JNTUH COLLEGE OF ENGINEERING HYDERABAD (Autonomous)
JNTUH, Kukatpally, Hyderabad – 500 085
Telangana, India

ACADEMIC REGULATIONS
COURSE STRUCTURE AND SYLLABUS

Electronics & Communication Engineering

with Masters Specialization in

Signal Processing

For

FIVE YEAR INTEGRATED
DOUBLE DEGREE MASTERS PROGRAM (IDDMP)
Leading to B.Tech., M.Tech. at JNTUH and
M. Sc. at Blekinge Institute of Technology, Sweden

(Applicable for the Batches admitted from 2013-2014)

JNTUH

BTH, Sweden

JNTUH COLLEGE OF ENGINEERING HYDERABAD (Autonomous)
JNTUH, Kukatpally, Hyderabad – 500 085
Telangana, India
2013

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JNTUH, Kukatpally, Hyderabad – 500 085
Telangana, India

JNTUH **BTH, Sweden**

ACADEMIC REGULATIONS COURSE STRUCTURE AND SYLLABI
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(Applicable for the Batches admitted from 2013-2014)
In

Electronics & Communication Engineering Branch

With Masters Specialization in

Signal Processing

1) Five Year Integrated Double Degree Masters Program:

JNTUH offers Five Years (10 Semesters) Integrated Double Degree Masters Program (IDDMP) under MOU with Blekinge Institute of Technology, (BTH), Sweden in the following Branches of Engineering, at its Constituent Autonomous College - JNTUH College of Engineering, Hyderabad, with effect from the Academic Year 2013 – 14 onwards.

S. No.	UG Program	PG Program	
		M.Sc. at BTH, Sweden (Specialization)*	***M. Tech. at JNTUH, India (Specialization)****
1.	B. Tech. in Electronics & Communication Engineering (ECE)	M.Sc. (Electrical Engineering with emphasis on Telecommunication Systems)	M. Tech. (Telecommunication Systems)
2.	B. Tech. in Electronics & Communication Engineering (ECE)	M.Sc. (Electrical Engineering with emphasis on Signal Processing)	M. Tech. (Signal Processing)
3.	B. Tech. in Electronics & Communication Engineering (ECE)	M.Sc. (Electrical Engineering with emphasis on Radio Communications)	M. Tech. (Radio Communications)

4.	B. Tech. in Computer Science & Engineering	M.Sc. (Computer Science)	M. Tech. (Computer Science & Engineering)
5.	B. Tech. in Computer Science & Engineering	M.Sc. (Software Engineering)	M. Tech. (Software Engineering)
6.	B. Tech. in Mechanical Engineering	M.Sc. (Structural Mechanics)	M. Tech. (Structural Mechanics)

(* A Minimum of 50% of intake/sanctioned students strength is necessary for any specialization to be offered.)

A student would be conferred the B. Tech., M. Tech. and M. Sc. Degrees in this IDDMP, after the successful completion of all the requirements for the 10 Semesters of study and earning the appropriate credits.

2) Eligibility of Admission:

2.1 Admission to the IDDMP shall be made either on the basis of JEE (Main) rank or the merit rank obtained by the qualifying examination at an Entrance Test conducted by the AP State Government (EAMCET), OR the University, OR on the basis of any other order of merit approved by the University.

2.2 Students opting for the 5 Year IDDMP must specify their choice for M. Tech. and M. Sc.(with the specialization given above), 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.

2.3 Students opting for 5 year IDDMP have to study for the specified period, to earn the relevant credits for the award of the B. Tech, M. Tech & M. Sc. Degrees, and they will not be permitted to have a choice for B. Tech. Degree alone after 4 years study.

3) IDDMP Structure:

3.1 The Integrated Double Degree Masters Program comprises of two parts – B. Tech. or UG Program and M. Tech. & M. Sc. or PG Program. The UG and PG Programs have the following groups or categories or components, which may include theory subjects / Laboratory courses / Design / Practicals / Major projects etc. as well.

S. No.	**UG/PG Program**	***Group/Category/Component***	***Description***
1)	UG	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects
2)	UG	EAS - Engineering	Include fundamental engineering subjects

		Arts and Sciences	
3)	UG	HSS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management
4)	UG	DE – Departmental Electives	Includes Elective subjects related to the parent discipline, department or branch of engineering
5)	UG	DC – Departmental Core	Includes core subjects related to the parent discipline, department or branch of engineering
6)	UG	OE – Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline, department or branch of engineering
7)	UG	Project	B. Tech. Project or UG Project or UG Major Project
8)	PG	PGC	PG Core Subjects related to the M. Tech. & M. Sc. specialization
9)	PG	PGE	PG Elective Subjects related to the M. Tech. & M. Sc. Specialization
10)	PG	Thesis / Dissertation / Project	PG Project / Thesis / Dissertation in M. Tech. & M. Sc. Specialization
11)	PG	Comprehensive Viva	Comprehensive Viva based on UG & PG Subjects

Note : The PG subjects / Lab / Electives / Thesis / Dissertation / Comprehensive viva as indicated above are tentative. The actual details of courses / Labs / Project / Majors / minors / Seminars etc. will be as per the norms and procedures of BTH, Sweden corresponding PG specialization.

3.2 In the IDDMP, each Subject, Lab., Project, Industrial Training / Seminar / Comprehensive Viva etc. - has specified credits, as indicated in the Course Structure. The credit requirements for IDDMP are: (i) at UG Level: 174 credits at B. Tech. level, plus (ii) at PG Level: 80 credits at M. Tech. & M. Sc.. level.

3.3 The minimum instruction days for each Semester shall be 90 working days. In a Semester, one lecture hour per week is rated as one credit, and two tutorial or two practical hours per week may be rated as one credit in general.

3.4 There shall be no branch transfers at UG Level, and no changes of specializations at PG Level, after the completion of the First Admission Process.

3.5 The Course Structure and Curriculum for the first 3 years (6 Semesters) would be same as that for earning the Regular 4 Year B. Tech. degree in the respective Branch of Engineering. The PG Project Work for the M. Tech. degree shall commence at the beginning of V Year I Semester, and shall be carried out up to the end of the V Year II Semester at BTH, Sweden.

4) Course Work:

4.1 A student after securing admission must pursue the 5 Year Integrated Double Degree Master Program of study for a duration of 10 Semesters (or 5 years). Each Semester shall be of 22 weeks duration (inclusive of examinations), with 16 weeks of instruction days at JNTUH up to 7 Semesters and the remaining Semesters will be as per the regulations of BTH, Sweden.

4.2 Course work up to and inclusive of IV Year I Semester shall be conducted at JNTUH, IV year II semester and V Year I & II semesters shall be at Blekinge Institute of Technology (BTH), Sweden.

4.3 The student must secure a total of 254 credits for the IDDMP - 174 credits for the B. Tech. degree Program, plus 80 credits for the M. Tech. & M. Sc. Program, under different categories as indicated in Item 3.1 and 3.2.

4.4 The student should complete the IDDMP within a period equal to twice the prescribed duration of the Program, from the Date of Admission. Students, who fails to fulfill all the academic requirements for the award of the Double Degrees within 10 academic years from the Date of Admission, shall forfeit their seat in both B. Tech., M. Tech. & M. Sc. Courses.

5) Attendance Requirements at JNTUH:

5.1 The student shall be eligible to appear for the Semester End Examinations, if he acquires a minimum of 75% attendance in aggregate of all the subjects put together up to IV Year - I Semester in each Semester.

5.2 Condonation of shortage of attendance in aggregate up to 10% (net attendance of 65% and above, and below 75%) in each Semester may be granted by the College Academic Committee. Such condonation shall be granted only on genuine and valid reasons, on representation by the candidate with supporting evidence, and on payment of the stipulated condonation fee.

5.3 Shortage of attendance below 65% in aggregate shall NOT be condoned.

5.4 Students, whose shortage of attendance is not condoned in any Semester, are not eligible to take their End Examinations of that Semester, and their registration for that Semester shall stand cancelled.

5.5 A student shall not be promoted to the next Semester, unless he satisfies the attendance requirement of the present Semester. In such cases, the student may seek re-admission for that Semester, as and when offered.

6) Academic Requirements:

The following academic requirements have to be satisfied, in addition to the attendance requirements specified in Item 5.

6.1(a) **U.G. Part:** A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory subject / practical subject /design /drawing subject / UG Project, if he secures not less than 35% of marks in the end examination (25 out of 70 marks, or 18 out of 50 marks as case may be), and a minimum of 40% marks in the sum total of the internal evaluation and end examination taken together.

(b) **P.G. Part:** A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory subject / practical subject / design / drawing / Comprehensive Viva-voice, if he secures a minimum of 40% of marks in the end examination, and a minimum of 50% marks in the sum total of the internal evaluation and end examination taken together.

6.2 A student shall be **promoted from II to III year** only if he fulfills the academic requirements of earning **40 credits from two regular and one supplementary examinations of I year I Semester, and One Regular & One Supplementary exam of I year II Semester, and one regular examination of II year I Semester** irrespective of whether the candidate takes the examination or not.

6.3 A student shall be **promoted from III year to IV year** only if he fulfills the academic requirements of earning total **67 credits from the following examinations,** whether the candidate takes the examinations or not.

a. Three regular and two supplementary examinations of I B Tech – I Semester.
b. Two regular and two Supplementary examinations of I B Tech II Semester
c. Two regular and one supplementary examinations of II year – I Semester.
d. One regular and one supplementary examinations of II year II Semester.
e. One regular examination of III year I Semester

6.4 A student shall be eligible to proceed to BTH, Sweden for admission into IV Year II Semester level, if he completes all the subjects and earned all the credits up to III B. Tech, I Semester and UG (Bachelor) Project during IV B. Tech - I Semester at JNTUH.

6.5 The credits earned by each student at JNTUH (inclusive of UG & PG) shall be transferred to BTH, Sweden, only after the student successfully completes and earns all credits up to and inclusive of IV year I semester along with UG Project.

6.6 A student shall be eligible to appear for the end Semester examination in any Subject (Theory/ Lab.) or Seminar/ Comprehensive Viva/ Project etc., but absent at it or has

failed in the end examination, may appear for the same at the supplementary examination or subsequent examination as and when offered.

6.7 (a) When a student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester when it is next offered, **with the academic regulations of the batch into which he got readmitted.**

(b) When a student is detained due to lack of credits in any year, he may be readmitted into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he got readmitted**

6.8 A student shall register for all the 254 credits as specified in the Course Structure and put up the minimum attendance requirements in all the Semesters, and earn all the 254 (174 at UG level + 80 at PG level) credits for the IDDMP. Marks obtained in all the specified 174 UG credits shall be considered for the calculation of percentage of marks for the B. Tech. Program, and the marks obtained in all the specified 80 PG credits shall be considered for the calculation of % of marks for the M. Tech. & M.Sc. Program. Evaluation of M. Sc. programme performance will be as per BTH norms in vogue.

6.9 Students, who fail to earn the 174 UG credits as indicated in the Course Structure, within 8 Academic Years from the Date of Admission, shall forfeit their seat in the IDDMP, and their admission for the entire Double Degree Masters Program shall stand cancelled.

6.10 Students, having secured the 174 UG credits, but fail to earn all the specified PG credits as indicated in the Course Structure, within 10 Academic Years from the Date of Admission, shall forfeit their seat in the IDDMP, and their registration/ continuation for the PG Degree Program shall stand cancelled.

7) Evaluation Procedure:

The performance of a student shall be evaluated in each Semester Subject wise as follows:

7.1 <u>For UG Part of the IDDMP</u>

i) The performance of a student shall be evaluated in each Semester Subject wise with a maximum of 100 marks for Theory and 75 marks for Practical/Laboratory subject. In addition the project work shall be evaluated for 200 marks.

ii) For theory subjects, the distribution shall be **30 marks for Internal Evaluation and 70 marks for the End-Examination**.

iii) For theory subjects, during the Semester there shall be **2 mid-term examinations.** Each mid-term examination consists of **one objective paper for 10 marks, one**

subjective paper for 15 marks with a duration of 110 minutes (20 minutes for objective and **90 minutes** for subjective paper), and one Assignment for 5 marks. Objective paper shall be set with multiple choice questions, true/false, fill-in the blanks, matching type questions, etc. for 10 marks. Subjective paper shall contain 5 questions, out of which the student has to answer 3 questions, each for 5 marks. The first mid-term examination shall be conducted for the first 50% of the syllabus, and second mid-term examination shall be conducted for the remaining 50% of the syllabus. First Assignment should be submitted before the conduct of the first mid examinations, and the second Assignment should be submitted before the conduct of the second mid examinations. The Assignment shall be as specified by the concerned subject teacher. The total marks secured by the student, in each mid-term examination, are evaluated for 30 marks and the better of the two mid-term examinations shall be taken as the final marks secured by each candidate.

iv) For practical subjects there shall be a continuous evaluation during the Semester for **25 sessional marks and 50 end examination marks**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 15 marks**, and **two internal examinations for practical's each of 10 marks,** shall be conducted by the concerned laboratory teachers. The **better of two** internal exams shall be considered. The End Examination shall be conducted by the teacher concerned and another faculty member of the same Department, as suggested by the Head of Dept.

v) For the Subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing and Estimation etc.), the distribution shall be **30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests) and 70 marks for end examination.** 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.

vi) **Open Electives:** Students are to choose One Open Elective (OE-I) during 3rd Year I-Semester and another Open Elective (OE-II) during 3rd Year II-Semester from the corresponding list of Open Electives given. However, students cannot opt for an Open Elective subjects offered by their own department, if it is already listed under core / elective subjects offered by that department in any Semester.

vii) The UG Project shall be evaluated for 200 marks, out of which 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Viva-Voce Examination. Out of 60 marks allocated for internal evaluation, 30 marks shall be awarded by the Project Supervisor (based on his continuous performance evaluation of the student), and the other 30 marks shall be awarded by Project Evaluation Committee (PEC) based on the presentation made by the student on the progress of the project at the time of IV Year I Semester I & II-Mid examinations. The PEC shall be constituted by the Head of the Department and shall consist of the Head of the Department, the Supervisor of UG Project and Senior Faculty Member of the Department.

7.2 <u>For M. Tech. (PG) Part of the IDDMP at JNTUH</u>

i) Theory Subjects are evaluated for 100 marks, and practicals/Laboratory Subjects are also Evaluated for 100 marks.

ii) For theory subjects, the distribution shall be 40 marks for Internal Evaluation and 60 marks for the End-Examination. For the award of the 40 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 instruction; each of which shall be evaluated for 25 marks, and the better one out of these two internals shall be considered for awarding the 25 sessional marks. Out of the remaining 15 sessional marks, 5 marks are allocated for teacher's assessment (allotment is based on performance of the student in the concerned subject/class) and 10 marks will be awarded based on the student's performance in the Assignments.

iii) For practical's/Laboratory subjects, there shall be a continuous evaluation during the Semester for 40 sessional marks and 60 End Examination marks. Of these 40 marks, 15 marks shall be awarded for day-to-day work and 25 marks to be awarded by conducting an internal laboratory test. The End Examination shall be conducted by the teacher concerned and another faculty member of the same Department, as suggested by the Head of Dept.

7.3 For M. Sc. (PG) part of the IDDMP at BTH, Sweden, the concerned subjects, regulations and evaluation procedure offered shall be as per the norms in vogue at BTH, Sweden.

7.4 Grading Procedure (Common for M. Tech. & M. Sc.)

(i) Marks will be awarded to indicate the performance of each student in each Theory Subject or Practical or UG Project or comprehensive viva voce etc. at JNTUH as specified above in Items 7.1, 7.2, & 7.3 and a proportional letter grade shall be given.

(ii) As a measure of the student's performance, a Grading System using the following letter grades and corresponding percentage of marks shall be followed.

***For UG at JNTUH:**

% of Marks Secured at JNTUH	*Letter Grade at JNTUH*
70% and above	A
Below 70% but not less than 60%	B
Below 60% but not less than 50%	C
Below 50% but not less than 40%	D
Below 40%	F

***For PG at JNTUH:**

% of Marks Secured at JNTUH	*Letter Grade at JNTUH*
70% and above	A

Below 70% but not less than 60%	B
Below 60% but not less than 50%	C
Below 50%	F

***For PG at BTH, Sweden**

% of Marks Secured at JNTUH	*Letter Grade Equivalent at BTH, Sweden*
Less than or equal to 100% but not less than 90%	A
Below 90% but not less than 80%	B
Below 80% but not less than 70%	C
Below 70% but not less than 60%	D
Below 60% but not less than 50%	E
Below 50%	F

8) Award of Degree or Class:

After a student satisfies all the requirements prescribed for the completion of the IDDMP and becomes eligible for the award of the respective Degree, he shall be placed in one of the following four classes ~

For UG at JNTUH:

Class Awarded in UG Program	*% of Marks Secured at JNTUH*	*Program Credits at JNTUH*
FIRST CLASS with DISTINCTION	70% and above	From the Aggregate secured for the 174 UG credits.
FIRST CLASS	Below 70% but not less than 60%	
SECOND CLASS	Below 60% but not less than 50%	
PASS CLASS	Below 50% but not less than 40%	

For PG:

Class Awarded in PG at JNTUH	% of Marks Secured at JNTUH	Equivalence between BTH grade and JNTUH marks for the purpose of award of class **BTH Grade[#] = JNTUH Marks**
FIRST CLASS with DISTINCTION	70% and above	**A = 95%**

FIRST CLASS	Below 70% but not less than 60%	**B = 85%** **C = 75%** **D = 65%** **E = 55%** **F < 50%**
SECOND CLASS	Below 60% but not less than 50%	
FAIL	Below 50%	

 # Note: If any unspecified symbol/ character is given by BTH, Sweden as the ECTS grade for any subject the corresponding ratification for the appropriate specified grade shall be obtained from BTH, Sweden, and corresponding percentage marks will be awarded at JNTUH.

JNTUH awards the

- B. Tech. Degree with specialization in **Electronics and Communication Engineering** after securing for 174 UG credits at JNTUH
- M. Tech. Degree with specialization in **Signal Processing** after securing a total of 80 PG credits (JNTUH) equivalent to 120 ECTS at BTH.

BTH awards the

- M. Sc. Degree in **Signal Processing** specialization after securing a total of 120 ECTS (BTH) equivalent to 80 PG credits at JNTUH.

9) Transfer of Credits Policy between JNTUH and BTH, Sweden for awarding PG degrees:

a) JNTUH offers 20 credits for PG in IV Year I Semester for this Integrated Double Degree Masters program, which will be transferred to BTH as 30 credits of European Credit Transfer System (ECTS).

b) The 30 ECTS offered in each Semester at BTH for PG in IV year II Semester, V year I and II Semesters are transferred to JNTUH, which will be equivalent to 20 credits at JNTUH.

10) Withholding of Results:

If the student has not paid dues to University/College, or if any case of indiscipline is pending against him, the result of the candidate 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.

11) Transitory Regulations:

Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the IDDMP, may be considered eligible for readmission to the same or equivalent subjects as and when they are offered, subject to Item 6.9 and 6.10.

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MALPRACTICES RULES

	Nature of Malpractices	Punishment
	If the candidate:	
1 (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
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.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including 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.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	or has the tendency to disrupt the orderly conduct of the examination.	
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during	Cancellation of the performance in that subject and all other subjects the candidate

	valuation or during special scrutiny.	has appeared including practical examinations and project work of that semester / year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the College / University for further action to award suitable punishment.	

