dividends, the MM hypothesis, Factors determining Dividend Policy-dividends and valuation of the firm-the basic models. Declaration and payment of dividends. Bonus shares. Rights issue, share-splits, Major forms of dividends – Cash and Bonus shares. The theoretical backdrop – Dividends and valuation; Major theories centered on the works of GORDON, WALTER and LITNER. A brief discussion on dividend policies of Indian companies. Working Capital Management: Components of working capital, gross vs. net working capital, determinants of working capital needs, the operating cycle approach. Planning of working capital, Financing of working capital through Bank finance and Trade Credit – Recommendations of Tandon and Daheja Committee on Working Capital. Cases.

Textbook

References:
7. IM Pandey, Cases in Financial Management, TMH 2/e 2012
MANAGEMENT INFORMATION SYSTEM (MIS)
PG Elective – I (SYSTEMS)

Course Objectives
1. To provide students basic concepts of MIS and IS models
2. To explain integration process of MIS with Enterprise Resource Planning (ERP)
3. To provide a practical framework for Information System operations and management

Learning Outcomes
1. Students learn different models of MIS and their applicability in various business resource requirement plans
2. Students learn user training, operations, control, troubleshooting and maintenance aspects of MIS
3. Students will appreciate what is the successful design and implementation of MIS in business departments and operations


References
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) IV Year I-Sem

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**SOFT SKILLS LAB**
(Activity-based)

- To improve the fluency of students in English
- To facilitate learning through interaction
- To illustrate the role of skills in real-life situations with case studies, role plays etc.
- To train students in group dynamics, body language and various other activities which boost their confidence levels and help in their overall personality development
- To encourage students develop behavioral skills and personal management skills
- To impart training for empowerment, thereby preparing students to become successful professionals

**INTRODUCTION**
Definition and Introduction to Soft Skills – Hard Skills vs Soft Skills – Significance of Soft/Life/Self Skills – Self and SWOT Analysis

1. **Exercises on Productivity Development**
   - Effective/ Assertive Communication Skills (Activity based)
   - Time Management (Case Study)
   - Creativity & Critical Thinking (Case Study)
   - Decision Making and Problem Solving (Case Study)
   - Stress Management (Case Study)

2. **Exercises on Personality Development Skills**
   - Self-esteem (Case Study)
   - Positive Thinking (Case Study)
   - Emotional Intelligence (Case Study)
   - Team building and Leadership Skills (Case Study)
   - Conflict Management (Case Study)

3. **Exercises on Presentation Skills**
   - Netiquette
   - Importance of Oral Presentation – Defining Purpose- Analyzing the audience- Planning outline and preparing the Presentation- Individual & Group Presentation- Graphical Organizers- Tools and Multi-media Visuals
   - One Minute Presentations (Warming up)
   - PPT on Project work- Understanding the Nuances of Delivery- Body Language – Closing and Handling Questions – Rubrics for Individual Evaluation (Practice Sessions)

4. **Exercises on Professional Etiquette and Communication**
   - Role-Play and Simulation- Introducing oneself and others, Greetings, Apologies, Requests, Agreement & Disagreement….etc.
   - Telephone Etiquette
   - Active Listening
   - Group Discussions (Case study)- Group Discussion as a part of Selection Procedure- Checklist of GDs
   - Analysis of Selected Interviews (Objectives of Interview)
   - Mock-Interviews (Practice Sessions)
   - Job Application and Preparing Resume
   - Process Writing (Technical Vocabulary) – Writing a Project Report- Assignments
5. **Exercises on Ethics and Values**

   Introduction — Types of Values - Personal, Social and Cultural Values - Importance of Values in Various Contexts
   • Significance of Modern and Professional Etiquette – Etiquette (Formal and Informal Situations with Examples)
   • Attitude, Good Manners and Work Culture (Live Examples)
   • Social Skills - Dealing with the Challenged (Live Examples)
   • Professional Responsibility – Adaptability (Live Examples)
   • Corporate Expectations

**Note:**
- Hand-outs are to be prepared and given to students.
- Training plan will be integrated in the syllabus.
- Topics mentioned in the syllabus are activity-based.

