B. Tech ECE 20-20

Course Curriculum

and

Scheme of Examination

for

Bachelor of Technology

in

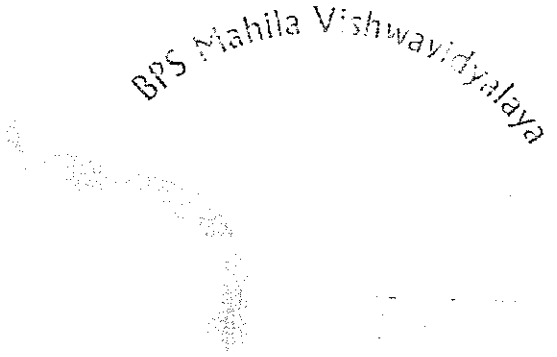
Electronics and Communication Engineering

(w.e.f academic session 2015-16)

Offered by

Department of Electronics and Communication Engineering

1st Semester to 8th Semester



Bhagat Phool Singh Mahila Vishwavidyalaya

Khanpur Kalan (Sonepat), Haryana-131305

www.bpswomenuniversity.ac.in

Department of Electronics and Communication Engineering
Bhagat Phool Singh Mahila Vishwavidyalaya,
Khanpur Kalan (Sonepat), Haryana-131305
Office No. 01263-283124, www.bpswomenuniversity.ac.in

Course Curriculum and Scheme of Examination
of
Bachelor of Technology
in
Electronics and Communication Engineering
(w.e.f academic session 2015-16)
First Semester

The Bachelor of Technology in Electronics and Communication is a four year full time programme. The course structure of the programme is given under:-

B.Tech Electronics and Communication Engineering 1st Year (ECE 1st Sem)									
S. No.	Code	Course Title	Hrs/Week			Total Credits	Marks		
			L	T	P		Internal Marks	External Marks	Total Marks
Theory Papers									
1.	ECL-100	Basic Electronics Engineering	3	1	-	4	20	80	100
2.	MAL-101	Mathematics-I	3	1	-	4	20	80	100
3.	CSL-100	Introduction to Computers & Programming in C	3	1	-	4	20	80	100
4.	HUL-100	Communication Skill in English	3	-	-	3	20	80	100
5.	PHL-100	Engineering Physics	3	1	-	4	20	80	100
Lab									
6.	ECP-100	Basic Electronics Lab	-	-	2	1	10	40	50
7.	CSP-100	Computer Programming Lab	-	-	2	1	10	40	50
8.	MEP-100	Workshop Practice	-	-	2	1	10	40	50
9.	HUP 100	English Language Communication Lab	-	-	2	1	10	40	50
10	PHP-100	Physics Lab	-	-	2	1	10	40	50
Total			15	4	10	24	150	600	750

Total Contact Hours = 29 Total Credits = 24

Note:

1. Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including cellular phones are not allowed in the examination.

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Second Semester
(w.e.f academic session 2015-16)

B.Tech Electronics and Communication Engineering 1st Year (ECE 2nd Sem)

S. No.	Code	Course Title	Hrs/Week			Total Credits	Marks		
			L	T	P		Internal Marks	External Marks	Total Marks
Theory Papers									
1.	EEL-100	Fundamentals of Electrical Engineering	3	1	-	4	20	80	100
2.	MAL-102	Mathematics-II	3	1	-	4	20	80	100
3.	CHL-100	Engineering Chemistry	3	1	-	4	20	80	100
4.	CSL-110	Information Science & Society	3	-	-	3	20	80	100
5.	MEL-100	Manufacturing Process	3	1	-	4	20	80	100
6	#HSL-100	Foreign Language (Non-Credit)	3	-	-	-	-	-	-
Lab									
7.	MEP-110	Engineering Graphics & Drawing	1	-	4	3	20	80	100
8.	CSP-110	Information Processing and Internet Lab	-	-	2	1	10	40	50
9.	EEP-100	Electrical Engineering Lab	-	-	2	1	10	40	50
10.	CHP-100	Chemistry Lab	-	-	2	1	10	40	50
Total			19	4	10	25	150	600	750

#Qualifying Paper
Total Contact Hours =33

Total Credits = 25

Note:

1. Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including cellular phones are not allowed in the examination.

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Third Semester
(w.e.f academic session 2015-16)

B.Tech Electronics and Communication Engineering 2nd Year (ECE 3rd Sem)										
S. No.	Code	Course Title	Hrs/Week			Total Credits	Marks		
			L	T	P		Internal Marks	External Marks	Total Marks
Theory Papers									
1	MAL-201	Mathematics-III	4	-	-	4	20	80	100
2	ECL-201	Electronics Devices & Circuit-I	3	-	-	3	20	80	100
3	ECL-203	Network Analysis & Synthesis	4	-	-	4	20	80	100
4	ECL-205	Digital Circuits & Systems	3	-	-	3	20	80	100
5	CSL-205	Data Structure & Algorithm	3	-	-	3	20	80	100
6	ECL-207	Signals and Systems	3	-		3	20	80	100
7	LLG-002	*Current Issues and Societal Development –II (Non-Credit)	3	1	-	-	-	-	-
Lab									
8	ECP-221	Digital Electronics Lab	-	-	2	1	10	40	50
9	ECP-223	Network Theory Lab	-	-	2	1	10	40	50
10	EEP-225	Electrical Workshop	-	-	2	1	10	40	50
11	ECP-227	Electronics Device & Circuit Lab-1	-	-	2	1	10	40	50
12	ECP-229	Programming with MATLAB	-	-	2	1	10	40	50
Total			23	1	10	25	170	680	850

Total Contact Hours =34

Total Credits = 25

* Qualifying Paper

Note:

1. Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including cellular phones are not allowed in the examination.