12) General:

- The Academic Regulations should be read as a whole for the purpose of any interpretation.
- The University/College reserves the right of altering the Academic Regulations and/or Syllabus/Course Structure, as and when necessary. The modifications or amendments may be applicable to all the candidates on rolls, as specified by the University/College.
- Wherever the words 'he' or 'him' or 'his' occur in the above regulations, they will also include 'she' or 'her' or 'hers'.
- Wherever the word 'Subject' occurs in the above regulations, it implies the 'Theory Subject' and 'Practical Subject' or 'Lab.'.
- In case of any ambiguity or doubt in the interpretations of the above regulations, the decision of the CAC / Academic Senate / Vice-Chancellor will be final.
- There shall be no branch transfers, no place transfers, no course transfers, and no transfers from 5 year IDDMP to 4 year B. Tech. (Regular) degree programme (Of same branch or any other branch) or Vice versa, after the completion of the admission process.
- The visa will be issued by the respective embassy, the student is required to fulfill the necessary norms. Students are responsible to show the required financial proofs to the migration authorities while applying for student permit (VISA). Either JNTUH or BTH will not be responsible for the visa rejections caused on the grounds of in-sufficient financial funds/statements or any other issues in front of Migration Board.

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ACADEMIC REGULATIONS
COURSE STRUCTURE AND SYLLABUS

Electronics & Communication Engineering

with Masters Specialization in

Signal Processing

For

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DOUBLE DEGREE MASTERS PROGRAM (IDDMP)
Leading to B.Tech., M.Tech. at JNTUH and
M. Sc. at Blekinge Institute of Technology, Sweden

(Applicable for the Batches admitted from 2013-2014)

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BTH, Sweden

JNTUH COLLEGE OF ENGINEERING HYDERABAD (Autonomous)
JNTUH, Kukatpally, Hyderabad – 500 085
Telangana, India
2013

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)
Five Year Integrated Double Degree Masters Program (IDDMP)
(B. Tech. + M. Tech., & M. Sc.)

ELECTRONICS & COMMUNICATION ENGINEERING
(Signal Processing)

COURSE STRUCTURE
(Applicable from the batch admitted during 2013-14 and onwards)

I YEAR **I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	BS	Mathematics- I	4	1	0	4
2	EAS	Computer Programming & Data Structures	4	1	0	4
3	HSS	English	4	0	0	4
4	EAS	Engineering Graphics	3	0	3	4
5	EAS	Engineering Mechanics	4	1	0	4
6	EAS	Computer Programming & Data Structures Lab	0	0	3	2
7	HSS	English Language Communication Skills Lab	0	0	3	2
8	EAS	Engineering Workshop	0	0	3	2
		NSS / NCC				
		TOTAL				**26**

I YEAR **II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	BS	Mathematics – II	4	1	0	4
2	EAS	Basic Electrical & Electronics Engineering	4	1	0	4
3	BS	Engineering Chemistry	4	0	0	4
4	BS	Applied Physics	4	0	0	4
5	EAS	Environmental Science	4	0	0	4
6	BS	Computational Mathematics	2	0	0	2
7	EAS	Basic Electrical & Electronics Engineering Lab	0	0	3	2
8	BS	Applied Physics Lab	0	0	3	2
9	BS	Computational Mathematics Lab	0	0	3	2
		NSS/NCC				
		TOTAL				**28**

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)
Five Year Integrated Double Degree Masters Program (IDDMP)
(B. Tech. + M. Tech., & M. Sc.)

ELECTRONICS & COMMUNICATION ENGINEERING
(Signal Processing)

COURSE STRUCTURE
(Applicable from the batch admitted during 2013-14 and onwards)

II YEAR **I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	BS	Mathematics – III	4	1	0	4
2	DC	Signals & Systems	4	1	0	4
3	DC	Electrical Technology	4	1	0	4
4	DC	Analog Electronics	4	1	0	4
5	DC	Network Analysis	4	1	0	4
6	DC	Analog Electronics Lab - I	0	0	3	2
7	DC	Electrical Technology Lab	0	0	3	2
8	DC	Basic Simulation Lab	0	0	3	2
		TOTAL				**26**

II YEAR **II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DC	Switching Theory and Logic Design	4	1	0	4
2	DC	Pulse & Digital Circuits	4	1	0	4
3	DC	Electromagnetic Theory & Transmission Lines	4	1	0	4
4	DC	Analog Communications	4	1	0	4
5	DC	Control Systems	4	1	0	4
6	DC	Analog Communications lab	0	0	3	2
7	DC	Pulse & Digital Circuits lab	0	0	3	2
8	DC	Analog Electronics Lab - II	0	0	3	2
9	HSS	Human values and Professional Ethics	2	0	0	2
		TOTAL				**28**

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)
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ELECTRONICS & COMMUNICATION ENGINEERING
(Signal Processing)
COURSE STRUCTURE
(Applicable from the batch admitted during 2013-14 and onwards)

III YEAR **I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DC	Linear & Digital IC Applications	4	1	0	4
2	DC	Antennas & Wave Propagation	4	1	0	4
3	DC	Digital Communications	4	1	0	4
4	OE-I	Open Elective – I	4	0	0	4
5	HSS	Managerial Economics & Financial Analysis	4	0	0	4
6	DC	Linear IC Applications Lab	0	0	3	2
7	DC	Digital Electronics Lab	0	0	3	2
8	DC	Digital Communications lab	0	0	3	2
		TOTAL				**26**

III YEAR **II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DC	Microprocessors & Microcontrollers	4	1	0	4
2	DC	Digital Signal Processing	4	1	0	4
3	OE-II	Open Elective – II	4	0	0	4
4	DE-I	Department Elective – I	4	0	0	4
5	DE-II	Department Elective – II	4	0	0	4
6	HSS	Advanced English Language Communications Skills Lab	0	0	3	2
7	DC	Digital Signal Processing lab	0	0	3	2
8	DC	Microprocessor & Microcontrollers lab	0	0	3	2
9	EAS	Disaster Management	2	0	0	2
		TOTAL				**28**

Summer between III & IV Year: UG Project: 4 credits*
***(UG Project continued into IV year I semester))**

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)
Five Year Integrated Double Degree Masters Program (IDDMP)
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ELECTRONICS & COMMUNICATION ENGINEERING
(Signal Processing)
COURSE STRUCTURE
(Applicable from the batch admitted during 2013-14 and onwards)

IV YEAR **I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DC	UG Project (continued)	-	-	-	4*+8
2	PGC	PG Core VLSI Technology & Design	4	1	0	4+1
3	PGE-I	PG Elective – I (Electives Listed Below) Recommended: Transform Techniques	4	1	0	4+1
4	PGE-II	PG Elective – II (Electives Listed Below) Recommended: Advanced Digital Signal Processir	4	0	0	4
5	PGC	PG Lab Signal Processing Laboratory	0	0	6	4
6	PGC	Comprehensive Viva voce	-	-	-	2
		TOTAL				4*+**28**

(* 4 credits for the UG project carried out during the summer after 3rd Year –II Semester).

FROM IV YEAR II SEMESER – AT BLEKINGE INSTITUTE OF TECHNOLOGY, SWEDEN

Each Semester in BTH-Sweden, is divided into two Groups (LP1&LP2 in IV-II semester, LP3 & LP4 in V-I Semester and V-II Semester Project work). Students have to take only 2 subjects per Learning Period (LP) each subject with 7.5 ECTS. Total of 4x7.5=30 ECTS per Semester and 90 ECTS at BTH. The subjects will be notified at the time of entry to the semester.

IV Year– II Semester - At Blekinge Institute of Technology, Sweden
(4x7.5=30 ECTS)

- Adaptive Signal Processing
- Data Transmission and Radio Communications
- Applied Adaptive Signal Processing
- Optional / Elective – I: 1) Sound and Vibration Analysis OR 2) Digital Image Processing and Analysis OR 3) Advanced Filter Design

V Year– I Semester - At Blekinge Institute of Technology, Sweden
(4x7.5=30 ECTS)

- Research Methodologies in Electrical Engineering Emphasis on Signal Processing
- Multi-dimensional Signal Processing
- Neural Networks
- Optional / Elective – II: 1) Optimal Signal Processing OR 2) Computer Vision OR 3) Experimental Modal Analysis Antenna Theory OR 4) Digital Signal Processors OR 5) Advanced Filter Design

(Note: Subjects listed above are indicative)
(Note: Number of elective courses will be offered depending on number of students.)
(Note: Totally two courses are elective at IV year II semester and V year I semester together)

V YEAR II Semester - – At BTH, Sweden (30 ECTS)

- Master Thesis Work in Electrical Engineering with emphasis on Signal Processing

A) Open Electives (OE)

Open Elective-I

S.No.	Subject	Offering Department
1.	GIS & Remote Sensing	Civil Engineering
2.	Non-Conventional Power Generation	Electrical & Electronics Engineering
3.	Operations Research	Mechanical Engineering
4.	Electronic Measurements & Instrumentation	Electronics & Communication Engineering
5.	OOPS through JAVA	Computer Science & Engineering
6.	Data Structures and Analysis of Algorithms	Computer Science & Engineering
7.	Operating Systems	Computer Science & Engineering
8.	Material Science	Metallurgical Engineering
9.	Nano Technology	Physics
10	Engineering Management	Humanities & Social Sciences

Open Elective-II

S.No.	Subject	Offering Department
1.	Estimation, Quantity survey & Valuation	Civil Engineering
2.	Energy Storage Systems	Electrical & Electronics Engineering
3.	Mechatronics	Mechanical Engineering
4.	Principles of Communication Systems	Electronics & Communication Engineering
5.	E-Commerce	Computer Science & Engineering
6.	Computer Graphics	Computer Science & Engineering
7.	Database Management	Computer Science & Engineering

	Systems	
8.	Nano Materials	Metallurgical Engineering
9.	Intellectual Property Rights	Humanities & Social Sciences
10.	Entrepreneurship	Humanities & Social Sciences

B) Departmental Electives (DE)

Departmental Elective-I

1. Electronic Measurements & Instrumentation
2. Television Engineering
3. Artificial Neural Networks

Departmental Elective-II

1. Telecommunication Switching Systems and Networks
2. Power Electronics
3. Digital Systems Design

C) PG Electives I & II at JNTUH

PGE – I

- Telecommunication Switching Systems and Networks
- Network Security & Cryptography
- Wireless Communications & Networks
- Ad hoc Wireless Sensor Networks
- Detection and Estimation Theory
- **Transform Techniques**

PGE – II

- TCP/IP Internetworking
- C++ Programming
- Biomedical Signal Processing
- System on Chip Architecture
- **Advanced Digital Signal Processing**

* * *

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

I Year B.Tech. ECE I-Semester

L	T	P	C
4	1	0	4

MATHEMATICS-I
(Common for all Branches)

UNIT – I: Differential calculus

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. Radius, Center and circle of curvature – Evaluates and Envelopes, Curve tracing – Cartesian, polar and parametric curves.

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

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

Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties, - Laplacian operator, Line integral – Work done – Surface integrals –Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification). Solenoidal and irrotational vectors, Finding potential function.

UNIT – IV: First Order Ordinary Differential Equations

Overview of differential equations- exact, linear and Bernoulli.

Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

UNIT V: Higher Order Ordinary Differential Equations

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $f(x) = e^{ax}$, Sin ax, Cos ax, and x^n, $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters. Applications on bending of beams, Electrical circuits and simple harmonic motion.

TEXT BOOKS:

1. Higher Engineering Mathematics By B S Grewal.
2. Advanced Engineering Mathematics By Peter V O'neil, Cengage Learning

3. Engineering Mathematics By Erwin Kreyszig,10th Edition Wiely Publications

REFERENCES:

1. Mathematics for Engineers By K.B.Datta And M.A S.Srinivas,Cengage Publications
2. Mathematics for Engineers By Prof.A R K Prasad, Wiely India.
3. Engineering Mathematics -1and 2 By T.K.V.Iyengar & B.Krishna Gandhi Etel

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

I Year B.Tech. ECE I-Semester

L	T	P	C
4	1	0	4

COMPUTER PROGRAMMING & DATA STRUCTURES

Objectives:

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues,
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists,

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

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.

Selection 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.

UNIT - II

Designing Structured Programs- Functions, basics, user defined functions, inter function communication,

Standard functions-Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programs

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

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.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

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- selection sort, bubble sort, insertion sort,
Searching-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:
1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:
1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
3 Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
4. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
5. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson
6. Education / PHI
7. C Programming & Data Structures,E.Balagurusamy,TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S.Chand&Co.

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

I Year B.Tech. ECE I-Semester

L	T	P	C
4	0	0	4

ENGLISH

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 it on their own the topics selected for discussion 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, advertiSemesterents, 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.

Learning Outcomes

- Usage of correct English Language, written and spoken
- Enrichment of comprehension and fluency
- Gaining Confidence in using language in varied situations

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its 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 recognise them, to distinguish between them to mark stress and recognise 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 to express themselves fluently and appropriately in social and professional contexts.
   - Oral practice
   - Describing objects/situations/people
   - Role play – Individual/Group activities (Using exercises from all the **six** units of the prescribed text: ***Skills Annexe: Functional English for Success*.)**
   - Just A Minute (JAM) Sessions.

Reading Skills:
Objectives

To develop an awareness in the students about the significance of silent reading and comprehension.

1. 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
   - Inferring lexical and contextual meaning
   - Understanding discourse features
   - Scanning
   - 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

4. TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts are prescribed:

For Detailed study

1. First Text book entitled **"*Skills Annexe -Functional English for Success*",** Published by Orient Black Swan, Hyderabad
2. The Second Textbook entitled **"*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 to Success Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'*Mokshagundam Visvesvaraya'*** from *"Epitome of Wisdom",* Published by Maruthi Publications, Hyderabad.

And

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
W- Writing Paragraphs
G-Types of Nouns and Pronouns
V- Homonyms, homophones synonyms, antonyms

Unit –II

1. Chapter entitled "***Advances in Science and Technology"*** from "***Skills Annexe -Functional English for Success***" Published by Orient Black Swan, Hyderabad.

2. Chapter entitled **'*Three days To See'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad.

And

L – Listening for themes and facts
S – Apologizing, interrupting, requesting and making polite conversation
R- for theme and gist
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

And

L – for main points and sub-points for note taking
S – Giving instructions and directions; Speaking of hypothetical situations
R – Reading for details
W – Note-making, information transfer, punctuation
G – Present tense
V – Synonyms and Antonyms

Unit –IV

1. Chapter entitled '***Human Values and Professional Ethics'*** from "***Skills Annexe - Functional English for Success"*** Published by Orient Black Swan, Hyderabad
2. Chapter entitled ***'The Last Leaf'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad

And

L -Listening for specific details and information
S- Narrating, expressing opinions and telephone interactions
R -Reading for specific details and information
W- Writing formal letters and CVs
G- Past and future tenses
V- 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

And

L- Critical Listening and Listening for speaker's tone/ attitude
S- Group discussion and Making presentations
R- Critical reading, reading for reference
W-Project proposals; Technical reports, Project Reports and Research Papers
G- Adjectives, prepositions and concord
V- Collocations and Technical vocabulary and using words appropriately

* Exercises from the texts not prescribed shall also be used for classroom tasks.

SUGGESTED READING:

1. ***Contemporary English Grammar Structures and Composition*** by David Green, MacMillan Publishers, New Delhi. 2010.

2. **Innovate with English: A Course in English for Engineering Students,** edited by T Samson, Foundation Books.
3. English Grammar Practice**, Raj N Bakshi, Orient Longman.**
4. **Technical Communication** by Daniel Riordan. 2011. **Cengage Publications. New Delhi.**
5. **Effective English, edited** by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by **Pearson**
6. Handbook of English Grammar& Usage**, Mark Lester and Larry Beason, Tata Mc Graw –Hill.**
7. Spoken English**, R.K. Bansal & JB Harrison, Orient Longman.**
8. Technical Communication, **Meenakshi Raman, Oxford University Press**

9. Objective English **Edgar Thorpe & Showick Thorpe**, **Pearson Education**
10. Grammar Games**, Renuvolcuri Mario, Cambridge University Press.**
11. Murphy's English Grammar with CD**, Murphy, Cambridge University Press.**
12. Everyday Dialogues in English**, Robert J. Dixson, Prentice Hall India Pvt Ltd.,**
13. ABC of Common Errors **Nigel D Turton, Mac Millan Publishers.**
14. Basic Vocabulary **Edgar Thorpe & Showick Thorpe**, **Pearson Education**
15. Effective Technical Communication**, M Ashraf Rizvi, Tata Mc Graw –Hill.**
16. An Interactive Grammar of Modern English, **Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO**
17. A Communicative Grammar of English, **Geoffrey Leech, Jan Svartvik, Pearson Education**
18. Enrich your English, **Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,**
19. A Grammar Book for You And I, **C. Edward Good, MacMillan Publishers.**

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

I Year B.Tech. ECE I-Semester

L	T	P	C
3	0	3	4

ENGINEERING GRAPHICS

Pre-requisite: Nil

Objective: The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications.

Codes / Tables: Nil

Question Paper Pattern:

5 Questions to be answered out of 8 questions.

Each question should not have more than 3 bits.

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING:

Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Involute. Scales – Plain, Diagonal and Vernier Scales.

UNIT- II

ORTHOGRAPHIC PROJECTIONS:

Principles of Orthographic Projections – Conventions – Projections of Points and Lines Projections of Plane regular geometric figures.—Auxiliary Planes.

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:

Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

TEXT BOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and Graphics Rane and Shah/ Pearson Edu.

REFERENCE BOOKS:

1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand
2. Engineering Graphics with Auto CAD / James D Bethune / Pearson Edu.
3. Engineering Graphics / K R Mohan / Dhanpat Rai.
4. Text book on Engineering Drawing / KL Narayana/ P Kannaih / Scitech

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

I Year B.Tech. ECE I-Semester

L	T	P	C
4	1	0	4

ENGINEERING MECHANICS

1. **Introduction to Mechanics** : Basic Concepts, system of Forces Coplanar Concurrent Forces -Components in Space -Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

2. **Friction**: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions -Motion of Bodies -Wedge Screw, Screw-jack and differential screw –jack

3. **Centroid and Center of Gravity**: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

4. **Area moments of Inertia**: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration - Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

5. **Mass Moment of Inertia**: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

TEXT BOOKS:

1. Singer's Engineering Mechanics Statics and Dynamics , K. Vijaya Kumar Reddy, J. Suresh Kumar, BS Publications, 3rd Edition(SI Units)Fifth impression 2013
2. Engg. Mechanics / Timoshenko & Young

REFERENCES:

1. Engg. Mechanics/ Irving Shames, G. Krishna Mohan Rao, Prentice Hall
2. Engg. Mechanics Umesh Regl / Tayal.
3. A text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company
4. Text Book in Applied Mechanics / Malhotra, Subramanian, Gahlot and Rathore / New Age.
5. Engg. Mechanics / KL Kumar / Tata McGraw Hill.
6. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah.
7. Engg. Mechanics / S.S. Bhavikati & K.G. Rajasekharappa

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

I Year B.Tech. ECE I-Semester

L	T	P	C
0	0	3	2

COMPUTER PROGRAMMING & DATA STRUCTURES LAB

Objectives:

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues,
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists,

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.

6. Write a C program to find the factorial of a given integer.

7. Write a C program to find the GCD (greatest common divisor) of two given integers.

8. Write a C program to solve Towers of Hanoi problem.

9. 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)

10. Write a C program to find both the largest and smallest number in a list of integers.

11. Write a C program that uses functions to perform the following:
i) Addition of Two Matrices
ii) Multiplication of Two Matrices

12. Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from a given position.
ii) To delete n Characters from a given position in a given string.

13. Write a C program to determine if the given string is a palindrome or not

14. 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.

15. Write a C program to count the lines, words and characters in a given text.

16. Write a C program to generate Pascal's triangle.

17. Write a C program to construct a pyramid of numbers.

18. 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.)

19. 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.)

20. 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)

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

22. Write C programs that implement stack (its operations) using
i) Arrays ii) Pointers

23. Write C programs that implement Queue (its operations) using
i) Arrays ii) Pointers

24. 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

25. 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

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.
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.