**SUGGESTED SOFTWARE:**
The following software from ‘train2success.com’
- Preparing for being Interviewed,
- Positive Thinking,
- Interviewing Skills,
- Telephone Skills,
- Time Management
- Team Building,
- Decision making

**SUGGESTED READING**

12. *The Hindu Speaks on Education* by the Hindu Newspaper
Course Aim: To understand the basic statistical tools for interpretation of quantitative and qualitative data.

Learning Outcome: Students will be able to apply the principles of research methodology for the research design for the various mini and major projects of the MBA programme. They will be able to analyse the data statistically.


2. **Tabulation, Graphical presentation of data**: Histogram, Diagrammatic representation of data: Bar diagram, Multiple Bar diagram, Sub-divided Bar Diagram, Pie Diagram. Measures of Central Tendency: Mean, Median and Mode. Measures of Dispersion: Range, Standard deviation and Variance, Coefficient of variation, Measure of Skewness.

3. **Linear Correlation and Regression Analysis**: Covariance, Pearson’s Correlation Coefficient, Scatter plot, Spearman’s rank Correlation Coefficient, Regression lines.

4. **Parametric and Non-Parametric Hypothesis Testing**: Procedure for Testing of Hypothesis, One Sample t-test for the Population Mean, Two Sample t-test for independent Samples, Paired Sample t-test. F-test for two population Variances (Variance ratio test), ANOVA One Way Classification, ANOVA two way Classification, Chi Square test of association, Chi Square test of independence.

5. **Time Series and Data Analysis**: Fitting a trend line to a time series, Method of least Squares and Method of Moving Averages, Measure of Seasonal Variation.

**Textbook**


**References**

(Students must read textbook along with cases. Faculty are free to choose any other cases)

Course Aim: The aim of this course is to enable students understand legal and regulatory framework for doing business in India.

Learning Outcome: After going through the text and case lets in terms of various court judgements, the students should be able to understand the formalities involved in incorporating a company and the nuances related to the Law of Contract. The student will also be able to know the implications of direct and indirect taxes, negotiable instruments Act and also about the cyber laws.


5. Cyber Crime and the Legal Landscape-the world-Why do we need cyber laws in the Indian context-The Indian IT act challenges to Indian Law and cyber crime scenario in India. (Refer Nina Godbole & Sunit Belapure)

Textbook:
1. RSN Pillai, Bagavathi, Business Law, S.Chand, 2013.

References
Aim: The aim of this course is to a) enable students to understand management of marketing communication, marketing mix and ethical aspects of marketing communication b) choose a marketing communications mix to achieve the communications and behavioral objectives of the IMC campaign plan.

Learning outcome
- The student should be able to design innovative integrated marketing communication strategies for a given product or service using social media.
- Students will able to create an integrated marketing communications plan to promote IMC strategies and to measure their effectiveness.

   Case: Cadbury Manages a Crisis with Integrated Marketing Communications (Kruti Shah page no 59)

2. Budgeting, Objectives and Evaluation of IMC: Setting Communication Objectives, DAGMAR Approach to setting objectives and measuring advertising effectiveness, allocating the Marketing Communication Budget, Conducting research to measure communication effectiveness, Post-Testing tools and techniques, Evaluating other promotional tools and IMC.
   Case: The Premium Milk Food Private Ltd. (Kruti Shah page no 820)

3. Marketing Communication Mix I:
   Creative Execution in Advertising, Decision in Print, Execution on Radio, Execution on online and television, getting that ‘Big Idea’ of creativity.
   Case: Tata Salt (Part I,II,III) (Kruti Shah page no 282,284,310-311,367-372)

4. Marketing Communication Mix II:
   Case: Amul taste of India (Kruti Shah page no 793)
   Case: Rasha Prankees promotion (Kruti Shah page no 600)

5. Regulation, Social and Ethical Aspects of Advertising and Promotion:-
   Case: Surrogate advertising(Jai shri Jethwaney page no 475-480)
   Case: The Unilever experience (Jai shri Jethwaney page no 606)

Textbook:
Journal: MICA Communications Review – A Marketing Communications Journal, Mudra Institute of Communications, Ahmedabad.

Business Game: AdSim Advertising: (Advertising & Promotion Simulation Game), TMH, 2013. You can play on any computer with internet (Rs.150/- per year-better buy and play). AdSim is a simulation game for the Advertising & Promotion course, where the students are required to formulate and implement their own Advertising and Promotion campaign. This helps the students to have an hands-on business experience in the classroom – experiential learning at its best.