Prescribed Lab Manual: A Manual entitled "***English Language Communication Skills (ELCS) Lab Manual- cum- Work Book***", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

- *In addition to the prescribed lab manual, all the listening and speaking activities mentioned in Text-1 and Text-2 can be conducted in the English Language Communication Skills Lab.*

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**
- **English Pronunciation in Use** (Elementary, Intermediate, Advanced) Cambridge University Press
- Raman, M & Sharma, S. 2011. Technical Communication, OUP
- Sanjay Kumar & Pushp Lata. 2011. Communication Skills, OUP

SUGGESTED READING:

1. Rama Krishna Rao, A. *et al. English Language Communication Skills – A Reader cum Lab Manual Course Content and Practice.* Chennai: Anuradha Publishers
2. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
3. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill
5. Hancock, M. 2009. *English Pronunciation in Use. Intermediate.* Cambridge: CUP
6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
7. Hewings, M. 2009. *English Pronunciation in Use. Advanced.* Cambridge: CUP
8. Marks, J. 2009. *English Pronunciation in Use. Elementary.* Cambridge: CUP
9. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication.* New Delhi : Foundation
10. Soundararaj, Francis. 2012. *Basics of Communication in English. New Delhi: Macmillan*
11. *Spoken English* (CIEFL) in 3 volumes with 6 cassettes, OUP.
12. *English Pronouncing Dictionary* Daniel Jones Current Edition with CD.
13. *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 25 sessional marks and 50 year-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 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.

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ENGINEERING WORKSHOP

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

UNIT – I: Linear ODE with variable coefficients and series solutions (second order only)
Equations reducible to constant coefficients-Cauchy's and Lagrange'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
Legendre's Differential equation, General solution of Legendre's equation, Legendre polynomials Properties: Rodrigue's formula – Recurrence relations, Generating function of Legendre's polynomials – Orthogonality.
Bessel's Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function, Trigonometric expansions involving Bessel functions.

UNIT-III: Partial Differential Equations
Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method), Method of separation of variables for second order equations –Applications of Partial differential equations-Two dimensional wave equation., Heat equation.

UNIT –IV: Laplace Transform
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 – V: Fourier Series and Fourier Transforms
Definition of periodic function. Fourier expansion of periodic functions in a given interval of length, 2π , Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier integral theorem – Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics By B S Grewal.
2. Advanced Engineering Mathematics By Peter V O'neil, Cengage Learning
3. Engineering Mathematics By Erwin Kreyszig,10th Edition Wiely Publications

REFERENCES:

1. Mathematics For Engineers Series- Advanced Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publications
2. Advanced Engineering Mathematics For Engineers By Prof.A R K Prasad., Wiely India
3. Advanced Engineering Mathematics By Sahanaz Bathul, Phi Publication
4. Engineering Mathematics-3 By T.K.V.Iyengar &B.Krishna Gandhi Etc
5. Complex Variables Principles And Problem Sessions By A.K.Kapoor, World Scientific Publishers
6. A Text Book Of Engineering Mathematics By N P Bali, Manesh Goyal

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BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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 characteristic, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

Rectifiers and Filters - The P-N junction as a rectifier - A 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

Bipolar Junction Transistor (BJT) - Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

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 β, 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:

Junction Field Effect Transistor - Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and JFET, Small Signal Model, Biasing JFET.

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 the help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

TEXT BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J.Millman and C.C.Halkias, Satyabratajit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.

REFERENCES:

1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
2. Electronic Devices and Circuits - K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal –Wiley India Pvt. Ltd. 1/e 2009.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N.C.Jagan & C.Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

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ENGINEERING CHEMISTRY

Unit-I: Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Boiler feed water and its treatment – Calgon conditioning – Phosphate conditioning - Colloidal conditioning – External treatment of water – Lime soda and ion-exchange processes. Desalination of water – Reverse osmosis. Numerical problems – Sewage water - COD, BOD and their determination. Treatment of sewage.

Unit-II: Electrochemistry and corrosion:
Electrochemistry: Conductance - Specific, equivalent and molar conductance. Ionic mobilities – Relationship between ionic conductance and ionic mobilities. Electro Chemical cells - electrode potential and its determination, standard electrode potential, types of electrodes – Standard hydrogen electrode, calomel and glass electrode. Nernst equation - electrochemical series and its applications – Concept of concentration cell –Numerical problems.
Corrosion- Causes and effects of corrosion – theories of chemical and electrochemical corrosion - mechanism of electrochemical corrosion. Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion. Corrosion control methods – Cathodic protection - sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application of metallic coatings – Hot dipping, cementation, electroplating of copper - Organic coatings: Paints – their constituents and functions.

Unit-III: High Polymers: Definition – Classification of polymers with examples – Types of polymerisation – Chain growth (free radical addition mechanism), step growth polymerization, coordination polymerization. Plastics, fibres and elastomers - definition and characteristics. Plastics – thermoplastic and thermosetting plastics, constituents of plastics. Fibre reinforced plastics. Preparation, properties and 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 polyvinyl acohol and their 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 petrol, diesel and kerosene. Synthetic petrol- Fischer-Tropsch's process. Cracking – thermal cracking and catalytic cracking. Fluid bed catalytic cracking,

Knocking - octane and cetane numbers. Gaseous fuels – Composition, properties and uses of Natural gas, LPG and CNG. Flue gas and its analysis by Orsat's apparatus.
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 (H_2-O_2 and Methanol –O_2 fuel cell) – Photovoltaic cells.

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, nano gold particles and fullerenes - Applications of nanomaterials.

TEXT BOOKS:

1. Engineering Chemistry by P.C.Jain & M.Jain ; Dhanpat Rai Publishing Company (P) Ltd., New Delhi, (15th Edition , 2005).
2. Engineering Chemistry by B.Rama Devi & Ch.Venkata Ramana Reddy; Cengage Learning, 2012.

REFERENCES:

1. A Text Book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co., New Delhi. (3rd Edition, 2003).
2. Engineering Chemistry by Y. Bharathi Kumari and C. Jyotsna, VGS Booklinks, 2012.
3. Text book of Engineering Chemistry by C P Murthy, C V Agarwal and A. Naidu; B.S. Publications, 2006.
4. Engineering Chemistry by M. Thirumala Chary and E. Lakshminarayana, Sci tech. Publications Pvt. Ltd., Chennai 2012.
5. Engineering Chemistry by B.Sivasankar, Tata McGraw-Hill Publishing Company Ltd., New Delhi 2008.
6. A Text Book of Engineering Chemistry by S.S. Dara, S.Chand Publications, (10th Edition, 2007).

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APPLIED PHYSICS

UNIT-I

1.Principles of Quantum & Statistical Mechanics: Waves and Particles, De Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, G.P. Thomson Experiment, Heisenberg's Uncertainty principle, Schrodinger's Time -Independent Wave Equation, Physical Significance of the Wave Function, Particle in One Dimensional Potential Box. Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (Qualitative).

2.Electron theory of Metals: Introduction, Classical Free Electron Theory of metals, Root Mean Square (RMS)velocity, Mean Free Path, Mean collision Time, Drift Velocity, Relaxation Time, Electrical Resistivity, Draw backs of Classical Free Electron Theory, Density of States, Calculation of Fermi energy, Quantum Free Electron Theory, Electron in a periodic Potential, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semiconductors and insulators, Concept of Effective Mass of an Electron.

UNIT-II

3. Semiconductor Physics: Position of Fermi Level, Estimation of Carrier concentration in Intrinsic and Extrinsic (p-type & n-type) Semiconductors, Equation of Continuity, Direct and Indirect Band gap Semiconductors, Hall Effect.

4. Physics of Semiconductor Devices: Formation of PN Junction, Energy band Diagram and I-V Characteristics of PN Junction Diode, Diode Equation, LED, LCD and Photo Diodes, Solar Cells.

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.

6. Magnetic Properties: Basic definitions , Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro magnetism on the basis of Hysteresis Curve , Soft and Hard Magnetic Materials, Properties of Anti – Ferro and Ferri Magnetic Materials.

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

8. Lasers: Characteristics of Lasers, Spontaneous and stimulated Emission of Radiation, Meta- Stable state, Population Inversion, Lasing Action, Einstein's Coefficients and Relation

between them, Ruby Laser, Helium- Neon Laser, Semiconductor Diode Laser and Applications of Lasers.

9. Fiber Optics: Principle & construction (structure) of an Optical Fiber, Acceptance Angle, Numerical Aperture, Types of Optical Fibers, Losses in Optical Fibers and Applications of Optical Fibers in communication.

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:

1. Principles of Physics by Halliday, Resnick, Walker, Wiley India Pvt Ltd, 9th Edition.
2. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
3. Engineering Physics by R.K.GAUR & S.L.GUPTA, Dhanpat Rai Publications.
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
2. Applied Physics by P.K.Mittal, I K International Publishers
3. Applied Physics by P.K. Palanisamy :Scitech publishers
4. Introduction to Nanotechnology by Charles P.Poole, Jr.Frank J ownes, John Wiley & sons
5. Applied Physics for Engineers by P. Madusudana Rao, Academic Publishing Company
6. Engineering Physics by Sanjay D Jain, Girish G Sahasrbudha: University Press.

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ENVIRONMENTAL SCIENCE

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-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - IV

ENVIRONMENTAL POLLUTION: 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

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. –Consumerism and waste products. -Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion - Family Welfare Programme -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies.

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 cosystemspond, river, hill slopes, etc.

TEXT BOOKS:

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.

REFERENCES:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

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2	0	0	2

COMPUTATIONAL MATHEMATICS

UNIT-I: Matrices and Linear Transformations:
Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix,

Finding rank of a matrix by reducing to Echelon and Normal forms.
Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix – Solving Linear System of equations, (number of equations and unknowns need not be same).Check the uniqness of solutions.

Cayley-Hamilton Theorem (without Proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation – Orthogonal Transformation. Eigen values and Eigen vectors of a matrix. Finding linearly independent Eigen vectors of a matrix when the Eigen values of the matrix are repeated. Properties of Eigen values and Eigen vectors of matrices.

Diagonolization of matrix – Quadratic forms upto three variables- Reduction of quadratic form to canonical form, Rank – Positive definite, negative definite – semi definite – index – signature of quadratic form.

UNIT – II: Interpolation and Curve fitting:
Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations – Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.
Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – III: Numerical techniques:
Solution of Algebraic and Transcendental Equations and Linear system of equations.
Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .
Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method)Jacobi's and Gauss-Seidel Iteration method

UNIT- IV: Numerical Differentiation, Integration, and Numerical solutions of First order differential equations:
Numerical differentiation, Numerical integration – Trapezoidal rule, Simpson's $1/3^{rd}$ and 3/8 Rule , Generalized Quadrature.

UNIT – V:

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method – Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods.

TEXT BOOKS:

1. Introductory Methods Of Numerical Analysis By Ss Sastry
2. Numerical And Statistical Methods With Programming In C By Sujatha Sinha And Subhabrada Dinda, Scitec Publishers

REFERENCES:

1. Advanced Engineering Mathematics By Alan Jeffery
2. Applied Numerical Methods Using Matlab By Rao.V.Dukkipati, New Age Publishers
3. Numerical Methods In Science And Engineering –A practical Approach By S.Rajasekharan, S.Chand Publications

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BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

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

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
    - Multimeters (Analog and Digital)
    - Function Generator
    - Regulated Power Supplies
    - CRO.

PART B: (For Laboratory examination – Minimum of 12 experiments)

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 JFET in CS configuration
6. Measurement of h-parameters of transistor in CB, CE, CC configurations
7. SCR Characteristics.
8. Verification of KVL and KCL.
9. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
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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APPLIED PHYSICS LAB

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.
6. Energy gap of material of PN- junction.
7. Bending Losses of Fibers & Evaluation of numerical aperture of given fiber.
8. L-C-R circuit.
9. Time constant of an R-C Circuit.
10. Characteristics of solar cell

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COMPUTATIONAL MATHEMATICS LAB

Interpolation:
Programming Tasks:

1. A) Write a C 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 C 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 C 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.)

Curve fitting:
Programming Tasks:

2. A) Write a C program to find a line of best fit from the given two arrays of x and y of same size.
   B) Write a C 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 C 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 C 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.

Solution of Algebraic and Transcendental Equations
Programming Tasks:

3. A) Write a C 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 C program to find the root of a given equation using method of false position (regula false position)
   C) Write a C program to find the root of a given equation using iteration method
   D) Write a C program to find the root of a given equation using Newton Rophson method

Linear system of equations
Programming Tasks:

4. A) Write a C program to find the solution of given system of linear equations using L- U decomposition method
   B) Write a C program to find the solution of given system of linear equations using jacobi's method
   C) Write a C program to find the solution of given system of equations using Gauss sidel iteration method

D) Write a C program to find the solution of given system of equations using Gauss Jordan elimination method

Numerical Differentiation, Integration, and Numerical solutions of First order differential equations:

Programming Tasks:

5. A) Write a C program to evaluate definite integral using trapezoidal rule, Simpson's $1/3^{rd}$ rule and $3/8^{th}$ rule.
   B) Write a C program to solve a given differential equation using Taylor's series
   C) Write a C program to solve a given differential equation Euler's and modified Euler's method
   D) Write a C program to solve a given differential equation using Ruge-Kutta method.

TEXT BOOKS:

1. Introductory Methods Of Numerical Analysis By SS Sastry
2. Numerical And Statistical Methods With Programming In C By Sujatha Sinha And Subhabrada Dinda, Scitec Publishers

REFERENCES:

1. Advanced Engineering Mathematics By Alan Jeffery
2. Applied Numerical Methods Using Matlab By Rao.V.Dukkipati,New Age Publishers
3. Numerical Methods In Science And Engineering –A practical Approach By S.Rajasekharan, S.Chand Publications

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MATHEMATICS – III

UNIT-I: Single Random variables and probability distributions.

Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution.

Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions. and hence finding the mean and variance.

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:

(i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)

(ii) Tests of significance of difference between sample S.D and population S.D.

(iii) 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

Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method.

Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.
Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity

UNIT – 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) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$

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 K 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 K Prasad., Wiely India

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SIGNALS AND SYSTEMS

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:

Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function.

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:

Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

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

Unit - V: Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi and M. M. Latha, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.
3. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001

REFERENCES:

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

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ELECTRICAL TECHNOLOGY

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

Transformers & Performance: Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit, Losses and Efficiency of transformer and Regulation – OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT III

Three Phase Induction Motor: Principle of operation of three-phase induction motors –Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.

UNIT IV

Alternators: Alternators – Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Predetermination of regulation by Synchronous Impedance Method – OC and SC tests.

UNIT V

Special Motors & Electrical Instruments : Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchro, Stepper Motors – Characteristics, Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters and Voltmeters).

TEXT BOOKS:

1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
2. Basic Electrical Engineering - T.K. Nagasarkar and M.S.Sukhija, Oxford University Press, 2005

REFERENCES:

1. Principles of Electrical Engineering - V.K Mehta, S.Chand Publications.
2. Theory and Problems of basic electrical engineering - I.J. Nagarath amd D.P Kothari, PHI Publications
3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin

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II Year B.Tech. ECE I-Semester

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ANALOG ELECTRONICS

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

Classification of Amplifiers – Distortion in amplifiers, Analysis of CE, CC, and CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier Different coupling schemes used in amplifiers, Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier, Darlington pair, Frequency response of BJT amplifier - Analysis at low and high frequencies, The Hybrid- pi (π) - Common Emitter transistor model, CE short circuit current gain, current gain with resistive load, single stage CE transistor amplifier response, Gain-bandwidth product

UNIT – II: FET AMPLIFIERS

Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOS Amplifiers, –MOSFET – MOSFET Characteristics in Enhancement and Depletion mode - MOS Small signal model, Common source amplifier with resistive, Diode connected and Current source loads, Source follower, Common Gate Stage, Cascode and Folded Cascode Amplifier - frequency response.

UNIT –III: POSITIVE & NEGATIVE FEEDBACK IN AMPLIFIERS

Classification of amplifiers, Concepts of feedback - Classification of feedback amplifiers - General characteristics of negative feedback amplifiers - Effect of Feedback on Amplifier characteristics - Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations - Simple problems.

Condition for oscillations. RC and LC type Oscillators - Frequency and amplitude stability of oscillators - Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators - RC-phase shift and Wien-bridge oscillators.

UNIT – IV:
LARGE SIGNAL AMPLIFIERS

Class A Power Amplifier, Maximum Value of Efficiency of Class - A Amplifier, Transformer Coupled Amplifier, Push Pull and Complimentary Symmetry Class B and Class AB Power Amplifiers – Principle of operation of class –C Amplifier, Transistor Power Dissipation, Heat Sinks.

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:

1. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
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
2. Introductory Electronic Devices and Circuits (Conventional flow version) – Robert T. Paynter, 7th Edition, 2009, PEI.
3. Microelectronic Circuits – Sedra / Smith – 5th Edition – Oxford, 2009
4. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.
5. Electronic Devices and Circuits, Anil.K. Maini, Varsha Agrawal, 1st Edition, WILEY.
6. Electronic Devices and Circuit Theory, Robert L.Boylestad, Louis Nashelsky, 9th Edition, Pearson Education.

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NETWORK ANALYSIS

UNIT I

Review of R, L,C, RC, RL, RLC circuits, Netrwork Topology, Terminology, Basic cutest and tieset matrices for planar networks, Illustrative Problems, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT II

Steady state and transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 2^{nd} 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

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3^{rd} Edition, 2000.
2. Networks, Lines and Fields - JD Ryder, PHI, 2^{nd} Edition, 1999.

REFERENCES:

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 5^{th} Edition, 1993.
2. Network Analysis and Synthesis – N.C.Jagan and C.Lakshminarayana, B.S. Publications, 2004.
3. Electric Circuits – J.Edminister and M.Nahvi – Schaum's Outlines, TMH, 1999.
4. Network Theory – Sudarshan and Shyam Mohan, TMH.
5. Communication Engineering Networks – Everitt and Anner.

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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

Equipment 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

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ELECTRICAL TECHNOLOGY LAB

PART – A

1. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
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

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
3. Brake test on DC shunt motor. Determination of performance characteristics.
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

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BASIC SIMULATION LAB

Note:

- All the experiments are to be simulated using MATLAB or equivalent software
- Minimum of 15 experiment 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, Saw tooth, 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.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon Simulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

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SWITCHING THEORY AND LOGIC DESIGN

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.

Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT-II:

Minimization and Design of Combinational Circuits:

Introduction, The Minimization of switching function using theorem, The Karnaaugh Map Method-Up to Five Variable Maps, Don't Care Map Entries, Tabular Method, Design of Combinational Logic: Adders, Subtractors, comparators, Multiplexers, Demultiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III:

Sequential Machines Fundamentals and Applications:

Introduction: Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop, Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.

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:

Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Synthesis of Synchronous Sequential Circuits, Serial Binary Adder, Sequence Detector, Parity-bit Generator, Design of Asynchronous Counters, Design of Synchronous Modulo N –Counters.

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:

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge.
2. Switching Theory and Logic Design – A Anand Kumar, PHI, 2013.

REFERENCES:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & Sons Inc.
3. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
4. Digital Logic Design - Ye Brian and Holds Worth, Elsevier
5. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
6. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
7. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

II Year B.Tech. ECE II-Semester

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PULSE AND DIGITAL CIRCUITS

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 clippers, Transistor clippers, 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:

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

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:

1. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 Ed., 2008, TMH.
2. Solid State Pulse Circuits –David A. Bell, 4 Ed., 2002 PHI.

REFERENCES:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 Ed., 2008.
3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH.
4. Wave Generation and Shaping - L. Strauss.

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II Year B.Tech. ECE II-Semester

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ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

UNIT–I:

Electrostatics: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

UNIT–II:

Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.

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:

EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization, Illustrative Problems.

EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor., Illustrative Problems.

UNIT–IV:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.

UNIT–V:

Transmission Lines – II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance

Transformations, Significance of Z_{min} and Z_{max} , Smith Chart – Configuration and Applications, Single and Double Stub Matching, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics – Matthew N.O. Sadiku, 4th Ed., Oxford Univ.Press, 2008
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2nd Ed., 2000, PHI.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES:

1. Engineering Electromagnetics – Nathan Ida, 2nd Ed., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Networks, Lines and Fields – John D. Ryder, 2nd Ed., 1999, PHI.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7th Ed., 2006, TMH.

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II Year B.Tech. ECE II-Semester

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ANALOG COMMUNICATIONS

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

Introduction to Hilbert Transform, Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT III
ANGLE MODULATION

Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

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 Divison Multiplexing.

TEXTBOOKS:

1. Communication Systems by Simon Haykins John Wiley & Sons, 4th Edition.
2. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004
3. Communication Systems – B.P. Lathi, BS Publication, 2004.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.

REFERENCES:

1. Electronic Communication Systems – Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
2. Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
3. Analog and Digital Communication – K. Sam Shanmugam, Willey ,2005
4. Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.

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CONTROL SYSTEMS

Objective:

In this course it is aimed to introduce to the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

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:

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

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:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

REFERENCE:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. Control Systems by S.Kesavan, Hitech Publications.
5. "Modeling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

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II Year B.Tech. ECE II-Semester

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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
13. Frequency Synthesizer.
14. AGC Characteristics.
15. PLL as FM Demodulator

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II Year B.Tech. ECE II-Semester

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PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

1. Linear wave 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 Boot strap 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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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/designed and tested circuits on a PCB.

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II Year B.Tech. ECE II-Semester

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HUMAN VALUES AND PROFESSIONAL ETHICS

Unit 1 Human Values: Morals, values, ethics – integrity – work ethics –service learning – civic virtue – respect for others- living peacefully - Caring –sharing –honesty – courage – valuing time – cooperation – commitment –empathy – self-confidence –spirituality – character- Mini-Cases

Unit II Professional Ethics: Profession- and professionalism - Two models of professionalism –Professional etiquette -Three types of Ethics or morality Responsibility in Engineering – Engineering standards –Engineering Ethics – Positive and Negative Faces. Professional Codes and Code of conduct (as given by ASME, ASCE, IEEE, IETE, Institute of Engineers as Guidelines for ethical conduct). Mini-cases.

Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis– congeniality, collegiality and loyalty. Respect for authority – conflicts of interest – occupational crime — Mini-Cases.

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

Unit V Ethics in global context: Global issues in MNCs- Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts – paternalism – different business practices – negotiating taxes. 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.
3. KR Govindan & Saenthil Kumar:Professional *Ethics and Human Values*, Anuradha Pubs.
4. S K Chakraborthy & D.Chakraborthy: *Human Values and Ethics*, Himalaya.
5. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: *Engineering Ethics(Includes Human Values),* HI Learning Pvt. Ltd., New Delhi – 110001

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III Year B.Tech. ECE I-Semester

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LINEAR AND DIGITAL IC APPLICATIONS

UNIT -I:

Operational Amplifier

Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT -II:

Op-Amp, IC-555 & IC 565 Applications

Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators – Triangular, Sawtooth, Square Wave, IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, 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:

1. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.
2. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
3. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCE:

1. Op Amps and Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/ Jaico, 2009.
2. Operational Amplifiers with Linear Integrated Circuits by K.Lal Kishore – Pearson, 2009.
3. Linear Integrated Circuits and Applications – Salivahana, TMH.
4. Modern Digital Electronics – RP Jain – 4/e – TMH, 2010.
5. Digital Design Principles and Practices – John. F. Wakerly 3/e, 2005.
6. Operational Amplifiers with Linear Integrated Circuits, 4/e William D.Stanley, Pearson Education India, 2009.

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III Year B.Tech. ECE I-Semester

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ANTENNAS AND WAVE PROPAGATION

UNIT -I:

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

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 and Large Loops (Qualitative Treatment).

UNIT -II:

VHF, UHF and Microwave Antennas - I : Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Practical Design Considerations for Monofilar Helical Antenna in Axial and Normal Modes, Horn Antennas – Types, Fermat's Principle, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

UNIT -III:

VHF, UHF and Microwave Antennas - II: Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics.

Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features, Illustrative Problems.

Lens Antennas – Introduction, Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications.

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, Pattern Measurement

Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods)

UNIT -V:

Wave Propagation – I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts, Ground Wave Propagation (Qualitative Treatment) – Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections. Space Wave Propagation – Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

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:

1. Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCES:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd Ed., 2005.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th Edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

III Year B.Tech. ECE I-Semester **L T P C**
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DIGITAL COMMUNICATIONS

UNIT I:

Elements of Digital Communication Systems: Model of Digital Communication Systems, Digital Representation of Analog Signal, Certain Issues in Digital Transmission, Advantages of Digital Communication Systems, Sampling Theorem, Types of Sampling – Impulse Sampling , Natural Sampling , Flat – Top Sampling. Introduction to Baseband Sampling.

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:

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, Signal Space Representation and Probability of Error, Eye Diagrams, Cross Talk.

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:

1. Principles of Communication Systems - Herbert Taub, Donald L Schiling, Goutam Saha, 3rd Edition, Mcgraw-Hill, 2008.
2. Digital and Analog Communication Systems – Sam Shanmugam, John Wiley, 2005.

REFERENCES:

1. Digital Communications – John G. Proakis , Masoud Salehi – 5th Edition, Mcgraw-Hill, 2008.
2. Digital Communication – Simon Haykin, Jon Wiley, 2005.
3. Digital Communications – Ian A. Glover, Peter M. Grant, 2nd Edition, Pearson Edu., 2008.
4. Communication Systems – B.P. Lathi, BS Publication, 2006.

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III Year B.Tech. ECE I-Semester

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OPEN ELECTIVE-I
GIS & REMOTE SENSING

UNIT – I

Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT - II

Remote Sensing – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III

Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons.

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OPEN ELECTIVE-I
NON CONVENTIONAL POWER GENERATION

UNIT - I

Fundamentals of Solar Energy-Solar spectrum- Solar Radiation on Earth's surface-Solar radiation geometry-Solar radiation measurements- Solar radiation data- Solar radiation on horizontal and tilted surfaces. Solar Thermal conversion- Flat plate collectors- concentrated collectors- construction and thermal analysis- Solar applications- Solar ponds- Heliostat systems-water heater-air heater-solar still.

UNIT - II

Solar-Electric Power generation- Photovoltaic cells- Equivalent circuit- V-I Characteristics-Photovoltaic modules – constructional details- design considerations- Tracking- Maximum power point tracking – algorithms - PV solar system design with energy back up- Solar Thermo electric conversion.

UNIT - III

Wind Energy- Fundamentals of wind energy-power available in wind- Betz Limit-Aerodynamics of wind turbine- Wind turbines- Horizontal and vertical axis turbines –their configurations- Wind Energy conversion systems.

UNIT - IV

Energy from Bio Mass- Various fuels- Sources-Conversion technologies-Wet Processes – Dry Processes- Bio Gas generation – Aerobic and anaerobic digestion-Factors affecting generation of bio gas –Classification of bio gas plants-Different Indian digesters- Digester design considerations- Gasification process-Gasifiers – Applications. Geothermal Energy-sources-Hydrothermal convective- Geo-pressure resources- Petro-thermal systems(HDR)-Magma Resources-Prime Movers.

UNIT - V

OTEC Systems- Principle of operation-Open and closed cycles, Energy from Tides- Principle of Tidal Power- Components of tidal Power plants-Operation Methods-Estimation of Energy in Single and double basin systems- Energy and Power from Waves-Wave energy conversion devices- Fuel Cells-Design and Principle of operation-Types of Fuel Cells-Advantages and disadvantages-Types of Electrodes- Applications-Basics of Batteries –Constructional details of Lead acid batteries- Ni-Cd Batteries.

TEXT BOOKS:

1. John Twidell & Wier, Renewable Energy Resouces, CRC Press, 2009.
2. G.D.Rai – Non Conventional Energy sources, Khanna publishers.

REFERENCES:

1. D.P .Kothari, Singal, Rakesh, Ranjan, Renewable Energy sources and Emerging Technologies, PHI, 2009.
2. F.C.Treble, Generating Electricity from Sun.
3. C.S.Solanki, Solar Photo voltaic- Fundamentals- Principles and Applications, PHI 2009
4. S.P.Sukhatme, Solar Energy Principles and Application - TMH

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OPEN ELECTIVE-I
OPERATIONS RESEARCH

UNIT – I

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

ALLOCATION: Linear Programming Problem - Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method; Duality Principle.

UNIT – II

TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem.

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

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

THEORY OF GAMES: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games –m x 2 & 2 x n games - graphical method – m x n games - dominance principle.

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

WAITING LINES: Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population.

DYNAMIC PROGRAMMING:

Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

TEXT BOOKS:

1. Operation Research /J.K.Sharma/MacMilan.
2. Introduction to O.R /Taha/PHI

REFERENCES:

1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspan and Lawrence Friedman
2. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
3. Operations Research / Wagner/ PHI Publications.
4. Introduction to O.R/Hillier & Libermann (TMH).

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OPEN ELECTIVE-I
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT I:
Block Schematics of Measuring Systems: Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag ;Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

.**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:
Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.
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.
Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure, Vacuum level, Temperature -Measurements, Data Acquisition Systems.

TEXT BOOKS:
1. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.

REFERENCES:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI 5th Edition 2003.
3. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
4. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

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OPEN ELECTIVE-I
OBJECT ORIENTED PROGRAMMING THROUGH JAVA

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, interthread 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.
Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCES:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, third edition, T. Budd, Pearson education.
3. Introduction to Java programming, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya,S.T.Selvi,X.Chu,TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
9. Maurach's Beginning Java2 JDK 5 , SPD.
10. Programming and Problem Solving with Java, JM Slack, B S Publications.

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OPEN ELECTIVE-I
DATA STRUCTURES & ANALYSIS OF ALGORITHMS

Objectives:

- To understand the basic concepts such as Abstract Data Types. Linear and Non Linear Data Structure.
- To understand the notations used to analyze the performance of algorithms
- To understand the behavior of data structures such as Trees, Graphs and their representation
- To choose the appropriate data structure for a specified application
- To analyze performance of algorithms
- To choose the appropriate data structure and algorithm design method for a specified application
- To understand how the choice of data structures and algorithms design methods impacts the performance of programs
- To solve problems using algorithms design methods such as the greedy method, divide and conquer, dynamic programming, Prerequisites Data structures, Mathematical foundations of computer science

Unit I:

C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deal location (new and delete), exception handling.

Function Over Loading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

Unit II:

Algorithms, performance analysis- time complexity and space complexity. Review of basic data structures- The list ADT, Stack ADT, Queue ADT, Implementation using template classes in C++.

Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching.

Unit III:

Trees: Definition, ADT, Trees Implementation Methods. Trees Traversal Methods

Graphs: Definition, ADT, Graphs Implementation Methods. Graphs Traversal Methods.

Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion.

Unit IV:

Algorithms: Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Stassen's matrix multiplication.

Unit V:

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt. Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

REFERENCES:

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education

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OPEN ELECTIVE-I
OPERATING SYSTEMS

Objectives:

- Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection) as fundamental principles by reference to real systems
- To give exposure to the professional responsibilities that are part of operating system design and development.
- To provide the student with the ability to write system oriented programs on Unix/Linux.

UNIT I:

Operating System Introduction, Structures - Simple Batch, Multi programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems , System components, Operating-System services, System Calls, Virtual Machines, System Design and Implementation.

UNIX/LINUX Utilities - Introduction to Unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, text processing utilities and backup utilities,

Working with Bash shell: what is a shell, shell responsibilities, pipes and input Redirection, output redirection, here documents, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT II:

Process and CPU Scheduling - Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Interposes Communication Scheduling Criteria, Scheduling Algorithm, Multiple -Processor Scheduling, Real-Time Scheduling.

System call interface for process management-fork, exit, wait, wait pid, exec,

Deadlocks - System Model, Dead locks Characterization, Methods for Handling Dead locks Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT – III:

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, fifos, message queues, shared memory, semaphores.

UNIT IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging. Demand Paging , Performance of Demanding Paging , Page Replacement ,Page Replacement Algorithm, Allocation of Frames, Thrashing.

UNIT V:

File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

Unix/LINUX Files: File structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, ioctl.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
3. Unix the ultimate guide, Sumitabha Das, TMH.
4. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCES:

1. Operating System A Design Approach-Crowley,TMH.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI
3. Operating Systems, Dhamdhere, TMH
4. Unix system programming using C++, T.Chan, PHI.
5. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
6. Unix Internals The New Frontiers, U.Vahalia, Pearson Education.
7. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education

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OPEN ELECTIVE-I
MATERIALS SCIENCE

UNIT – 1

Engineering materials. Mechanical properties. Structure-property relation. Grains and grain boundaries. Slip. Determination of grain size. Microstructure and strength. Crystal structure and ductility.

UNIT – 2

Constitution of alloys. Necessity of alloying. Types of solid solutions. Hume-Rothery rules. Intermediate alloy phases. Intermetallic compounds. Electron compounds.
Phase diagrams. Construction and interpretation. Isomorphous and eutectic systems. Cu-Ni and Pb-Sn phase diagrams. Lever rule. Phase rule.

UNIT - 3

The iron-carbon phase diagram. Polymorphism. Phases. Structure and properties of hypoeutectoid and hypereutectoid steels and cast irons (white cast iron, malleable cast iron, gray cast iron, nodular cast iron).

UNIT-4:

Heat treatment of steels. TTT diagrams. Annealing, normalizing, hardening, tempering. Effect of alloying elements on the Fe-C diagram and TTT diagram. Hardenability.
Heat treatment of nonferrous alloys. Precipitation hardening. Al-Cu phase diagram. Composite materials I. Particle-reinforced composites (Cu-Al2O3, WC-Co). Manufacturing techniques.

UNIT-5:

Ceramics. Crystalline ceramics. Classification: Clay products, Refractories, Abrasives. Applications. Glasses. Strain point, annealing point, softening point, working point, melting point.
Composite materials II. Fiber-reinforced composites. Role of fibre phase and matrix phase. Polymer-matrix, Metal-matrix, and transformation-toughened ceramic matrix composites. Processing and Applications.

TEXT BOOKS:

1. Materials Science and Engineering. An introduction, WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007
2. Metallurgy for Engineers – Clark and Varney
3. Elements of Materials Science – V Raghavan

REFERENCES:

1. Foundations of Materials Science and Engineering – WF Smith
2. C. Suryanarayana, Experimental Techniques in Mechanics and Materials, John Wiley, NJ, USA, 2006
3. Introduction to Physical Metallurgy, SH Avner, Tata McGraw-Hill edition, 1997

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OPEN ELECTIVE-I
NANOTECHNOLOGY

Unit 1: 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 2: Molecular Nanotechnology
Atoms by inference, Electron Microscopes, Scanning electron microscope, Modern transmission electron microscope, Scanning probe microscope-atomic force microscope, Scanning tunneling microscope, Self-Assembly.

Unit 3: Nano powders and Nanomaterials
What are nanomaterials? Preparation, Plasma arcing, chemical vapor deposition, Sol-gels, Electrodeposition, Ball milling, using natural nanoparticles, Applications of nanomaterials.

Unit 4: Nano electronics
Approaches to Nano electronics, Fabrication of integrated circuits, MEMS, NEMS, Nano circuits, Quantum wire, Quantum well, DNA-directed assembly and application in electronics.

Unit 5: Applications
MEMS, NEMS, Coatings, Optoelectronic Devices, Environmental Applications, Nano medicine.

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.
6. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,
   NANOTECHNOLOGY Basic Science and EmergingTechnologies by Michael Wilson, Kamali Kannangara Geoff Smith, Michelle Simmons, Burkhard Raguse- CHAPMAN & HALL/CRC PRESS 2002.

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OPEN ELECTIVE-I
ENGINEERING MANAGEMENT

Course objectives:

1. To sensitise and orient the future engineers about the challenges in managing engineering enterprises
2. To teach how to provide value through innovations, leadership in technology projects, and the application of emerging technologies through web-based tools

Unit-I

Introduction to Engineering Management - Management Challenges for Engineers – Planning –Organizing –Leading- Controlling-Value Engineering

Unit-II

Cost Accounting for Engineering Managers-Financial Accounting and Analysis for Engineering Managers- Managerial Finance for Engineering Managers

Unit-III

Project management – Total Quality Management –New product design – Production planning and control –Process planning – Maintenance Management – Marketing Management for Engineering Managers.

Unit-IV

Engineers as Managers/Leaders- Ethics in Engineering/Business Management. – Business Process Re-engineering-Ergonomics – Group Technology.

Unit-V

Advanced Manufacturing Technologies and systems -Web-Based Enablers for Engineering and Management- Globalization- Engineering Management In The New Millennium

TEXT BOOKS:

1. C M Chang, Engineering Management: Challenges in the New Millennium, Pearson, 2013.

REFERENCES:

1. Martand Telsang, Industrial Engineering and Production Management, S. Chand, 2nd Edition.
2. A.K. Gupta, Engineering Management, S.Chand, 2010.

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

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

Unit II Production & Cost Analysis: *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis***:** Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

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

Unit IV Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital Trading Forecast Capital Budget, Cost Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions Introduction IFRS Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis***:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

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

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.

2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Kasi Reddy Sraswathi, MEFA PHI Learning, 2012.
10. Shailaja & Usha : MEFA, University Press, 2012.

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LINEAR IC APPLICATIONS LAB

Note:

- To perform any twelve experiments (choosing at least five from each part).
- Verify the functionality of the IC in the given application.

Design and Implementation of:

1. Inverting and Non-inverting Amplifiers using Op Amps.
2. Adder and Subtractor using Op Amp.
3. Comparators using Op Amp.
4. Integrator Circuit using IC 741.
5. Differentiator circuit using Op Amp.
6. Active Filter Applications – LPF, HPF (first order)
7. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
8. Mono-stable Multivibrator using IC 555.
9. Astable Multivibrator using IC 555.
10. Schmitt Trigger Circuits – using IC 741.
11. IC 565 – PLL Applications.
12. Voltage Regulator using IC 723.
13. Three Terminal Voltage Regulators –7805, 7809, 7912.

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DIGITAL ELECTRONICS LAB

Note:

- To perform any twelve experiments (choosing at least five from each part).
- Verify the functionality of the IC in the given application.

Design and Implementation of:

1. Half Adder and Half Subtractor.
2. Full Adder and Full Subtractor
3. Two-bit Comparator
4. BCD to Gray coder converter and Gray to BCD converter
5. Verification of SR, JK, T, D flip flop truth tables
6. 8×1 Multiplexer and 2×4 Demultiplexer.
7. Four bit Shift register.
8. Three bit Ring and Twisted ring counters.
9. Asynchronous decade counter using JK flip flops.
10. UP/DOWN counter using 74163
11. Universal shift registers using 74194/195.
12. RAM (16*4) using 74189 (Read and Write operations).
13. Decimal to Octal Encoder.
14. 3 × 8 Decoder.

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DIGITAL COMMUNICATIONS LAB

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

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MICROPROCESSORS AND MICROCONTROLLERS

UNIT -I:

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, interrupts of 8086.

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:

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rd Ed.
3. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier, 2012

REFERENCES:

1. Microprocessors and Interfacing, D. V. Hall, TMGH, 2nd Edition 2006.
2. Introduction to Embedded Systems, Shibu K.V, TMH, 2009
3. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
4. ARM Reference Manuals
5. Digital Signal Processing and Applications with the OMAP-L138 Experimenter, Donald Reay,WILEY.

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DIGITAL SIGNAL PROCESSING

Unit I:

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, conversion of continuous to discrete signal, Normalized Frequency, Linear Shift Invariant Systems, Stability, and Causality, linear differential equation to difference equation, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

Realization of Digital Filters: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

Unit II:

Discrete Fourier series: Fourier Series, Fourier Transform, Laplace Transform, Z-Transform relation, DFS Representation of Periodic Sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N.