References:

Course objectives:
1. The aim of the course is to enable HR elective students develop awareness towards labour laws.
2. The students will be introduced, how to deal with legal problems emanating from employer and employee relations in organizations.
3. To introduce the students with the concept of collective bargaining, employee welfare, wage policy act.

Learning Outcomes:
1. The student understands the industrial relations, its importance in HR
2. Various Labour Laws like Factories Act, Wage and Bonus Act and Dispute Preventive and Corrective Mechanisms are learnt.
3. They will also understand the role of Trade Unions, Settlement of disputes, Collective Bargaining, Wage Policy.

1. Industrial Relations: Introduction, Dunlop’s Industrial Relations Systems, Characteristics of Indian IR System; Trade Unions: Union Purpose, Trade Union, Functions, Methods, Politics, Types of Unions, Trade Unions in India: Union Structure and characteristics. Recognition of Unions: States provisions for Recognition. Rights of recognized Unions, Unfair Labour Practices:
   Case 1. Let us get back to work (p.no. 720, C.B.Mamoria)
   Case 2. A case of complicated multi-union manoeuvres (J.A. Kulkarni)

   Case 1. Stop the shouting game please (p.no. 760, C.B.Mamoria)
   Case 2. The dish ends ltd. (p.no.07, J.A. Kulkarni)

   Case 1.who is to be blamed (p.no. 685, C.B.Mamoria)

   Case 1. Rules and regulations still guide actions at UPS (p.no. 37, C.B.Mamoria)

   Case 1. Organizations and unions working as partners (p.no. 738, C.B.Mamoria)

Textbook:
• Mamoria, Mamoria, Gankar “Dynamics of Industrial Relations” Himalaya Publishing House.2012.

Cases:
References:
1. Dr K S Anandram “Cases in Personnel Management Industrial Relations and Trade Relations” Everest, 2012.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) IV Year II-Sem

SECURITY ANALYSIS PORTFOLIO MANAGEMENT
PG Elective-II (Finance)

(Students must read textbook. Faculty are free to choose any other cases)

Course Aim: To understand the investment alternatives, process and portfolio management

Learning Outcome: The objective of this course is to provide the conceptual and practical understanding of Stock markets, Equity & Bond Valuation, Cash market and also Mutual funds.

1. a) Investment Environment in India, overview of Indian financial system, securities trading in stock markets, investment alternatives, the investment management process.
   b) Security Analysis: Fundamental Analysis, Technical Analysis, EMH (Efficient Market Hypothesis)

2. Portfolio Analysis: The returns and risks from investing, Markowitz portfolio Theory, Mean-variance approach, portfolio selection-efficient portfolios, The single index model-capital asset pricing model, arbitrage pricing theory.


4. (a) Equity Valuation: Equity Analysis & Valuation, Balance sheet Analysis, equity valuation models, intrinsic value & market price, The P/E Ratio & Earnings multiplier Approach, CAGR, Price/Book value, Price/ Sales ratio, Economic Value Added (EVA) and MVA.


Textbooks:

Journals: Vikalpa, IIMA, IIMB Review, Decision, IIMC, Vision, MDI.

Business Game: Stock-Trak: (Finance Simulation Game), TMH, 2013- You can play on any computer with internet (Rs.150/- per year-better buy and play).

Stock-Trak is the most comprehensive, Online investment simulation game for Finance students to trade on Stocks, bonds, mutual funds, options, futures, spots, future options and international stocks with virtual money. This game is created specifically for classroom use and students can play this game 24*7 to give them hands-on experience on Investments.

References:
2. ZVI Bodie, Alex Kane, Alan J Marcus: Investments, TMH, 2012.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) IV Year II-Sem

ENTERPRISE RESOURCE PLANNING
PG Elective – II (SYSTEMS)

(Student must read textbook. Faculty are free to choose any other cases)

Course Objectives
1. To provide students the foundations of ERP planning and system options
2. To provide framework of general and specialized modules of ERP
3. To provide students a risk-benefit analysis of ERP system

Learning Outcomes
1. Students understand a) integration of various ERP modules with each other and with Business Environment b) the issues in operation and implementation of a successful ERP system and c) how to face the challenges associated with the present and future ERP systems.