Unit III:

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

Unit IV:

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

Unit V:

Multirate Digital Signal Processing: Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Conversion of Band Pass Signals, Concept of Resampling, Applications of Multi Rate Signal Processing.

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

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.

2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCES:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. EIAli, CRC press, 2009.
5. Digital Signal Processing - A Practical approach, Emmanuel C. **Ifeachor** and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

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OPEN ELECTIVE-II
ESTIMATION, QUANTITY SURVEY & VALUATION

UNIT – I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating.

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 contigent charges.

UNIT-V

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation - Standard specifications for different items of building construction.

NOTE: NUMBER OF EXERCISES PROPOSED:

1. Three in flat Roof & one in Sloped Roof
2. Exercises on Data – three Nos.

TEXT BOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie

REFERENCES:

1. Standard Schedule of rates and standard data book by public works department.
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. Chakraborthi; Laxmi publications.

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OPEN ELECTIVE-II
ENERGY STORAGE SYSTEMS

Unit-1 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-2 Needs for Electrical Energy Storage

Emerging needs for EES, More renewable energy, less fossil fuel , Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

Unit-3 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-4 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-5 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:

1. ‘’Energy Storage Benefits and Market Analysis’’ by James M. Eyer, Joseph J. Iannucci and Garth P. Corey.
2. The Electrical Energy Storage by IEC Market Strategy Board.

REFERENCES:

1. Jim Eyer, Garth Corey: *Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide,* Report, Sandia National Laboratories, Feb 2010.

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OPEN ELECTIVE-II
MECHATRONICS

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.

SIGNAL CONDITIONING : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution, Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps –Software - Digital Signal Processing – Low pass , high pass , notch filtering

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 , resettable 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.

MICROCONTROLLERS OVERVIEW: 8051 Microcontroller, microprocessor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming –Assembly, C (LED Blinking, Voltage measurement using ADC).

UNIT – IV

PROGRAMMABLE LOGIC CONTROLLERS : Basic Structure - Programming : Ladder diagram -Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling -Analog input / output - PLC Selection - Application.

UNIT – V

PROGRAMMABLE MOTION CONTROLLERS : Introduction - System Transfer Function – Laplace transform and its application in analysing differential equation of a control system - Feedback Devices : Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors : Inductive , Capacitive , Infrared - Continuous and discrete processes - Control System Performance & tuning - Digital Controllers - P , PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal- S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear , Circular - Core functionalities – Home , Record position , GOTO Position - Applications : SPM, Robotics.

TEXT BOOKS:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCES:

1. “Designing Intelligent Machines”. Open University, London.
2. Michel B. Histand and David G. Alciatore,”
3. Introduction to Mechatronics and Measurement systems, “Tata MC Graw hill
4. I. C.W. Desi ha, “Control sensors and actuators,” Prentice Hall.
5. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
6. Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.
7. Mechatronics System Design / Devdas shetty/Richard/Thomson.

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OPEN ELECTIVE-II
PRINCIPLES OF COMMUNICATION SYSTEMS

Unit 1:
Introduction: Communication Systems and types, modulation and multiplexing, Electromagnetic spectrum, Gain, Attenuation and decibels.

Unit 2:
Simple description on Modulation: Analog Modulation-AM, FM, Pulse Modulation-PAM, PWM, PCM, Digital Modulation Techniques-ASK, FSK, PSK, QPSK modulation and demodulation schemes.

Unit 3:
Telecommunication Systems: Telephones Telephone system, Paging systems, 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.
Optical Communication: Optical Principles, Optical Communication Systems, Fiber –Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

Unit 5:
Multiple Access Techniques: FDMA, TDMA, CDMA, Packet Radio techniques-ALOHA, slotted ALOHA.
Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA, and WCDMA.
Wireless Technologies: Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.

TEXT BOOKS:
1. Principles of Electronic Communication Systems, Louis E. Frenzel, 3e, McGraw Hill publications, 2008.
2. Wayne Tomasi, Introduction to data communications and networking, Pearson Education, 2005.

REFERENCES:
1. Tarmo Anttalainen, Introduction to Telecommunications Network Engineering, Artech House Telecommunications Library.
2. Theodore Rappaport, Wireless Communications-Principles and practice, Printice Hall, 2002.

3. Roger L. Freeman, Fundamentals of Telecommunications, 2e, Wiley publications.
4. Kennady, Davis, Electronic Communications systems, 4e, TMH, 1999.

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OPEN ELECTIVE-II
E-COMMERCE

UNIT-I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT-II

Consumer Oriented Electronic commerce - Mercantile Process models, Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT-III

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks, Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT-IV

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT-V

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering, Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

TEXT BOOKS:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCES:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

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OPEN ELECTIVE-II
COMPUTER GRAPHICS

Objectives:
- To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
- To make the student present the content graphically.

Outcomes:
- Students can animate scenes entertainment.
- Will be able work in computer aided design for content presentation..
- Better analogy data with pictorial representation.

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, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill 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

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.
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-IV:
Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

UNIT-V:

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Text Books:

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

REFERENCES:

1. Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw hill edition.
3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

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OPEN ELECTIVE-II
DATABASE MANAGEMENT SYSTEMS

Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

UNIT I:

Data base System Applications: data base 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 applications Programs ,data base Users and Administrator ,Transaction Management, data base 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, Aggregative 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, Problem related to decomposition, reasoning about FDS,FIRST, SECOND, THIRD Normal forms ,BCNF, Lossless join Decomposition ,Dependency preserving Decomposition, Schema refinement in Data base Design ,Multi valued Dependencies , FORTH Normal Form, FIFTH Normal Form.

UNIT IV:

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions , Serializability, Recoverability ,Implementation of Isolation ,Testing

for serializability, Lock Based Protocols , Timestamp Based Protocols, Validation- Based Protocols ,Multiple Granularity.
Recovery and Atomicity ,Log–Based Recovery ,Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems.

UNIT V:
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures ,Hash Based Indexing ,Tree base Indexing ,Comparison of File Organizations ,Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:
1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:
1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
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.
6. Fundamentals of Database Management Systems, M.L.Gillenson, Wiley Student Edition.

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OPEN ELECTIVE-II
NANOMATERIALS

Unit – 1

Introduction

What is Nano – Why Nano – Properties at Nano Scales, Advantages & Disadvantages, Applications in comparison with bulk materials (Nanostructure, nanowires, nanotubes, nanocomposites)

Nano Particles

Introduction – Synthesis procedures – wet chemical approach & physical vapor synthesis approach – size effect & shape change and their properties – examples of systems involved – characterization techniques – properties & their applications

Unit – II

Nano Wires

Introduction – various synthesis procedures (template assisted method, VLS method and other synthesis methods) – properties of nanowires – characterization procedures & principles involved. Applications of Nanowires.

Nanotubes

Introduction – Different systems involved in nanotubes – single walled, multi-walled, Carbon based, metal incorporated tubes. Synthesis procedures (Solid & gaseous carbon source based production techniques) Growth mechanism of carbon nanotubes – properties of carbon nanotubes – characterization – applications.

Unit – III

Nano Composites

Introduction, Synthesis procedures, various systems (metal-polymer, metal-ceramics and polymer-Ceramics). Characterization – procedures – Applications.

Unit – IV

Micro/Nano Fabrication Techniques

Introduction, Basic fabrication techniques (lithography, thin film deposition and doping) MEMS fabrication techniques, Nano fabrication techniques (E-Beam nano-imprint fabrication, Epitaxy and strain engineering. Scanned probe techniques)

Unit – V

Materials of Nano Technology

Introduction – Si-based Materials - Ge-based materials - Ferro electric materials – Polymer materials - GaAs & InP (III – V) Group materials, Nano tribology and materials - characterization using Scanning Probe Microscope, AFM, FFM.

Nano Biomaterials

Introduction, Biocompatibility; anti-bacterial activity – principles involved – Applications.

TEXT BOOKS / REFERENCES:

1. Nano Materials: A. K. Bandyopadyay, New age Publications
2. Nano Essentials: T. Pradeep, TMH
3. Springer Handbook of Nanotechnology
4. The Guest for new materials Auther S. T. Lakshmi Kumar, Published by Vigyan Prasar.
5. Nano – The Essentials: C – Pradeep (IIcue Professor), McGraw Hill
6. Nano Materials Synthersis, Properties and applications, 1996, Edlstein and Cammarate

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OPEN ELECTIVE-II
INTELLECTUAL PROPERTY RIGHTS

Unit-I

Introduction to Intellectual property law Basics-types of Intellectual property-Agencies responsible for intellectual property registration, internal organisations, and treaties the increasing importance of intellectual property rights. Foundation of trade mark law purpose types and function of trade mark A acquisition of trademarks rights. Selecting and evaluating the application drawing mark a mark .preparing the application drawing of marks.

Unit-II

Interparty proceeding, infringement, and dilution, inter parties proceedings infringement of trademarks dilution of trademarks related trade mark claims. New development in trademark law the internet protecting a domain names hyper linking and the first amendment other cyberspace trade mark issues. Applications in the United States based on foreign applications and registration.

Unit-III

Foundations of copyright law common law right and right under the 1976 copyright Act the united states copyright office-the subject matter of copyright, originality of material fixation of material work of authorship exclusion from copyright protection case study and activity. The right afforded by copyright law right of reproduction right to prepare derivative works copyright ownership, transfer and duration.

Unit-IV

Introduction foundations of patent law rights under federal law United States patent and trademark office design patents plant patents double patenting the orphan drug Act. Patent ownership and transfer sole and joint inventor's disputes over inventor ship. New developments and international patent law

Unit-V

The *law of trade secrets unfair competition determination of trade secret status liability for misappropriation of trade secrets employer-employee relationships protection for submissions defences to trade secret misappropriation remedies for misappropriation trade secret litigation trade secret protection programs. Intellectual property audits and due diligence reviews.*

TEXT BOOKS:

1. Deborah E. Bo choux: *intellectual property*, Cengage learning, 2012.

REFERENCES:

1. P.Narayana: Intellectual property Law 3rd Edition. Eastern Law House 2001-2002.
2. Dr S.R.Myneni: law of intellectual property 2nd edition, Asian law house 2003

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OPEN ELECTIVE-II
ENTREPRENEURSHIP

Aim: The aim of this subject is to inspire students to become entrepreneurs so that they will emerge as job providers rather than job seekers.

Learning Outcome: By the end of this course the students should be able to understand the mindset of the entrepreneurs, identify ventures for launching, develop an idea on the legal framework and also understand strategic perspectives in entrepreneurship.

1. Understanding Entrepreneurial Mindset- The revolution impact of entrepreneurship- The evolution of entrepreneurship- Approaches to entrepreneurship- Process approach- Twenty first centaury trends in entrepreneurship.
   Case1: Ready, Aim, Fire Fire (B. Janakiram, M.Rizwana, page 212),
   Case2: Henry Ford, (B. Janakiram, M. Rizwana, page 214)
   Case 3: From candle seller to CEO (Arya Kumar P.No. 48)
2. The individual entrepreneurial mind-set and Personality- The entrepreneurial journey- Stress and the entrepreneur- the entrepreneurial ego- Entrepreneurial motivations. Corporate Entrepreneurial Mindset- the nature of corporate entrepreneur- conceptualization of corporate entrepreneurship Strategy-sustaining corporate entrepreneurship.
   Case: Globalizing Local Talent, (B. Janakiram, M. Rizwana, page 228).
3. Launching Entrepreneurial Ventures- opportunities identification- entrepreneurial Imagination and Creativity- the nature of the creativity process-Innovation and entrepreneurship. Methods to initiate Ventures- Creating new ventures-Acquiring an Established entrepreneurial venture- Franchising-hybrid- disadvantage of Franchising.
   Case 1: Water, Water everywhere: but not a drop to drink, (Richard Blundel, Page 48).
   Case 2: Critical Incident, Mark Robinson: Strategy Mapping Business (Richard Blundel, Page 48).
   Case 3: Pets.com (Arya Kumar P.No. 88)
   Case 4: creativity in start-ups (Arya Kumar P.No. 166)
   Case 5: Opportunity – Earthmoving Industry (Arya Kumar P.No. 211)
4. Legal challenges of Entrepreneurship-Intellectual property protection-Patents, Copyrights-Trademarks and Trade secrets-Avoiding trademark pitfalls. Formulation of the entrepreneurial Plan- The challenges of new venture start-ups, Poor financial Understanding-Critical factors for new venture development-The Evaluation process-Feasibility criteria approach.
   Case 1: Victoria, Tomlinson; Network. (Richard Blundel, Page 99).
   Case 2: Tim Lockett, Knowing your Customers & Suppliers (Richard Blundel Page128).
   Case 3: Google (Arya Kumar P.No. 248)
   Case 4: Tata Motors – Nano (Arya Kumar P.No. 279)

5. Strategic perspectives in entrepreneurship- Strategic planning-Strategic actions- strategic positioning-Business stabilization- Building the adaptive firms-Understanding the growth stage-Unique managerial concern of growing ventures.
   Case 1: To Lease or Not: A Cash flow Question (David H.Holt, Page 452).
   Case 2:- Public Sector - address seed capital (David H.Holt, Page 453).

TEXT BOOKS:

1. D F Kuratko and T V Rao "Entrepreneurship- A South-Asian Perspective "Cengage Learning, 2012.

Cases:

1. Arya Kumar "**Entrepreneurship- creating and leading an entrepreneurial organization" Pearson 2012.**
2. Richard Blundel, Exploring Entrepreneurship Practices and Perspectives, Oxford, 2011.
3. David H Holt, Entrepreneurship: New Venture Creation" PHI, 2013.

JOURNAL:

1. **The Journal of Entrepreneurship,** Entrepreneurship Development Institute of India, Ahmedabad,
2. **Journal of Human Values**: IIM Calcutta.

REFERENCES:

1. Vasant Desai "Small Scale industries and entrepreneurship" Himalaya publishing 2012.
2. Rajeev Roy "Entrepreneurship" 2e, Oxford, 2012.
3. B.Janakiram and M.Rizwana" Entrepreneurship Development: Text & Cases, Excel Books, 2011.
4. Robert Hisrich et al "Entrepreneurship" 6th e, TMH, 2012.

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

III Year B.Tech. ECE II-Semester

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ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(DE-I)

UNIT I:

Block Schematics of Measuring Systems: Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag ;Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

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:

Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

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.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure, Vacuum level, Temperature -Measurements, Data Acquisition Systems.

TEXT BOOKS:

1. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.

REFERENCES:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI 5th Edition 2003.
3. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
4. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

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TELEVISION ENGINEERING
(DE - I)

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:

1. Television and Video Engineering- A.M.Dhake, 2nd Edition.
2. Modern Television Practice – Principles, Technology and Service- R.R.Gallatin, New Age International Publication, 2002.
3. Monochrome and Colour TV- R.R. Gulati, New Age International Publication, 2002.

REFERENCES:

1. Colour Television Theory and Practice-S.P.Bali, TMH, 1994.
2. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

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III Year B.Tech. ECE II-Semester

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ARTIFICIAL NEURAL NETWORKS
(DE - I)

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

Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

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

Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

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 Patter 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:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

REFERENCES:

1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Inteligance, Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

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III Year B.Tech. ECE II-Semester

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TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS (DE - II)

UNIT-I:

Switching Systems: Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Digital Switching Systems.

Telecommunications Traffic: Introduction; The Unit of Traffic; Congestion; Traffic Measurement; A Mathematical Model; Lost-Call Systems-Theory; Traffic Performance; Loss Systems in Tandem; Use of Traffic Tables; Queuing Systems-The Second Erlang Distribution; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

UNIT-II:

Switching Networks: Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four Stage Networks

Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching.

Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control; Reliability; Availability and Security; Stored Program Control.

UNIT-III:

Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems-Outband Signaling; Inband (VF) Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCITT Signaling System Number 6; CCITT Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT-IV:

Packet Switching: Introduction; Statistical Multiplexing; Local Area And Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT-V:

Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent Networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

TEXT BOOKS:

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

REFERENCES:

1. John C Bellamy, "Digital Telephony," John Wiley International Student Edition, 3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi," Introduction to Data Communication and Networking," Pearson Education, 1st Edition, 2007.

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III Year B.Tech. ECE II-Semester

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POWER ELECTRONICS

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

UNIT – I: POWER SEMI CONDUCTOR DEVICES AND COMMUTATION CIRCUITS

Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics and other thyristors – Basic theory of operation of SCR – Static characteristics – Turn on and Turn off methods- Dynamic characteristics of SCR - Turn on and Turn off times -Salient points.

Two transistor analogy of SCR – R,RC,UJT firing circuits– Series and parallel connections of SCR's – Snubber circuit details – Specifications and Ratings of SCR's, BJT, IGBT - Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT – II: SINGLE PHASE HALF WAVE CONTROLLED CONVERTERS

Phase control technique – Single phase Line commutated converters – Half wave controlled converters with Resistive, RL load and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Freewheeling Diode –Numerical problems

SINGLE PHASE FULLY CONTROLLED CONVERTERS:

Fully controlled converters, Midpoint and Bridge connections with Resistive, RL loads and RLE load– Derivation of average load voltage and current – Line commutated inverters , semi-converters, active and Reactive power inputs to the converters , Effect of source inductance – Expressions of load voltage and current – Numerical problems.

THREE PHASE LINE COMMUTATED CONVERTERS:

Three phase converters – Three pulse and six pulse converters and bridge connections with R, RL load voltage and current with R and RL load and RLE loads – Semi Converters, Effect of Source inductance–Dual converters Waveforms –Numerical Problems.

UNIT – III: AC VOLTAGE CONTROLLERS

AC voltage controllers – Single phase two SCR's in anti-parallel with R and RL loads , modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor- wave forms , Numerical problems.

UNIT – IV: CHOPPERS

Choppers – Time ratio control and Current limit control strategies – Step down choppers- Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression.

Morgan's chopper – Jones chopper - Oscillation choppers (Principle of operation only) - waveforms — AC Chopper – Problems.

UNIT – V: INVERTERS

Inverters – Single phase inverter – Basic series inverter, parallel Capacitor inverter, bridge inverter – Waveforms,. Simple bridge inverters – Modified Mc Murray and Mc Murray – Bedford inverters, Voltage control techniques for inverters- Pulse width modulation techniques – Numerical problems.

TEXT BOOKS:

1. P.S.Bhimbra, "Power Electronics ", Khanna publications.
2. M. D. Singh & K. B. Kanchandhani, Power Electronics, Tata Mc Graw – Hill Publishing Company, 1998.
3. M. H. Rashid, Power Electronics : Circuits, Devices and Applications,– Prentice Hall of India, 2nd edition, 1998

REFERENCES:

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

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III Year B.Tech. ECE II-Semester

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DIGITAL SYSTEMS DESIGN
(DE - II)

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.

Fundamental mode model – Flow table – State reduction – Minimal closed covers – Races, Cycles and Hazards.

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.

Fault diagnosis of combinational circuits by conventional methods – Path sensitization techniques, Boolean Difference method – Kohavi algorithm – Test algorithms – D algorithm, PODEM, Random testing, Transition count testing, Signature analysis and test bridging faults.

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:

1. Digital Circuits and Logic Design – Samuel C. Lee , PHI
2. Digital Systems Testing and Testable Design – Miron Abramovici, Melvin A. Breuer and Arthur D. Friedman- John Wiley & Sons Inc.
3. Digital Design – Morris Mano, M.D.Ciletti, 4th Edition, PHI

REFERENCES:

1. Switching and Finite Automata Theory – Z. Kohavi , 2nd ed., 2001, TMH.
2. Logic Design Theory – N. N. Biswas, PHI
3. Fundamentals of Logic Design – Charles H. Roth, 5th ed., Cengage Learning

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III Year B.Tech. ECE II-Semester

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ADVANCED ENGLISH LANGUAGE 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.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

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
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. Prescribed Lab Manual: A book titled ***A Course Book of Advanced Communication Skills (ACS) Lab*** published by Universities Press, Hyderabad.