1. Introduction to ERP- Foundation for Understanding ERP systems-Buisiness benefits of ERP-The challenges of implementing ERP system-ERP modules and Historical Developement. Case: Response top RFP for ban ERP system (Mary Sumner).


3 ERP system Installation Options- IS/IT Management results-Risk Identification analysis-System Projects- Demonstration of the system-Failure method-system Architecture & ERP (David L.Olson) Case: DataSolutions & Technology Knowledge (Mary Sumner).


Textbook:

References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) IV Year II-Sem

STATISTICAL ANALYSIS LAB USING SPSS / EXCEL

Course aim: The course aims to understand MS Excel for applying statistical tools learnt in RMSA.

Learning Outcome: The learning outcome is that the students should be able to:
- Analyse the data to draw inference for decision making.
- Understand application of statistical measures of central tendency.
- Understand application of ANOVA.
- Analyse trends.
- Test hypotheses.

Syllabus - PART A

About EXCEL
2. Getting started with excel: Opening a blank or new workbook, general organization.
4. Highlights and main functions: Data, review, view, add-ins.
5. Using the Excel help function.

General EXCEL Lessons
6. Customizing the Quick Access Toolbar.
7. Creating and Using Templates.
9. Formatting Data and Using the Right Mouse Click.
12. Manipulating Data, using Data Names and Ranges, Filters and Sort and Validation Lists.
13. Data from External Sources.
15. Basic Formulas and Use of Functions.

ADVANCED EXCEL LESSONS
19. Advanced Formulas and Functions.
20. Advanced Worksheet Features.

PART B – STATISTICAL TOOLS FOR EXECUTION USING EXCEL

I. Tabulation, bar diagram, Multiple Bar diagram, Pie diagram, Measure of central tendency: mean, median, mode, Measure of dispersion: variance, standard deviation, Coefficient of variation.
II. Correlation, regression lines.
III. t- test, F-test, ANOVA one way classification, chi square test, independence of attributes.
IV. Time series: forecasting Method of least squares, moving average method.
V. Inference and discussion of results.

Text

References:
JNTUH COLLEGE OF ENGINEERING HYDERABAD

STRATEGIC MANAGEMENT
PG CORE-V
(Students must read textbook. Faculty are free to choose any other cases)

Course Aim:
The aim of this subject is to enable the students develop a holistic perspective about Strategic management of an organization

Learning Outcome:
By reading the text and discussing the cases students should be able to understand how to scan internal and external environment of an organization, understand different types of strategies and structures, strategies of the competitors, turnaround strategies, global strategies and strategic control. With that knowledge they would be able to formulate strategies, change strategies if necessary and implement strategies. They will also be able to evaluate strategies and take corrective steps.

Unit-I:
Case:Bharti Airtel (Hitt & Irelandpage no 4).
Case: ITC Limited (Hitt & Irelandpage no 30).

Unit-II: Formulation of Strategic Actions: Business level strategy-Effectively managing relationships with Customers-the purpose of Business strategy. Competitive Rivalry and Dynamics - A Model of Competitive Rivalry-Competitor Analysis-Drivers of Competitive actions and responses-Competitive rivalry and dynamics.
Case:Bajaj Auto limited (Hitt & IrelandPage no 80).
Case: Coca cola Vs Pepsi in India (Hitt & Irelandpage. no 108).

Unit-III: Corporate level Strategy-Levels of Diversifications and reasons-Value creating diversifications. Strategic Acquisitions & Restructuring - Popularity of Mergers & Acquisitions strategies, problems in achieving Acquisition Success-Restructuring.
Case: Foster’s Group Diversification into the Wine Business (Hitt & IrelandPage 150)
Case: Merger and Acquisition Activity during a Global Crisis: Global and in India (Hitt & Ireland page 154) Focus : Troubles in the Godrej –P & G Alliance(Hitt & Irelandpage. no 223)

Unit-IV: Global Strategy-Identifying International Opportunities and international Strategies-Strategic competitive Outcomes and risk in an international Environment. Corporate Implications for strategy-Strategic Alliances-corporate level cooperative strategy, Competitive risk with Cooperative strategies.
Case: Entry into India & China by Foreign Firms and Indian/Chinese Firms Reaching for Global markets (Hitt & Irelandpage. no 176).
Case: Using Cooperative Strategies at IBM (Hitt & Ireland page 206)

Unit-V: Structure and Controls with Organizations-Organizational Structure and controls, Evolutionary Patterns of strategy and organizational structure. Leadership Implications for Strategy - Entrepreneurial Implications for Strategy. Fundamental principles of Ethics, Professional Ethics, Ethics of Finance & Accounting professionals, Cyber crimes, Ethics & Human rights
Case 1 CISCO’s Evolution of Strategy and Structure. (Hitt & Irelandpage. no 256)
Case 2 selecting a new CEO (Hitt & Irelandpage no 282)
Case 3 The Continuing innovation revolution at Amazon: The kindle and E-books(Hitt & Ireland page 304)
REFERENCES:
- Hitt & Ireland and Manikutty, "Strategic Management: A South Asian Perspective": Cengage Learning, 9e, 2012
- C.L. Bansal, Business and Corporate Laws, 1/e, Excel Books, 2006
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) V Year I-Sem

RETAILING MANAGEMENT
PG Elective-III (Marketing)

(Students must read textbook. Faculty are free to choose any other cases)

Course Aim: The main aim of this course is a) to enable students to gain an insight into retailing industry and shopping environment. b) to familiarize them with concepts of Retailing through cases and motivate them to go for a career in retailing industry.

Learning outcome:

a. To enable the students to link Modern Retailing Concepts to cases and understand the present Retailing Trends.

b. To facilitate the students to be able to managing retail operations efficiently and effectively.

1. Introduction to Retail Management - Meaning of Retail & Retailing, History, types, functions, utilities, theories of retailing, e-tailing, structure of Indian retail industry, retailing in Asia, global retailing, retailing in Europe, service retailing, FDI retailing, Rural marketing, ethics in retailing.
   - Case: The Classic story. (Aditya page no 283)
   - Case: The Panwallah. (Aditya Prakash page no 287)

2. Understanding Shoppers & Shopping - Shopping Environment, shopping in a Socio Cultural Contest, shopping process shopping behaviour, demographics of Indian shoppers, psychographic profile of Indian shoppers, lifestyle of Indian shoppers, shopping patterns in India.
   - Case: Multinational Fast Food Chains in India. Retail Management (Suja Nair page no 474)
   - Case: Changing Indian Consumers. (Aditya page no 258)
   - Case: Tanishq. (Suja Nair page no 440)

3. Delivering Value through Retail Functions - Classification of formats, ownership-based, store based, non-store based, other retail formats, Value Based Model of store format choice, attribute based model of store format choice, the competitive market place, Marketing Structure, the demand side of retailing, non price decisions, types of competition, evolution of retail competition, future changes in retail competition.
   - Case: Nirula’s. (Suja Nair Page no 448)
   - Case: Hot Breads. (Suja Nair page no 452)
   - Case: McDonalds India. (Suja Nair page no 459)
   - Case: Automobile and Niche Marketing (Dr. Harjit Singh page no 417)

   - Case: Café Coffee Day. (Suja Nair page no 434)
   - Case: Shoppers stop. (Suja Nair page no 470)

5. Retail Buying & Managing Retail Operations -objectives of buying, organization buying, retailing buying behaviour, models of buying behaviour, buyer-responsibilities, merchandising & assortment plans-merchandise plan, merchandise plan for basic stocks retail buying groups, negotiations in retail, contract in retail, store layout & design, merchandise display-fixtures, positioning of merchandise, materials & finishes – floors, interior walls, ceilings, lightings, music, graphics-exterior signage, interior signage, layouts for e-tailers.
   - Case: Godrej and Boyee’s. (Suja Nair page no 466)
Textbook


References:
5. Dr. Harjit Singh, Retail Management a global perspective text and cases, S.Chand, 2011.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) V Year I-Sem

SERVICES MARKETING
PG Elective-IV (Marketing)

L  T  P  C
4  0  0  4

(Students must read textbook. Faculty are free to choose any other cases)

Course Aim:
To facilitate the students about the concepts of Services Marketing through cases.

Learning Objective: The objective of the course is to provide a deeper insight into the Marketing Management of companies offering Services as product. The students will be able to understand the characteristics of services, understand consumer behaviour in services, align service design and standards, delivering service, managing services promises.