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:

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

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.***

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III Year B.Tech. ECE II-Sem

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DIGITAL SIGNAL PROCESSING LAB

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
2. Histogram of White Gaussian Noise and Uniformly Distributed Noise.
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.

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III Year B.Tech. ECE II-Semester

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MICROPROCESSORS AND MICROCONTROLLERS LAB.

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:

1. Advanced Microprocessors And Peripherals by A K Ray, Tata McGraw-Hill Education, 2006
2. The 8051 ***Microcontrollers***: Architecture, Programming & Applications by Dr. K. Uma Rao,

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III Year B.Tech. ECE II-Semester

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DISASTER MANAGEMENT

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:

1. Alexander, D. Natural Disasters, ULC press Ltd, London, 1993.
2. Carter, W.N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok, 1991.
3. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.

REFERENCES:

1. Abarquez I. & Murshed Z. Community Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
3. Goswami, S.C Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.
4. Chakrabarty, U.K. Industrial Disaster Management and Emergency Response, Asian Book Pvt. Ltd., New Delhi 2007.
5. Disaster Management in India, Ministry of Home Affairs, Government of India, New Delhi, 2011.
6. National Policy on Disaster Management, NDMA, New Delhi, 2009
7. Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.
8. District Disaster Management Plan-Model Template, NIDM, New Delhi, 2005.
9. Disaster Management, Future challenge and opportunities, Edited by Jagbir singh, I.K. International publishing home Pvt, Ltd.

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IV Year B.Tech./M. Tech.- ECE I-Semester	**L**	**T**	**P**	**C**
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VLSI TECHNOLOGY & DESIGN
(PGC)

UNIT I:

Review of Microelectronics and Introduction to MOS Technologies: MOS, CMOS, BiCMOS Technology, Trends and Projections.

Basic Electrical Properties of MOS, CMOS & BiCMOS Circuits: I_{ds}-V_{ds} relationships, Threshold Voltage V_T, G_m, G_{ds} and ω_o, Pass Transistor, MOS, CMOS & Bi CMOS Inverters, Z_{pu}/Z_{pd}, 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 & Architecture Design: Floor Planning Methods, Off-chip Connections, High-level Synthesis, Architecture for Low Power, SOCs and Embedded CPUs, Architecture Testing.

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems, K. Eshraghian Eshraghian. D. A. Pucknell, 2005, PHI.
2. Modern VLSI Design - Wayne Wolf, 3rd Ed., 1997, Pearson Education.

REFERENCES:

1. Principals of CMOS VLSI Design – N.H.E Weste, K.Eshraghian, 2nd Ed., Adisson Wesley.

JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

IV Year B.Tech./M. Tech. ECE - I Sem	**L**	**T**	**P**	**C**
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TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(PGE - I)

UNIT-I:
Switching Systems: Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Digital Switching Systems.
Telecommunications Traffic: Introduction; The Unit of Traffic; Congestion; Traffic Measurement; A Mathematical Model; Lost-Call Systems-Theory; Traffic Performance; Loss Systems in Tandem; Use of Traffic Tables; Queuing Systems-The Second Erlang Distribution; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

UNIT-II:
Switching Networks: Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four Stage Networks
Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching.
Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control; Reliability; Availability and Security; Stored Program Control.

UNIT-III:
Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems-Outband Signaling; Inband (VF) Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCITT Signaling System Number 6; CCITT Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT-IV:
Packet Switching: Introduction; Statistical Multiplexing; Local Area And Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT-V:
Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent Networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

TEXT BOOKS:

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

REFERENCES:

1. John C Bellamy, "Digital Telephony," John Wiley International Student Edition, 3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi," Introduction to Data Communication and Networking," Pearson Education, 1st Edition, 2007.

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IV Year B.Tech./M. Tech. ECE - I Sem	L	T	P	C
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NETWORK SECURITY AND CRYPTOGRAPHY
(PGE-I)

UNIT I:

Attacks, Services and Mechanisms: Security Attacks, Security Services, A Model For Internet Work Security, Classical Techniques: Conventional Encryption Model, Steganography, Classical Encryption Techniques.

Modern Techniques:

Simplified DES, Block Cipher Principles, Data Encryption Standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of Operations

UNIT II:

Algorithms:

Triple DES, International Data Encryption Algorithm, Blowfish, RC5, CAST-128, RC2, Characteristics of Advanced Symmetric Block Ciphers

Conventional Encryption:

Placement of Encryption function, Traffic Confidentiality, Key Distribution, Random Number Generation

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

Public Key Cryptography:

Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptography.

UNIT III:

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 Digests Algorithm, Secure Hash Algorithm, RIPEMD-160, HMAC

Digital Signatures and Authentication Protocols:

Digital Signatures, Authentication Protocols, Digital Signature Standards

UNIT IV:

Authentication Applications:

Kerberos, X.509 directory Authentication service

Electronic Mail Security: Pretty Good Privacy, S/MIME.

UNIT V:

IP Security:

Overview, Architecture, Authentication, Encapsulating Security Payload, Combining Security Associations, Key Management

Web Security:

Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction

Intruders, Viruses and Worms: Intruders, Viruses and Related Threats.

Fire Walls: Fire Wall Design Principles, Trusted Systems.

TEXT BOOKS:

1. Cryptography and Network Security: Principles and Practice - William Stallings, 2000, PE.

REFERENCES:

1. Principles of Network and Systems Administration, Mark Burgess, John Wiely

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IV Year B.Tech./M. Tech.ECE I-Semester	**L**	**T**	**P**	**C**
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WIRELESS COMMUNICATIONS AND NETWORKS
(PGE-I)

UNIT I:

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communications, Examples of Wireless Communication Systems, Paging Systems, Cordless Telephone Systems, Comparison of various Wireless Systems.

Modern Wireless Communication Systems: Second Generation Cellular Networks, Third Generation Wireless Networks, Wireless in Local Loop, Wireless Local Area Networks, Blue Tooth and Personal Area Networks.

UNIT II:

Cellular System Design Fundamentals: Spectrum Allocation, Basic Cellular System, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Trunking and Grade off Service, Improving Coverage and Capacity, Cell Splitting.

Multiple Access Techniques for Wireless Communication: Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum Multiple Access, Space Division Multiple Access, Packet Radio, Capacity of a Cellular Systems.

UNIT III:

Wireless Networking: Difference between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Fixed Network Transmission Hierarchy, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel Signaling.

UNIT IV:

Wireless WAN: Mechanism to Support a Mobile Environment, Communication in the Infrastructure, IS-95 CDMA Forward Channel, IS – 95 CDMA Reverse Channel, Packet and Frame Formats in IS – 95, IMT – 2000, Forward Channel in W-CDMA And CDMA 2000, Reverse Channels in W-CDMA And CDMA-2000, GPRS and Higher Data Rates.

Wireless LAN: Wireless Home Networking, IEEE 802.11. The PHY Layer, MAC Layer, HYPER LAN, HYPER LAN – 2.

UNIT V:

Orthogonal Frequency Division Multiplexing: Basic Principles of Orthogonality, Single versus Multi Channel Systems, OFDM Block Diagram and its Explanation, OFDM Signal Mathematical Representation.

TEXT BOOKS:

1. Theodore S. Rappaport, “Wireless Communications and Appliction”, Pearson Education - 2003.
2. Upen Dalal, “Wireless Communications”, Oxford University Press, 2010.

3. Kaveh Pahlavan, Prashant Krishnamoorthy, “Principles of Wireless Networks, - A United Approach”, Pearson Education, 2002.

REFERENCES:

1. P.Nicopolitidis, M.S.Obaidat, G.I. papadimitria, A.S. Pomportsis, “Wireless Networks”, John Wiley & Sons, 2003.
2. X.Wang and H.V.Poor, “Wireless Communication Systems”, Pearson education, 2004.
3. Dr.Sunil Kumar S. Manvi, Mahabaleshwar S. Kakkasageri, “Wireless and Mobile Networks: concepts and Protocols”, Wiley India, 2010.
4. Jon W. Mark and Weihua Zhqung,” Wireless Communication and Networking”, PHI, 2005.
5. Jochen Schiller, “Mobile Communications”, Pearson Education, 2nd Edition, 2003.

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IV Year B.Tech./M. Tech.ECE I-Semester	**L**	**T**	**P**	**C**
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AD HOC WIRELESS SENSOR NETWORKS
(PGE-I)

UNIT I:
Wireless LANS and PANS: Introduction, Fundamentals of WLANS, IEEE 802.11 Standard, HIPERLAN Standard, Bluetooth, Home RF.
Wireless Internet: Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web Over Wireless.

UNIT II:
AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet.
MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT III:
Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

Transport Layer and Security Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

UNIT IV:
Quality of Service: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks.

Energy Management: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT V:

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan Sarangapani, CRC Press

REFERENCES:

1. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh, 1st Ed. Pearson Education.
2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer

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IV Year B.Tech./M. Tech.ECE I-Semester	**L**	**T**	**P**	**C**
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DETECTION & ESTIMATION THEORY
(PGE-I)

UNIT I:

Introduction: Simple Binary Hypothesis Tests, M-Hypothesis, Estimation Theory, Composite Hypothesis, General Gaussian Problem, Performance Bounds and Approximations, Sampling of Bandlimited Random Signals, Periodic Random Processes, Spectral Decomposition, Vector Random Processes.

UNIT II:

Detection & Estimation: Detection & Estimation of Signals in White Gaussian Noise and Non-White Gaussian Noise, Signals with unwanted Parameters, Multiple Channels and Multiple Parameter, Linear & Non-Linear estimates, MLP & ML Estimates, Maximum Likelihood Estimate of Parameters of Linear Systems

UNIT III:

Minimum Probability Error Criterion: Neyman-Pearson Criterion for Radar Detection of Constant and Variable Amplitude Signals, Matched Filters, Optimum Formulation, Detection of Random Signals, Simple Problems there on with Multisample Cases.

UNIT IV:

Estimation of Continuous Waveforms: Derivation of Estimator Equations, A Lower Bound on the Mean Square Estimation Error, Multi Dimensional Waveform Estimation, Nonrandom Waveform Estimation.

UNIT V:

Estimation of Time Varying Signals: Kalman Filtering, Filtering Signals in Noise Treatment, Restricted to Two Variable Case only- Simple Problems, Realizable Linear Filters, Kalman Bucy Filters, Fundamental role of Optimum Linear Filters.

TEXT BOOKS:

1. Detection, Estimation and Modulation Theory: Part – I – Harry L. Van Trees, 2001, John Wiley & Sons, USA.
2. Signal Processing: Discrete Spectral Analysis – Detection & Estimation – Mischa Schwartz, Leonard Shaw, 1975, McGrawHill.

REFERENCES:

1. Fundamentals of Statistical Signal Processing: Volume I Estimation Theory– Steven.M.Kay, Prentice Hall, USA, 1998.
2. Fundamentals of Statistical Signal Processing: Volume I Detection Theory– Steven.M.Kay, Prentice Hall, USA, 1998.
3. Introduction to Statistical Signal Processing with Applications - Srinath, Rajasekaran, Viswanathan, 2003, PHI.

4. Statistical Signal Processing: Detection, Estimation and Time Series Analysis – Louis L.Scharf, 1991, Addison Wesley.
5. Random Signals: Detection, Estimation and Data Analysis – K.Sam Shanmugam, Arthur M Breiphol, 1998, John Wiley & Sons.

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IV Year B.Tech./M. Tech.ECE I-Semester	L	T	P	C
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TRANSFORM TECHNIQUES
(PGE-I)

UNIT I:

Review of Transforms: Signal Spaces, Concept of Convergence, Hilbert Spaces for Energy Signals, Fourier Basis, FT-Failure of FT-Need for Time-Frequency Analysis, Spectrogram Plot-Phase Space Plot in Time-Frequency Plane, Continuous FT, DTFT, Discrete Fourier Series and Transforms, Z-Transform, Relation Between CFT-DTFT, DTFT-DFS,DFS-DFT, DCT(1D&2D), Walsh, Hadamard, Haar, Slant, KLT,Hilbert Transforms – Definition, Properties and Applications

UNIT II:

CWT & MRA: Time-Frequency Limitations, Tiling of Time-Frequency Plane for STFT, Heisenberg Uncertainty Principle, Short Time Fourier Transform (STFT) Analysis, 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- Need for Scaling Function- Multi Resolution Analysis, Tiling of Time Scale Plane for CWT, Important Wavelets : Haar, Mexican Hat Meyer, Shannon, Daubechies.

UNIT III:

Multirate Systems, Filter Banks and DWT:

Basics of Decimation and Interpolation in Time & Frequency Domains, Two-Channel Filter Bank, Perfect Reconstruction Condition, Relation Ship between Filter Banks and Wavelet Basis, DWT Filter Banks for Daubechies Wavelet Function

UNIT IV:

Special Topics: Wavelet Packet Transform Multidimensional Wavelets, Bi-orthogonal Basis-B-splines, Lifting Scheme of Wavelet Generation, Multi Wavelets

UNIT V:

Applications of Transforms:

Signal Denoising, Subband Coding of Speech and Music, Signal Compression - Use of DCT, DWT,KLT, 2-D DWT, Fractal Signal Analysis.

TEXT BOOKS:

1. "Fundamentals of Wavelets- Theory, Algorithms and Applications", Jaideva C Goswami, Andrew K Chan, John Wiley & Sons, Inc, Singapore, 1999.
2. Wavelet Transforms-Introduction theory and applications-Raghuveer M.Rao and Ajit S. Bopardikar, Pearson edu, Asia, New Delhi, 2003.
3. "Insight into Wavelets from Theory to Practice", Soman. K. P. Ramachandran. K.I. Printice Hall India, First Edition, 2004.

REFERENCES:

1. "Wavelets and Sub-band Coding", Vetterli M. Kovacevic, PJI, 1995.

2. “Introduction to Wavelets and Wavelet Transforms”, C. Sydney Burrus, PHI, First Edition, 1997.
3. “A Wavelet Tour of Signal Processing”, Stephen G. Mallat,. Academic Press, Second Edition,
4. Digital Image Processing – Jayaraman – TMH,2009
5. Digital Image Processing – S.Jayaraman, S.Esakkirajan, T.Veera Kumar – TMH,2009

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IV Year B.Tech./M. Tech.ECE I-Semester	**L**	**T**	**P**	**C**
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TCP/IP INTERNETWORKING
(PGE-II)

UNIT I:

Network Models: Layered Tasks, The OSI Model, Layers in OSI Model, TCP/IP Protocol suite, Addressing.

Connecting devices: Passive Hubs, Repeaters, Active Hubs, Bridges, Two Layer Switches, Routers, Three Layer Switches, Gateway, Backbone Networks.

UNIT II:

Internetworking Concepts: Principles of Internetworking, Connectionless Interconnection, Application Level Interconnection, Network Level Interconnection, Properties of the Internet, Internet Architecture, Interconnection through IP Routers

TCP, UDP & IP: TCP Services, TCP Features, Segment, A TCP Connection, Flow Control, Error Control, Congestion Control, Process to Process Communication, User Datagram, Checksum, UDP Operation, IP Datagram, Fragmentation, Options, IP Addressing: Classful Addressing, IPV6.

UNIT III:

Congestion and Quality of Service: Data Traffic, Congestion, Congestion Control, Congestion Control in TCP, Congestion Control in Frame Relay, Source Based Congestion Avoidance, DEC Bit Scheme, Quality of Service, Techniques to Improve QOS: Scheduling, Traffic Shaping, Admission Control, Resource Reservation, Integrated Services and Differentiated Services.

UNIT IV:

Queue Management: Concepts of Buffer Management, Drop Tail, Drop Front, Random Drop, Passive Buffer Management Schemes, Drawbacks of PQM, Active Queue Management: Early Random Drop, RED Algorithm.

UNIT V:

Stream Control Transmission Protocol: SCTP Services, SCTP Features, Packet Format, Flow Control, Error Control, Congestion Control.

Mobile Network Layer: Entities and Terminology, IP Packet Delivery, Agents, Addressing, Agent Discovery, Registration, Tunneling and Encapsulating, Inefficiency in Mobile IP.

Mobile Transport Layer : Classical TCP Improvements, Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission, Timeout Freezing, Selective Retransmission, Transaction Oriented TCP.

TEXT BOOKS:

1. TCP/IP Protocol Suite: Behrouz A Forouzan, TMH, 3rd Edition
2. Data communication & Networking: B.A. Forouzan, TMH, 4th Edition.

REFERENCES:

1. High performance TCP/IP Networking -- Mahbub Hasan & Raj Jain PHI -2005
2. Internetworking with TCP/IP -- Douglas. E.Comer, Volume I PHI -
3. Computer Networks-Larry L. Perterson and Bruce S.Davie -
4. Mobile Communications , Jochen Schiiler, Pearson , Second Edition

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C++ PROGRAMMING
(PGE-II)

UNIT I:
Overview of C: Basic structure of C language, operators, control statements, arrays, structures, pointers, functions, operations on files
Basics of object oriented programming: Introduction to OOP, differences between OOP and procedure oriented programming concepts of OOP

UNIT II:
Fundamentals of C++: Structure of a C++ program, data types, declarations, expressions, operator precedence, program flow controls, functions, scope of variables, default arguments, dynamic allocations, NEW and DELETE operators
Data Abstraction: Class definition, controlling access to other functions, different types of constructors and destructors

UNIT III:
Polymorphism: Overloading functions and Operators

UNIT IV:
Inheritance: Types of inheritance, C++ syntax, runtime polymorphism and virtual functions, virtual base class, dynamic binding
C++ I/O: Stream I/O in C++, I/O manipulators, formatted I/O, File I/O

UNIT V:
Generic Classes in C++: Necessity of templates, generic classes using Macros, class templates, function templates, Exception handling in C++, Benefits of Exception handling, Troubles with standard C functions (set jump & long jump), Exception handling mechanism in C++

TEXT BOOKS:
1. C++ Programming Language by Bjarne Stroustrup (Addoson Wesley)

REFERENCES:
1. C++: How to program? By Deitel and Dietel, Pearson Education Asia- 3rd Ed
2. Starting with C++, Tony Gaddis, IDG Publications

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IV Year B.Tech./M. Tech.ECE I-Semester

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BIOMEDICAL SIGNAL PROCESSING
(PGE-II)

UNIT I:

Discrete and Continuous Random Variables: Probability Distribution and Density Functions, Gaussian and Rayleigh, Density Functions, Correlation between Random Variables.

Stationary Random Process, Ergodicity, Power Spectral Density and Autocorrelation Function of Random Processes, Noise Power Spectral Density Analysis, Noise Bandwidth, 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, DCT and the KL Transform

UNIT III:

Cardiological Signal Processing: Pre-processing, QRS Detection Methods, Rhythm Analysis, Arrhythmia Detection Algorithms, Automated ECG Analysis, ECG Pattern Recognition, Heart Rate Variability Analysis

Adaptive Noise Cancelling: Principles of Adaptive Noise Cancelling, Adaptive Noise Cancelling with the LMS Adaptation Algorithm, Noise Cancelling Method to Enhance ECG Monitoring, Fetal ECG Monitoring

UNIT IV:

Signal Averaging, Polishing – Mean and Trend Removal, Prony's Method, Prony's Method Based on the Least Squares Estimate, Linear Prediction, Yule – Walker (Y –W) Equations, Analysis of Evoked Potentials.

UNIT V:

Neurological Signal Processing: Modeling of EEG Signals, Detection of Spikes and Spindles, Detection of Alpha, Beta and Gamma Waves, Auto Regressive(A.R.) Modeling of Seizure EEG, Sleep Stage Analysis, Inverse Filtering, Least Squares and Polynomial Modeling

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles – Peyton Z. Peebles, 4th Ed., 2009, TMH.
2. Biomedical Signal Processing- Principles and Techniques - D.C.Reddy, 2005, TMH.