   Case 1: The United Indian Bank (Govind Apte Page no 55-56)
   Case 2: Online air travel: Expedia, Orbitz and Travelocity lead the pack (John E.G.Bateson Page no 82-83)

2. Focus on the Consumer: Consumer behaviour in services, Consumer expectations in service, consumer perceptions of service, Understanding Consumer Requirements-listening to customers through research, building customer relationships, service recovery.

   Case 1: The Crestwood Inn, (John E.G.Bateson Page no 320-321)
   Case 2: Population growth and the urban poor (Vinnie Jauhari, Kirti Dutta Page no 106-108)

3. Aligning Service Design and Standards: Service innovation and design-challenges, types of service innovations, stages in service innovation and development, service blueprinting, high performance service innovations, new Service Development Processes, Customer defined service standards-factors, types, and development, Physical Evidence and the Servicescape.

   Case 1: Physical evidence a case of KF. (Vinnie Jauhari Page 236-238).
   Case 2: IT Trainers Limited. (Govind Apte Page no 186).

4. Delivering and Performing Service: Employee’s roles in service delivery, customer’s roles in service delivery, delivering service through intermediaries and electronic channels, managing demand and capacity.

   Case 2: Total Assurance Ltd. (Govind Apte Page 207-208).

5. Managing Service Promises: Integrated services marketing communications-need for coordination, five categories of strategies to match service promises with delivery, Pricing of Services-three key ways that service prices are different for customers, approaches to pricing services, pricing strategies that link to the four value definitions.


Textbook

Journal : MICA Communications Review – A Marketing Communications Journal, Mudra Institute of Communications, Ahmedabad.
References

12. Dr. B. Balaji, Services Marketing and Management, S.Chand, 2012.
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) V Year I-Sem

INTERNATIONAL MARKETING
PG Elective-V (Marketing)

L T P C
4 0 0 4

(Students must read textbook. Faculty are free to choose any other cases)

Course Aim: To enable the student understand the Global Markets, formulate of Global Marketing Strategies and Implement.

Learning Objective: The objective of the course is to provide a deeper insight into the global marketing management, environment of global markets, assessing global market opportunities, developing and implementing global marketing strategies.

   Case: 1 Starbucks –going Global fast. (Philip, John, Prashant Text)

   Case: 1 IKEA Catalogue. (Svend & Madhurima-Pearson page no 242)
   Case: 2 Mc. Donalds and obesity. (Philip John Prashant Text)

   Case: 1 Reliance Entertainment(Svend & Madhurima, Pearson page no 312)
   Case: 2 Mahindra & Mahindra (Svend & Madhurima, Pearson page no 356)
   Case: 3 IMAX corporation (Svend & Madhurima, Pearson page no 412)

   Case: 1 Harley-Davidson:-Price level (Svend & Madhurima, Pearson page no 510)
   Case: 2 Mc Donalds Great Britain –the Turnaround (Text page no 793)

5. Implementing Global marketing strategies: Negotiation with customers and selection method, E-Marketing channels organization & controlling of the global marketing programme.
   Case: 1 NTT DOCOMO (Svend & Madhurima, Pearson page no 709)

Textbook


References

4. Dr.Gajender Sharma- International Marketing-1st edition-Excel Books-2010
(Students must read textbook. Faculty are free to choose any other cases)

Course Aim:
It enables the student understand the concepts issues and challenges of compensation and reward management.

Learning Outcome:
The student understands how to design the compensation for various levels of jobs in the organization, designing the compensation for special groups. Government and legal issues in compensation design.

   Case: So you want to lead an orchestra (George T Milkovich page no 72)
   Case: Job Evaluation at whole foods (George T Milkovich page no 125)

2. Defining Competitiveness, Designing pay levels, Mix and pay structures, pay for performance. The Evidence pay for performance plans.
   Case: Burger Boy(George T Milkovich page no 249)
   Case: Incentives in the club House(George T Milkovich page no 279)

   Case: Merit pay: Making policies and practices that work (George T Milkovich page no 319)

4. Compensation of Special Groups, Union role in wage and Salary administration. International pay systems.
   Case: Compensation of special groups (George T Milkovich page no 443)
   Case: Coke and IBM(George T Milkovich page no 491)

5. Government and legal issues in compensation Public sector pay Management: Making it work.
   Case: Communicating by copier(George T Milkovich page no 575)

Textbook:

References:
7. Barry Gerhart, "Compensation" Sage, 20...
Course Aim:
The course enables the student to understand the concept change management. This will help them to emerge as leaders in the organizations.

Learning Outcome:
The student understands the need to bring change, how to design change in the organizations, role of leadership in change management, change communication and resistance to change and the role of HR in change management.

1. Managing Change Conundrums, Organizational change classifications, History and organizational change. The role of paradigms and perspectives. External and Internal change contexts.
   Case: Changing times at Factory Bank (Mark Hughes page no 70)

2. Organizational design and change, strategic level change, Group and team level change, and Individual level change. Organizational Structure. Organizational Culture and Management of Change.
   Case: Restructuring at Flexco (Adrian page no 57)
   Case: Cultural change at DuPont Nylone (Adrian page no 65)

3. The leadership of Change, Change communication, resistance to change, Organizational learning, power, politics and Organizational change. Ethics and Managing Change, Change Agents and Agency.
   Case: Funding crisis at Musicians in the community (Mark Hughes page no 221)

   Case: Recruitment and Selection at Unicol (Adrian page no 117)
   Case: Reward Management at Midland Main Line - Strategic Reward Management (Adrian page no 191)

   Case: Downsizing at Energy Co (Adrian page no 268)
   Case: Evaluating a possible change to training methods at telesales Incorporated (Adrian page no 300)

Textbook:

References:
Course Aim:
To give an understanding about performance management and reward system linked with performance.

Learning Outcome:
The students can understand the importance of performance Management, Performance Appraisals, Reward System, and other performance related concepts.

   Case: Performance Management at Network Solutions,Inc (Herman Aguinis page no 26)
   Case: Performance Management at the University of Ghana (Herman Aguinis page no 48)

   Case: Accountabilities, Objectives and Standards (Herman Aguinis page no 113)
   Case: Evaluating the appraisal form used by a Grocery Retailer (Herman Aguinis page no 145)

   Case: Implementation of 360 degree feed back system at Ridge intellectual (Herman Aguinis page no 204)
   Case: Was Robert Eaton A Good Coach (Herman Aguinis page no 233)

   Case: Possible Illegal Discrimination at Tractors,Inc. (Herman Aguinis page no 265)
   Case: Team Performance Management at Duke University Health systems. (Herman Aguinis page no 283)

5. Relevant Performance related concepts: Benchmarking, Six Sigma, Competency Mapping, Balance Score card, Coaching and Mentoring Pygmalion effect, Job Analysis.
   Case: BHEL,EVA Incentive Schemes: (B D Singh page no 589)
   Case: The TCS Approach and experience(B D Singh page no 601)
   Case: NTPC Performance Management System(B D Singh page no 632)
   Case: Performance Management system(PMS) at Bharti Telecom(B D Singh page no 663)

Textbook.

Reference
Aim:
To develop an understanding of the role of financial strategy, in the investing, financing and resource allocation decisions with in an organization. To develop an understanding of the various strategies that are in use to trade off risk and return

Learning Outcome:
To explain the role and nature of investment and financial strategies and its relationship to maximization of wealth/shareholders value. To examine various risk models in capital budgeting. To evaluate the motives for financial implications of mergers and acquisitions and lease financing. To discuss the impact of general and specific inflation on financial and investment strategy decisions.


2. Types of Investments and disinvestments: Project abandonment decisions, Evidence of IRR. Multiple IRR, Modified IRR, Pure, simple and mixed investments. Lorie Savage Paradox. Adjusted NPV and impact of inflation on capital budgeting decisions.

3. Critical analysis of appraisal techniques: Discounted pay back, post pay back, surplus life and surplus pay back, Bail-out pay back, Return on Investment, Equivalent Annual Cost, Terminal Value, single period constraints, multi-period capital constraint and an unresolved problem, NPV mean variance analysis, Hertz Simulation and Hillier approaches. Significance of information and data bank in project selections.


5. Financing Decisions: Mergers and Acquisitions Basic Issues, Strategy, Diversification and Mergers and Acquisitions, Theories of Mergers, Types of Mergers, Government guidelines for Takeover, Problems on Mergers & Acquisitions and cases

Textbooks:

References:
1. Prasanna Chandra: Financial Management, 8/e, TMH, 2012
INTERNATIONAL FINANCIAL MANAGEMENT
PG Elective – IV (Finance)

(Students must read textbook. Faculty are free to choose any other cases)

Course Aim:
To give an understanding about MNC Financial Management.