REFERENCES:

1. Digital Bio signal Processing - Weitkunat R, 1991, Elsevier.
2. Biomedical Signal Processing - Akay M, IEEE Press.
3. Biomedical Signal Processing -Vol. I Time & Frequency Analysis - Cohen.A, 1986, CRC.

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SYSTEM ON CHIP ARCHITECTURE
(PGE-II)

UNIT I:

Introduction to Processor Design: Abstraction in Hardware Design, MUO a Simple Processor, Processor Design Trade Off, Design for Low Power Consumption

ARM Processor as System-On-Chip: Acorn RISC Machine – Architecture Inheritance – ARM Programming Model – ARM Development Tools – 3 and 5 Stage Pipeline ARM Organization – ARM Instruction Execution and Implementation – ARM Co-Processor Interface

UNIT II:

ARM Assembly Language Programming: ARM Instruction Types – Data Transfer, Data Processing and Control Flow Instructions – ARM Instruction Set – Co-Processor Instructions

Architectural Support for High Level Language: Data Types – Abstraction in Software Design – Expressions – Loops – Functions and Procedures – Conditional Statements – Use of Memory

UNIT III:

Memory Hierarchy: Memory Size and Speed – On-Chip Memory – Caches – Cache Design-An Example – Memory Management.

UNIT IV:

Architectural Support for System Development: Advanced Microcontroller Bus Architecture – ARM Memory Interface – ARM Reference Peripheral Specification – Hardware System Prototyping Tools – Armulator – Debug Architecture

UNIT V:

Architectural Support for Operating System: An Introduction to Operating Systems – ARM System Control Coprocessor – CP15 Protection Unit Registers – ARM Protection Unit – CP15 MMU Registers – ARM MMU Architecture – Synchronization – Context Switching Input and Output

TEXT BOOKS:

1. ARM System on Chip Architecture – Steve Furber – 2nd Ed., 2000, Addison Wesley Professional.
2. Design of System on a Chip: Devices and Components – Ricardo Reis, 1st Ed., 2004, Springer

REFERENCES:

1. Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology) – Jason Andrews – Newnes, BK and CDROM
2. System on Chip Verification – Methodologies and Techniques –Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

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ADVANCED DIGITAL SIGNAL PROCESSING
(PGE-II)

UNIT I:

Review of DFT, FFT, IIR Filters, FIR Filters,

Multirate 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, Applications of Multirate Signal Processing

UNIT II:

Non-Parametric Methods of Power Spectral Estimation: 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 of Power Spectrum Estimation: Autocorrelation & its Properties, Relation between Auto Correlation & Model Parameters, AR Models - Yule-Waker & Burg Methods, MA & ARMA Models for Power Spectrum Estimation.

UNIT IV:

Implementation of Digital Filters

Introduction to Filter Structures (IIR & FIR), Frequency Sampling Structures of FIR, Lattice Structures, Forward Prediction Error, Backward Prediction Error, Reflection Coefficients for Lattice Realization, Implementation of Lattice Structures for IIR Filters, Advantages of Lattice Structures.

UNIT V:

Finite Word Length Effects: Analysis of Finite Word Length Effects in Fixed-Point DSP Systems – Fixed, Floating Point Arithmetic – ADC Quantization Noise & Signal Quality – Finite Word Length Effect in IIR Digital Filters – Finite Word-Length Effects in FFT Algorithms.

TEXTBOOKS:

1. Digital Signal Processing: Principles, Algorithms & Applications - J.G.Proakis & D.G.Manolokis, 4th ed., PHI.
2. Discrete Time Signal Processing - Alan V Oppenheim & Ronald W Schaffer, PHI.
3. DSP – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W. Jervis, 2 ed., Pearson Education.

REFERENCES:

1. Modern Spectral Estimation : Theory & Application – S. M .Kay, 1988, PHI.
2. Multirate Systems and Filter Banks – P.P.Vaidyanathan – Pearson Education
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya, 2000,TMH

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SIGNAL PROCESSING LABORATORY
(PGC)

Note: All experiments may be simulated using MATLAB and to be verified theoretically.

1. Program to convert CD Data into DVD Data.
2. Generation of Dual Tone Multiple Frequency (DTMF) Signals
3. Plot the Periodogram of a Noisy Signal and Estimate PSD using Periodogram and Modified Periodogram Methods.
4. Estimation of Power Spectrum using Bartlett and Welch methods.
5. Estimation of power Spectrum using Blackman –Turey methods.
6. Verification of Autocorrelation Theorem
7. Parametric Methods (Yule-Walker and Burg) of Power Spectrum Estimation.
8. Estimation of Data Series using N^{th} Order Forward Predictor and Comparing to the Original Signal.
9. Design of LPC Filters using Levinson-Durbin Algorithm.
10. Computation of Reflection Coefficients using Schur Algorithms.
11. Program to perform Decomposition and Reconstructions of given Signal (Using different Wavelet Transform).

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Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Adaptiv signalbehandling

Adaptive Signal Processing

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2432
Educational level: Advanced level
Course level: A1N
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 6
Applies from: 2009-09-01
Approved: 2009-11-01
Replaces course syllabus approved: 2009-09-01

1 Course title and credit points
The course is titled Adaptive Signal Processing/Adaptiv signalbehandling and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by School of Engineering 2009-06-17. The course syllabus was revised by School of Engineering and applies from 2009-09-01. Dnr ING56-12-2009. This course replaces the Theory part of ET2415.

3 Objectives
The student will acquire the background to and knowledge of adaptive and optimal systems. The student will also acquire insights into and experiences of applied signal processing problems of which these systems form part.

4 Content
Central items of the course are:
Stochastic signals
Discrete stochastic processes, correlation, spectral density, cross spectrum, models for stochastic signals.
Optimal signal processing
Estimation, least square error, the normal equations, least square filter, prediction, inverted filtration.
Adaptive signal processing
Introduction of the adaptive concept, iterative solution, the adaptive LMS filter, stability, convergence. Applications such as noise reduction, signal improvement and echo extinction. Algorithms, variants of the LMS.
Laboratory work
Software based laboratory work.

5 Aims and learning outcomes
On completion of the course the student will be able to:
•design and implement the Wiener filter •recognize situations where adaptive systems may provide a good solution

6 Generic skills
The following generic skills are trained in the course:
- Capacity for applying knowledge in practice.
- Capacity for analysis and synthesis
- General knowledge in the subject area of the studies.

7 Learning and teaching
The teaching consists of lectures, exercises, home assignments, and laboratory work. The home assignments are compulsory and must be done individually. During arithmetical problems the exercise instructor illustrates how the theory that has been learnt should be applied on signal processing problems. In order to further explain the

theory and its applications there is a compulsory laboratory work. The laboratory work may be carried out individually or in groups.
The teaching language is English. The teaching language is English.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1005	Written examination[1]	6 ECTS	F/P/3/4/5
1015	Laboratory work + written assignment	1.5 ECTS	U/G

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5 .The examination is done through a written exam together with an account of the compulsory home assignments, and the laboratory work assignments.

Grading of the laboratory work assignments is done with the grades Pass or Fail, with the grade of Pass required for obtaining a final grade of the course. This final grade will be the same as the examination grade.
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
Required courses for admission to this course: ET1303 Signal Processing II and
MS1101 Mathematical Statistics

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Additional information
The course MS1102 Stochastic Processes is recommended as previous knowledge but does not constitute a formal requirement.

14 Course literature and other teaching material
Monson H. Hayes *Statistical Digital Signal Processing and Modeling*, Wiley 1996. ISBN 0-471-59431-8. Material from the department.
■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Avancerad filterdesign

Advanced Filterdesign

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2402
Educational level: Advanced level
Course level: A1N
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 17
Applies from: 2009-11-01
Approved: 2009-11-01
Replaces course syllabus approved: 2007-03-07

1 Course title and credit points
The course is titled Advanced Filterdesign/Avancerad filterdesign and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by The Board of the Department of Electrical Engineering 2007-03-07. The course syllabus was revised by The Board of the Department of Electrical Engineering and applies from 2009-11-01. The Department of Signal Processing is responsible for the realization of the course. Dnr TEK56-81/07.

3 Objectives
The course aims at giving the students deepened knowledge of digital filters, their characteristics and construction and also at giving meaning to the concept of optimal filter design. In particular, the least-square- and minimax criteria will be studied and compared. The purpose is to provide the students with an understanding of the mathematical formulation and its solution and also to provide knowledge and experience that is useful at the choice of filter type and optimization criterion.

4 Content
Central items of the course are:
• Characteristics of FIR filters:
• The four types of linear-phase FIR filters o Construction of linear-phase FIR filters: o least-square approximation
o the Chebyshev approximation o the Remes algorithm
o Linear programming
o Quadratic programming
• Minimum-phase and complex approximation
• Optimal amplitude Chebyshev design
o Minimum phase
o Complex least-square approximation o Complex Chebyshev approximation
• Construction of IIR filters o Butterworth,
o Chebyshev
o Inverted Chebyshev o Elliptic filters
• Construction of half-band filters
• Filter construction with spectral factorization
• Optimal windows
• Filter design with Cepstrum technique
• All-pass realization of IIR filters
• Simulated annealing
• Deterministic annealing

5 Aims and learning outcomes
On completion of the course the student will: •be able to understand and use the various filter construction methods for both FIR- and IIR filters •be able to understand and use the various optimization methods •know which optimization method and filter type to use for solving a problem

6 Generic skills
The following generic skills are trained in the course:
- Skill in analysis and synthesis
- Skill in applying knowledge in practice
- Solution of problems
- Academic writing

7 Learning and teaching
The course is a self-instruction course based mainly on a number of compulsory hand-in assignments. The hand-in assignments must be handed in individually by each participant and may consist of a theoretical problem and/or programming assignments. Upon request some introductory lectures/exercises/opportunities to ask questions may be given in order for the students to familiarize

themselves with the subject. The instruction is carried out entirely or partly in English.
The teaching language is partly, or fully, English

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1010	Assignment[1]	7.5 ECTS	F/P/3/4/5

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5 .The examination will take place through a written presentation of the compulsory hand-in assignments. The grade is based on the number of handed in and passed assignments. All programming code must be attached electronically. On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
For admission to the course the following courses are required: Signal Processing II ET1303 7,5 credit points.

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Additional information
Access to Matlab is required in order to take the course.

14 Course literature and other teaching material
Parks T.W. & Burrus C.S. (1987). *Digital Filter Design.* Wiley & Sons, Inc. ISBN 0-471-82896-3.
■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Tillämpad adaptiv signalbehandling

Applied Adaptive Signal Processing

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2433
Educational level: Advanced level
Course level: A1F
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 3
Applies from: 2009-08-31
Approved: 2009-11-01

1 Course title and credit points
The course is titled Applied Adaptive Signal Processing/Tillämpad adaptiv signalbehandling and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by School of Engineering 2009-06-17. The course syllabus was revised by The Board of the Department of Electrical Engineering and applies from 2009-08-31.
Dnr ING56-13-2009. The course replaces the project part of ET2415.

3 Objectives
This course is a continuation on theoretical knowledge that was acquired in the course Adaptive Signal Processing ET2432. The student will during this course enhance their knowledge, experience and the understanding of adaptive signal processing through applying their knowledge in a larger project.

4 Content
A major project is carried out at the department. The project may either consist of a software project with emphasis on algorithms or a more applied project with the use of signal processors. In all projects the student must apply some of the methods and algorithms that have been studied in the course Adaptive Signal Processing (ET2432)

5 Aims and learning outcomes
On completion of the course the student will be able to:
•recognize situations where adaptive systems may provide a good solution
•implement adaptive systems, both in the industry and in continued studies.
•independently implement a project, i.e. go from a
problem formulation to implementation

6 Generic skills
The following generic skills are trained in the course:
• Capacity for applying knowledge in practice.
• Academic writing.
• General knowledge in the subject area of the studies.

7 Learning and teaching
In order to further enhance their knowledge about Adaptive Signal Processing students will work independently in a large project where they will apply their earlier acquired knowledge of the methods and algorithms that have been studied in ET2432. The project has to be accounted for both via an oral presentation and by means of a written report. The laboratory work and the project may be carried out individually or in groups.

The teaching language is English. The teaching language is English.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1005	Written Project Assignment[1]	6 ECTS	U/G
1015	Oral Presentation	1.5 ECTS	U/G

1 Determines the final grade for the course, which will only be issued when all components have been approved. The course will be graded Fail (U) or Pass (G).

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
Required courses for admission to this course: -ET2432 Adaptive Signal Processing

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material
Monson H. Hayes *Statistical Digital Signal Processing and Modeling*, Wiley 1996. ISBN 0-471-59431-8. Material from the department.
■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Signalprocessorteknik

Digital Signal Processors

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET1304
Educational level: Basic level
Course level: G2F
Field of education: Technology
Subject group: Electrical Engineering
Subject area: Electrical Engineering
Version: 10
Applies from: 2007-03-07
Approved: 2009-11-01

1 Course title and credit points
The course is titled Digital Signal Processors/Signalprocessorteknik and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by The Board of the Department of Electrical Engineering 2007-03-07. The course syllabus was revised by The Board of the Department of Electrical Engineering and applies from 2007-03-07. The Department of Signal Processing is responsible for the realization of the course. Reg.no.TEK56-81/07.

3 Objectives
The objective of the course is that the student acquire both theoretical knowledge and practical skills regarding the use of digital signal processors (DSP) within various application areas. The student will learn how to develop and test different software constructions in a signal processor.

4 Content
Central items of the course are:
- How to develop and test different software constructions in a signal processor
- Integrated Development Environment (IDE) for signal processors
- Architecture
- Instruction set
- Input/output (A/D and D/A conversion)

5 Aims and learning outcomes
On completion of the course the student will:
- be able to develop and test different software constructions in a signal processor

6 Generic skills
The following generic skills are trained in the course:
- Skill in applying knowledge in practice
- Skill in team working

7 Learning and teaching
The teaching comprises lectures. The instruction consists of lectures, laboratory work, and one or several project assignments. These laboratory work / project assignments may be done individually or in a group.
The teaching language is partly, or fully, English

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade

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1010 Project[1]           7.5 ECTS    U/G
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1 Determines the final grade for the course, which will only be issued when all components have been approved. The course will be graded Fail (U) or Pass (G).The course is assessed with the grades Underkänd [Failed] or Godkänd [Passed]. For the grade Godkänd [Passed] it is required that the construction, the written documentation, and the oral presentation of the construction are passed. On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
For admission to the course the following courses are required: Signal Processing II, ET1303, 7,5 cp [hp] Digital- and Computer Technology, ETA029 7,5

cp [hp]Introduction to Programming in C++, DVA0397, 5 cp [hp] or Programming in C, DVA021 7,5 cp [hp]

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material
Material from the department.
■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Digital transmission och radiosystem

Digital Transmission and Radio Communications

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2434
Educational level: Advanced level
Course level: A1N
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 6
Applies from: 2012-01-16
Approved: 2011-12-20
Replaces course syllabus approved: 2007-05-04

1 Course title and credit points
The course is titled Digital Transmission and Radio Communications/Digital transmission och radiosystem and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department of Signal Processing 2009-06-17. The course syllabus was revised by School of Engineering and applies from 2012-01-16.
The course replaces ET1310. Reg.no: ING 560-0271-2011

3 Objectives
The student will acquire the theoretical conditions for the different partial systems that form part of digital communication systems. The student will further acquire knowledge of the different modulation methods and also how they are affected by different types of interferences. Furthermore, the spectral characteristics of signals and single channels will be dealt with. Fundamental limits on performance and channel capacity theory will also be acquired.

4 Content
Central items of the course are:
• Digital transmission and radio systems
• Digital communication
• The vector model and signal space
• White noise, error probability, receivers.
• Pulse amplitude modulation, effect of white noise and intersymbol interference, amplitude modulation, phase modulation, frequency modulation, multilevel modulation, coherent and non-coherent reception, channel fading, equalization.
• Channel capacity theory

5 Aims and learning outcomes
On completion of the course the student will: •understand the components of a digital communication system and their significance •understand the theory behind baseband and bandpass modulation techniques •understand the theoretical principles behind detection and error probability calculations •understand the fundament limits on performance in digital communication •understand frequency domain analysis and bandwidth effects on digital systems •understand frequency domain analysis

6 Generic skills
The following generic skills are trained in the course:
• General knowledge within the subject area of the studies

• Capacity for applying knowledge in practice
• Problem solving
• Capacity for analysis and synthesis

7 Learning and teaching
The teaching consists of lectures, laboratory work and assignments. The purpose of laboratory work and assignments is to further explain the theory and its applications. Thus, these are compulsory and form part of the course. These tasks should be solved independently.The teaching consists of lectures, laboratory work and assignments. The purpose of laboratory work and assignments is to further explain the theory and its applications. Thus, these are compulsory and form part of the course. These tasks should be solved independently. The teaching language is English.
The teaching language is English.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
0805	Exam[1]	5 ECTS	F/P/3/4/5
0815	Laboratory work + project assignment	2.5 ECTS	U/G

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5 .
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
Required courses for admission to this course:
• Signal Processing I ET1203 and Mathematical Statistics MS1101

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Additional information
The following courses are, furthermore, recommended:
• Mathematics second course MA1109

14 Course literature and other teaching material Main literature:
Simon Haykin (1988). *Digital Communications.* Wiley. ISBN 0-471-63775-0.
Laboratory experiment instructions.
Works of reference:
•Ahlin Lars, Zander Jens *Digital radiokommunikationssystem och metoder*Studentlitteratur, 1992 418 s ISBN 91-44-34551-8 (swedish)
•Ahlin,Lars & Zander,Jens *Principles of Wireless Communications*Studentlitteratur, 1998, 418 pages ISBN 91-44-00762-0
• Lee William C *Mobile Cellular Telecommunications Systems*Mc Graw-Hill, 1989 449 s ISBN 0-07-100790-3
•Proakis,John G. *Digital Communications*
McGraw-Hill, 1995, 928 pages ISBN 0-07-051726-6 •Marvin K. Simon et al.
*Digital Communications Techniques: Signal Design and Detection*Prentice Hall, 1995, 888 pages ISBN 0-13-200610-3
•Stephen G. Wilson *Digital Modulation and Coding*
Prentice Hall, 1996, 677 pages ISBN 0-13-210071-1
•Alberto Leon-Garcia *Probability and Random Processes for Electrical Engineering*, 2nd edition, Addison Wesely, 1994, 677 pages ISBN
0-201-50037-X ■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Experimentell modalanalys

Experimental Modal Analysis

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2544
Educational level: Advanced level
Course level: A1F
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 1
Applies from: 2013-04-30
Approved: 2013-04-30
Replaces course syllabus approved: 2012-02-14

1 Course title and credit points
The course is titled Experimental Modal Analysis/Experimentell modalanalys and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department for Electrical Engineering 2012-10-18. The course syllabus is approved by School of Engineering and applies from 2013-04-30.
Reg.no: BTH 4.1.1-0318-2013. The course replaces ET2528.

3 Objectives
The course shall provide knowledge and proficiency of fundamental methods and tools for characterization of mechanical structures, including experimental modal analysis and system simulation.

4 Content
· Single and multiple degrees of freedom systems
· The modal concept in analytical and matrix formulation
· Damping models
· Modal parameters and Frequency Response Function connection
· Practical aspects on Frequency Response Function measurements
· Modal parameter extraction
· Multiple references
· Structural modification, Substructure coupling
· Correlation with Finite Element Analysis

5 Aims and learning outcomes
On completion of the course the student will be able to:
•specify an experimental modal analysis on mechanical structures.
•perform experimental modal analysis on
mechanical structures, including selection and mounting of transducers, selection and mounting of an exciter, data acquisition and parameter extraction.
•perform simulations of mechanical systems using parameters from numerical models and/or experiments, for example concerning influence from applied loads and/or simple structural changes. •use modern software for structural mechanics, including modal parameter extraction, structural modification and correlation with Finite Element Analysis.