Learning Outcome:
The objective of the course is to provide students with a broad view of International Monetary Systems and its understanding to enable a global manager to do business in a global setting. The prerequisite for the course is Financial Accounting and Analysis and Financial Management.

1. International Financial Management: An overview, Importance, nature and scope, International Business Methods, Recent changes and challenges in IFM

2. International Flow of Funds: Balance of Payments (BoP), Fundamentals of BoP, Accounting components of BOP, Factors affecting International Trade flows, Agencies that facilitate International flows. Indian BoP Trends. International Monetary System: Evolution, Gold Standard, Bretton Woods’s system, the flexible exchange rate regime, evaluation of floating rates, the current exchange rate arrangements, the Economic and Monetary Union (EMU).


Textbooks:

References:
7. Reid. W.Click& Joshua D.Coval, PHI 2012
Aim:
To give an understanding about the derivatives in stock, commodity and Forex markets.

Learning Outcome:
The objective of this course is to make students efficient in the area of Derivatives, giving them the knowledge of basics in Derivatives, Future Markets, Option Strategies, etc


   **(b) Basic Option Strategies**, Advanced Option Strategies, Trading with Options, Hedging with Options, Currency Options.

4. **Commodity Market Derivatives**- Introduction, Types, Commodity Futures and Options, Swaps. Commodity Exchanges- MCX, NCDEX- Role, Functions & Trading. (Refer : M.Ranganatham & R.Madhumathi)

5. **Swaps** – Concept and Nature, Evolution of Swap Market, Features of Swaps, Major types of Swaps, Interest Rate Swaps, Currency Swaps, Commodity Swaps, Equity Index Swaps, Credit Risk in Swaps, Credit Swaps, using Swaps to Manage Risk, Pricing and Valuing Swaps.

**Textbooks:**

**References:**
Course Aim:
It enables the student understand the concepts of Electronic Business.

Learning Outcome:
The student understands E-Business, its Models, E-Business plans, E-Business Application and Securing E-Business

   Case : Barnes & Noble nad Amazon. Com (Ref 1- Kulkarni).

   Case: B2C model at Aradha Tours. (Ref 1 Kulkarni)

   Case" FLOP (ref 1 :Kulkarni)

   Case Nokia (Ref 1 Kulkarni)

   Case: Asmi Agencies-e-market (Ref 1 Kulkarni)

Textbook:

Reference
JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. ECE & M.Tech. / MBA) V Year I-Sem

CYBER SECURITY
PG Elective – IV (SYSTEMS)

(Students must read textbook. Faculty are free to choose any cases)

Course Aim:
It enables the student to understand Cyber crime, Tools and methods used in cyber crime and Cyber Security.

Learning Outcome:
The student understands the cyber crimes. Computer forensic system, and Cyber Security.


2. Tools and methods used in cyber crime-Proxy servers and Anonymizers-Phishing-Password cracking-Key loggers and Spywares-Virus and worms-Trojan Horse and Backdoors-Steganography-SQL Injection-Buffer overflow-Attacks on wireless network.

3. Understanding computer forensic-Historical background of cyber forensic-Forensic analysis of e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory-Relevance of the OSI 7 Layer model to computer Forensic-Computer forensic from compliance perspectives.


Textbook:

Reference:
(Students must read textbook. Faculty are free to choose any other cases)

Course Aim:
It enables the student understand the concepts of Information System and Control.

Learning Outcome:
The student understands the audit standards, Audit Process, Computer assistance Audit tools, Managing Audit tools and Strategy and Standards for Auditing.

1. Audit and review the role of Information Technology-Audit standards-Importance of audit standard independence- AICPA proannouncements- The need for IT audit function- role of the IT auditor-Legal implications.
Cases.

Cases.

Cases.

4. Managing IT audits- Establish a career development and planning-Evaluating IT audit quality criteria for IT audit quality-IT auditing in new millennium-code of ethics and professional standards-Private industry- Management consultancy.
Cases.

Cases.

Textbook:

Reference:
• D P Dube, V P Gulati, Information System Audit and Assurance – Includes case studies and checklists from the banking industry, TMH, 2008.