6 Generic skills
The following generic skills are trained in the course:
•Capacity for analysis and synthesis •Capacity for applying knowledge in practice •Problem solving

•Academic writing

7 Learning and teaching
The teaching consists of lectures and projectwork.In order to further explain the theory and it´s applications there is a compulsory project task. The project work is compulsory and must be carried in groups. A written report to account for the work forms part of the project task.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1310	Written exam[1]	3.5 ECTS	A-F
1320	Project	3 ECTS	G-U
1330	Assignment	1 ECTS	G-U

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Insufficient,

supplementation required, F Fail.The examination is done through a written exam together with a report of the compulsory project work assignments. For a final grade of the course, the grade of Pass is required for the project part. The final grade will be the same as the examination grade.
If grade FX are given, the student may after consultation with the course coordinator / examiner get an opportunity to within 6 weeks complement to grade E for the specific course element.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
Required cours for admission to this course: ET2529 Sound and Vibration Analysis, 7,5 credit points.

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Additional information
In addition to the prerequisites for the course it is recommended to haven the course Signal Processing II, ET1303 or the equivalent.
The course can also be included in the Mechanical Engineering field.

14 Course literature and other teaching material
Brandt, A. (2011) Noise and Vibration Analysis, Wiley ISBN 978-0-470-74644-8
■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Masterarbete i Elektroteknik med inriktning mot Signalbehandling

Master´s Thesis (120 credits) in Electrical Engineering with emphasis on Signal processing
30 ECTS credit points (30 högskolepoäng)

Course code: ET2524
Educational level: Advanced level
Course level: A2E
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 4
Applies from: 2012-01-16
Approved: 2011-12-20

1 Course title and credit points
The course is titled Master´s Thesis (120 credits) in Electrical Engineering with emphasis on Signal processing/Masterarbete i Elektroteknik med inriktning mot Signalbehandling and awards 30 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department for Electrical Engineering 2011-12-14. The course syllabus was revised by School of Engineering and applies from 2012-01-16.
Reg.no: ING-560-0254-2011

3 Objectives
Master´s Thesis is the culmination of several years of study in a major subject and shall show that the author has matured to a level such that it can provide a scientifically viable contributions to the field.
The course objective is for participants to further develop and demonstrate the knowledge and understanding and the skills needed to work independently and professionally in the main field.

4 Content
The course consists of Parts:
• Development of a research idea and planning of projects.
• Implementation of the project, summary of your project in a master's thesis.
• Presentation and defense of thesis and opposition on another thesis.

5 Aims and learning outcomes
On completion of the course the student will be able to:
•show an ability to critically and systematically identify scientific problems and to transform them into workable research data.
•show an ability to critically, independently and creatively identify, formulate and plan, and using appropriate methods, carry out an advanced independent work in a timely manner, thus contributing to the development of knowledge in technical work.
•demonstrate ability to methodological skills, critical thinking and rigorous analysis of an independent scientific work that is characterized by good preparation.
•show an ability to critically and systematically integrate theory and empirical data, analyze and deal with complex phenomena, issues and findings and present them in an instructive and worth reading means.
•show ability in both national and international contexts, orally and in writing, explain and discuss their conclusions and the knowledge and arguments behind them, in dialogue with different groups. •show the skills required to participate in research and development work or to work independently in other advanced activities in the field.
•show the ability to in a critical and constructive comment and oppose on another independent master's work and could make a major contribution in a seminar discussion.

In addition, the student of his sovereign master's work:
•show the ability to make judgments with regard to relevant scientific, social and ethical aspects, demonstrate an awareness of ethical aspects of research and development.
•show understanding of the law on research ethics and especially in the sections that are relevant to the area.
•show insight into the possibilities and limitations, its role in society and the responsibility for its use.
•identify weaknesses and strengths in their own and others must work.

6 Generic skills

7 Learning and teaching
Master Project normally carried out by students in groups of two (or individually in special cases, which are assessed by the course examiner). The student is responsible for independently supported by designated guide resource planning and implementing the various elements of the course. Teaching is normally in English.
Limitations in time for implementation:
- A student has three chances within a twelve month period in which to present a complete work in accordance with the scheduled presentations (reckoned from the date of first registration for the course). If the student fails to do so is rejected work and hence the course.
- If a student failing the course, the student can
re-register for the course once. That is, a student has two separate chances to complete the course, and allowed to change supervisor and topic (in the same course) in between.
- The student can request a total supervision during the first 18 months from the time students are first-time registered on the course after this time is the section not obligated to provide continued guidance.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1205	Project/Planning	2 ECTS	U/G
1215	Presentation/Defence	2 ECTS	U/G
1225	Opposition	1 ECTS	U/G
1235	Thesis[1]	25 ECTS	F/P/3/4/5

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5
.Grades is given by the examiner after consideration of recommendations from the supervisors for the work. In order to determine the grade for the course is the assessment criteria established by section. The final grade for the course is only after all required operations are completed.
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
For admission to the course requires a completion of a course in Researchmethodology 7.5 credits and that at least 52.5 credits (including 45 credits in the main field) is completed.

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area
Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material
Textbooks and other teaching materials to be used determined by the supervisor with regard to examensarbetsuppgiftens character
■

Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Flerdimensionell signalbehandling

Multidimensional Signal Processing

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2546
Educational level: Advanced level
Course level: A1N
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 3
Applies from: 2013-07-01
Approved: 2013-05-29
Replaces course syllabus approved: 2011-06-17

1 Course title and credit points
The course is titled Multidimensional Signal Processing/Flerdimensionell signalbehandling and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department for Electrical Engineering 2013-05-29. The course syllabus was revised by School of Engineering and applies from 2013-07-01.
Reg.no: BTH-4.1.1-0496-2013. Replaces ET2403.

3 Objectives
The course aims at making the student expand her/his knowledge within digital signal processing to multidimensional signals and systems, e.g. analysis and construction of multidimensional filters and spectral analysis of multidimensional signals. The applications in the course mainly deal with two-dimensional signal processing, i.e. image processing.

4 Content
Central items of the course are:
Signals, systems, Fourier- and Z-transform
• Two-dimensional signals and linear time-invariant systems
• The Fourier transform and the frequency
concept for two-dimensional signals, e.g. images
• The sampling theorem for two dimensions
• Two-dimensional Z-transform, convergence, pole surfaces and stability
• Two-dimensional difference equations, recursive countability and masks
• Two-dimensional DFT and FFT
• The discrete cosinus transform
Multidimensional digital filters
• FIR filters: zero-phase filter, the window method, the frequency sampling method, the frequency transformation method
• Optimal filter design
• IIR-filter: Design in spatial domain
• Design in frequency domain
• Implementation
• Stabilization
Spectral estimation
• Two-dimensional stochastic processes
• Correlation and spectral density
• The Wiener filter

• Methods for spectral estimation based on the Fourier transform
• High-definition methods, the Maximum Likelihood Method, the Maximum Entropy Method
• Autoregressive signal modeling

Image processing

• Bases for image processing
• Representation of color images
• Image enhancement: contrast amplification, histogrammodification, spatial noise reduction, high-pass filtration
• Homomorphic image processing
• Low-pass filtration
• Median filtration
• Edge detection
• Motion estimation
• Image reconstruction: Wiener filtration
• Spectral subtraction

5 Aims and learning outcomes

After completion of the course the student will: •be able to understand and apply the concept multidimensional signal processing.
•be able to understand and use relevant frequency transformations in various dimensions, e.g. the Z-transform, the Fourier transform.
•be able to design and use filters according to given specifications in various dimensions.
•be able to estimate effect spectra according to classical methods.
•have a basic understanding of digital processing of images, and be able to make use of ordinary linear and non-linear filter structures.

6 Generic skills

7 Learning and teaching

The teaching comprises lectures, laboratory work, project work and exercises. During the arithmetical exercises the theory is applied to signal processing problems.
In order to further explain the theory and its applications compulsory laboratory work assignments form part of the course. The laboratory work assignments are based on programming assignments where program packages for signal and image processing are used. The laboratory work assignments can be done individually or in a group. The project assignment consists of the student making an in-depth study of one of the image processing methods that are brought up in the course. The laboratory work assignments and the project assignment are compulsory and will be solved individually or in a group.
The teaching language is partly, or fully, English

8 Assessment and grading

Examination of the course

Code	Module	Credit	Grade
1310	Exam[1]	6 ECTS	A-F
1320	Laboration	1.5 ECTS	G-U

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Insufficient, supplementation required, F Fail.The examination will take place through a written examination and also through presentation of the compulsory laboratory work assignments and the project assignment. The project assignment is presented through an oral presentation. The final grade for the course requires a Pass in all components and final grade for the course is given by the score on the exam.
If grade FX are given, the student may after consultation with the course coordinator / examiner get an opportunity to within 6 weeks complement to grade E for the specific course element.

9 Course evaluation

The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites

For admission to the course the following course is required: Signal Processing II, ET1303 7,5 credit points

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material
Bose T. (2003). *Digital Signal and Image Processing.*
John Wiley and Sons. ISBN 0-471-45230-0. Referenslitteratur.
Lim J.S. (1990). *Two-Dimensional Signal and Image Processing.* Prentice-Hall. ISBN 0-13-934563-9. Referenslitteratur.
Schröder, H. & Blume, H. (2001). *One- and Multidimensional Signal Processing - Algorithms and Applications in Image Processing.* John Wiley and Sons. ISBN 0-471-80541-6. Referenslitteratur.
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Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Neurala nätverk

Neural Networks

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2404
Educational level: Advanced level
Course level: A1F
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 12
Applies from: 2007-03-07
Approved: 2009-11-01

1 Course title and credit points
The course is titled Neural Networks/Neurala nätverk and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by The Board of the Department of Electrical Engineering 2007-03-07. The course syllabus was revised by The Board of the Department of Electrical Engineering and applies from 2007-03-07. The Department of Signal Processing is responsible for the realization of the course. Reg.no.TEK56-81/07.

3 Objectives
The course builds on and enlarges the student's solid knowledge of digital filter design, both stationary- and adaptive filter design. The course aims at giving the student a background to and knowledge of the theory of artificial neural networks and also to give insights into and experience of its applications within signal processing. The student will be familiarized with how these are implemented in software and also gain insights into which contexts they are applicable in.

4 Content
Central items of the course are:
- Artificial learning
- Multilayer Perceptrons (MLP)
- Radial Basis Network
- Self-organization Network
- Feeback Networks
- Applications of neural networks
- Associative memories

5 Aims and learning outcomes
On completion of the course the student will:
- be able to understand and use various models of artificial learning (Supervised/un-supervised learning).
- be able to understand and use the model, and its characteristics, for the neuron and the perceptron.
- be able to understand and use the MLP as a tool in optimization problems.
- be able to both understand and use the theory behind Radial Basis/self-organization/feedback networks in different applications.

6 Generic skills
The following generic skills are trained in the course:
- Skill in analysis and synthesis
- Skill in applying the knowledge in practice

• Solution of problems
• Academic writing

7 Learning and teaching
The teaching comprises lectures. The instruction consists of lectures. Since the course is at an advanced level with a deep theoretical part the instruction is a combination of classical lectures and hand-in assignments. The hand-in assignments have several purposes, partly to increase the interaction with the student but also to practise and illustrate applications of the theoretical parts of the course. A hand-in assignment may consist of a theoretical problem or a programming assignment. The reporting of the hand-in assignments is done in writing. The instruction is carried out entirely or partly in English.
The teaching language is partly, or fully, English

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1010	Exam[1]	7.5 ECTS	F/P/3/4/5

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5 .The examination will take place through a written examination and also through presentation of the compulsory hand-in assignments. Grading of the hand-in assignments is done with the grades Godkänd [Passed] or Underkänd [Failed]. For a final grade of the course the grade Godkänd [Passed] is required for the hand-in assignments.
Upon request grades may also be given in accordance with the ECTS.
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
For admission to the course the following courses are required:
- Complex Analysis and Transforms, MAB014, 7,5 cp [hp]
- Adaptive Signal Processing, ETC004, 7,5 cp [hp]
- Stochastic Processes and Time Series, MSA002, 7,5 cp [hp]

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material
Rojas, R. & Feldman, J. (1996). *Neural Networks: A Systematic Introduction.* Springer Verlag. ISBN 3-540-60-505-3.
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Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Forskningsmetodik med inriktning mot ingenjörsvetenskap

Research Methodology with Emphasis on Engineering Science

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2501
Educational level: Advanced level
Course level: A1F
Field of education: Technology
Subject group: Other Technical subjects

Subject area: The course is not part of a main field of study at BTH.
Version: 2
Applies from: 2010-01-18
Approved: 2010-01-20

1 Course title and credit points
The course is titled Research Methodology with Emphasis on Engineering Science/Forskningsmetodik med inriktning mot ingenjörsvetenskap and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department for Electrical Engineering 2010-01-13. The course syllabus was revised by The Board of the Department of Electrical Engineering and applies from 2010-01-18.
ING56-70/2010

3 Objectives
The goal of the course is to give a fundamental introduction to modern approach to science, particularly to nature sciences and engineering. The course also gives an insight on history and philosophy of science and how the scientific methods could be applied in engineering. After the course the students should be able to carry on research projects and write a scientific report.

4 Content
PART 1: Theory, 2.5 ECTS credits
• History of science. A way from experience facts to experimentalism and bring up questions at issues as observations, experimental attempt, induction and deduction.
• Modern theory of science: falsificationism, Kuhn's paradigm, Lakato's research programmes, Feyerabend's anarchistic theory of science, subjective Bayesians, and new experimentalism.
• Principle of scientific methods.
• How to organise and write thesis/scientific report
• Legal and ethical aspects of research.
• Modern search tools for scientific sources.

PART 2: Project/Seminar, 5 ECTS credits
• Approaching research problem - a research question and hypothesis;
• Validation and verification of research hypothesis;
• Content of research report;
• Using journal and conference templates;
• Presenting and disputing of research results;
• Reviewing of the research reports.
• Project management – project plan, milestones and deliveries;
• Team work management;

5 Aims and learning outcomes

After the course the students should be able to:
• have understanding for fundamental concept and theory concerning modern paradigm in science, special in natural sciences and engineering;
• have a knowledge in scientific history and philosophy;
• apply scientific methods within engineering;
• write, present and dispute scientific papers and reports
• analyse, review and oppose scientific papers and reports;
• use search tools and sources to base the research on scientific content;
• cooperate within a project group and apply project management tools.

6 Generic skills
The following skills are practiced
• Scientific writing.
• Analysis and synthesis ability.
• Research competence.

7 Learning and teaching
The teaching comprises lectures, group assignments and seminars. The course is given in English when necessary. The teaching language is Swedish. However, the teaching could be carried out in English.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1005	Verbal and/or written exam[1]	2.5 ECTS	F/P /3/4/5
1015	Project	5 ECTS	U/G

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5
.Examinations can be done continuously during the course, by test at the end of the course or through a combination of these two forms. Examinations can be oral and/or written.
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
M.Sc. in Engineering

11 Field of education and subject area
The course is part of the field of education Technology and is not part of a main field of study at BTH.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material
Compulsory literature
Compendia (provided by the department) Reference literature
Chalmers, A. F.: What is this Thing Called Science? ISBN 0-87220-452-9.
Chalmers, A. F.: Vad är vetenskap egentligen? om väsen och status hos vetenskapen och dess metoder. ISBN-10: 9157804257
- Graziano, A.M., Raulin, M.L.: Research Methods. A Process on Inquiry. ISBN 0-205-51221-6
Wayne C Booth, Gregory G Colomb, Joseph M Williams: Craft of Research, ISBN 9780226065663 Wayne C Booth, Gregory G Colomb, Joseph M Williams: Forskning och skrivande : konsten att skriva enkelt och effektivt, ISBN 9789144032276
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Blekinge Institute of Technology
Department for Electrical Engineering

COURSE SYLLABUS

Ljud- och vibrationsanalys

Sound and Vibration Analysis

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: ET2529
Educational level: Advanced level
Course level: A1N
Field of education: Technology
Subject group: Electrical Engineering

Subject area: Electrical Engineering
Version: 1
Applies from: 2012-03-26
Approved: 2012-02-14
Replaces course syllabus approved: 2011-02-18

1 Course title and credit points
The course is titled Sound and Vibration Analysis/Ljud- och vibrationsanalys and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department for Electrical Engineering 2012-02-10. The course syllabus is approved by School of Engineering and applies from 2012-03-26.
Replaces ET2431
Reg.no: ING-560-0036-2012

3 Objectives
The course aims at giving the students basic knowledge of sound- and vibration measurements. The course also reflects how modern signal analysis is applied for the measuring of sound and vibrations. The student will be well prepared for sound- and vibration measuring within the industry as well as for continued studies in the subject.

4 Content
· Mechanical systems
· Transducers for noise and vibration analysis
· Frequency analysis
· Experimental frequency analysis
· Spectrum estimation using the FFT
· The FFT-analyzer
· Frequency response measurements
· Rotating machinery analysis

5 Aims and learning outcomes
On completion of the course the student will:
- be able to understand and use the basic theory for dynamic systems in mechanics.
- have acquired a basic understanding of modal analysis.
- be able to understand and analyze measurement-technical problems in sound- and vibration measuring.
- have knowledge of different measuring methods and sensors that are used for the measuring of sound and vibrations.
- be able to measure and interpret sound- and vibration spectra.
- be able to measure frequency responses and coherence functions.
- be able to use a frequency analyzer.
- have acquired a basic understanding of revolution-per-minute (RPM) analysis in order to understand and solve vibration- and noise problems in relation to rotating. machines

6 Generic skills
The following generic skills are trained in the course:

• Skill in analysis and synthesis
• Skill in applying the knowledge in practice
• Solution of problems
• Team working
• Academic writing

7 Learning and teaching
The teaching comprises lectures and project work. During the lectures the teacher introduces the theoretical foundations and connects the theory to practical applications in the industry. In the project work the student is able to practise the theoretically acquired knowledge and learn how to handle data acquisition systems and advanced measuring instruments for sound- and vibration measurements. The project work is compulsory and will be carried out individually or in a group. The project work includes the presentation of the work in the form of a report. In order for the student to practise theory, theoretical assignments are handed in. The assignments that are handed in are compulsory and must be done individually.
The teaching language is English.

8 Assessment and grading
Examination of the course

Code	Module	Credit	Grade
1205	Written exam[1]	3.5 ECTS	F/P/3/4/5
1215	Project	3 ECTS	U/G
1225	Assignment	1 ECTS	U/G

1 Determines the final grade for the course, which will only be issued when all components have been approved.
The course will be graded Fail, Pass, 3, 4 or 5 .1 Determines the final grade for the course which will not be issued until all items have been passed.
The examination will take place through a written examination and of the handing in of the compulsory assignments and of the project work assignments. At the grading of the examination one of the grades Underkänd [Failed], 3, 4 or 5 is used. Grading of the project work assignments will be done through the grades Godkänd [Passed] or Underkänd [Failed]. For a final grade of the course the grade Godkänd [Passed] is required for the project work part and also for the assignments that are to be handed in.
Upon request grades may also be given in accordance with the ECTS.
On request grades according to ECTS will be given.

9 Course evaluation
The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites
For admission to the course the following course is required:
- Signal Processing I, ET1203, 7,5 credit points or the equivalent.

11 Field of education and subject area
The course is part of the field of education Technology and is included in the subject area Electrical Engineering.

12 Restrictions regarding degree
The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Additional information
The course can also be linked to Mechanical Engineering.

14 Course literature and other teaching material
Brandt, A. (2011). *Noise and Vibration Analysis.* Wiley. ISBN 978-0-470-74644-8.
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