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Fourth Semester
(w.e.f academic session 2015-16)

B.Tech Electronics and Communication Engineering 2nd Year (ECE 4th Sem)									
S. No.	Code	Course Title	Hrs/Week			Total Credits	Marks		
			L	T	P		Internal Marks	External Marks	Total Marks
Theory Papers									
1.	HUL-202	Engineering Economics & Management	3	-	-	3	20	80	100
2.	MAL-202	Numerical Methods	3	-	-	3	20	80	100
3.	ECL-202	Electronics Devices & Circuit- II	4	-	-	4	20	80	100
4.	ECL-204	Electromagnetic Field Theory	4	-	-	4	20	80	100
5.	ECL-206	Linear Integrated Circuits	4	-	-	4	20	80	100
6.	ECL-208	Communication Systems	4	-	-	4	20	80	100
Lab									
7.	ECP-242	Linear Integrated Circuits Lab	-	-	2	1	10	40	50
8.	ECP-244	Electronics Devices & Circuit Lab-II	-	-	2	1	10	40	50
9.	ECP-246	Communication System Lab	-	-	2	1	10	40	50
10.	ECP-248	Electronics Circuit Simulation Lab	-	-	2	1	10	40	50
Total			22	-	8	26	160	640	800

Total Contact Hours =30 **Total Credits = 26**

Note:

1. Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including cellular phones are not allowed in the examination.
4. Each student has to undergo Professional Training (Industrial Practical Training-I) of at least 4 weeks from the industry/institute/research lab/training center/In-house electronics workshop/PCB making and assembling/use of CAD software etc. during summer vacation after fourth semester; however, viva-voce for evaluation of Industrial Practical Training-I will be conducted in fifth semester.

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Fifth Semester

(w.e.f academic session 2015-16)

B.Tech Electronics and Communication Engineering 3rd Year (ECE 5th Sem)

S. No.	Code	Course Title	Hrs/Week L	T	P	Total Credits	Marks Internal Marks	External Marks	Total Marks
Theory Papers									
1.	CSL-201	Computer Organization & Architecture	3	1	-	4	20	80	100
2.	ECL-303	Digital Communication	3	1	-	4	20	80	100
3.	ECL-305	Microprocessor & Interfacing	3	-	-	3	20	80	100
4.	ECL-307	Electronics Measurement & Instrumentation	3	-	-	3	20	80	100
5.	ECL-308	Digital System Design	3	-	-	3	20	80	100
6.	ECL-309	Antenna & Wave Propagation	3	1	-	4	20	80	100
Lab									
7.	ECP-325	Microprocessor & Interfacing Lab	-	-	2	1	10	40	50
8.	ECP-327	Communication Engg Lab-2	-	-	2	1	10	40	50
9.	ECP-329	Electronics Measurement & Instrumentation Lab	-	-	2	1	10	40	50
10.	IPT-325	Industrial Practical Training Seminar-I	-	-	-	2	100	-	100
11	ECP-331	Digital System Design Lab	-	-	2	1	10	40	50
12	ECP-333	Skill development workshop	-	-	2	1	50	-	50
Total			18	3	10	28	310	640	950

Total Contact Hours =30

Total Credits = 28

* Qualifying Paper

Note:

1. Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including cellular phones are not allowed in the examination.
4. Assessment of Industrial Practical Training-I, undergone at the end of IV Semester, will be based on seminar, viva-voce, report and certificate of the Professional Training obtained by the student from the industry, institute, research lab, training center etc. The evaluation of Industrial Practical Training Seminar-I will be conducted in this semester.

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Sixth Semester
(w.e.f academic session 2015-16)

B.Tech Electronics and Communication Engineering 3rd Year (ECE 6th Sem)							Marks		
S. No.	Code	Course Title	Hrs/Week			Total Credits	Internal	External	Total
			L	T	P				
Theory Papers									
1.	ECL-312	Design and Simulation Tools	3	1	-	4	20	80	100
2.	ECL-302	Microwave Engineering	3	1	-	4	20	80	100
3.	ECL-304	Digital Signal Processing	3	1	-	4	20	80	100
4.	ECL-306	Computer Network	3	-	-	3	20	80	100
5.	ECL-308	Control System	3	1	-	4	20	80	100
6.	ECL-310	VLSI Design	3	-	-	3	20	80	100
Lab									
7.	ECP-324	Digital Signal Processing Lab	-	-	2	1	10	40	50
8.	ECP-328	Microwave Lab	-	-	2	1	10	40	50
9.	ECP-326	VLSI Design Lab	-	-	2	1	10	40	50
10.	ECP-330	Simulation and Design Lab	-	-	2	1	10	40	50
Total			18	4	8	26	160	640	800

Total Contact Hours =30

Total Credits = 26

* Qualifying Paper

Note:

1. Minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3. Electronic gadgets including cellular phones are not allowed in the examination.
4. Each student has to undergo Professional Training (Industrial Practical Training-II) of at least 4 weeks from the industry/institute/research lab/training center/In-house electronics workshop/Design and Simulation tool etc. during summer vacation after sixth semester; however, viva-voce for evaluation of Industrial Practical Training-II shall be carried out in the VII Semester.

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Seventh Semester

(w.e.f academic session 2015-16)

B.Tech Electronics and Communication Engineering 4th Year (ECE 7th Sem)

S. No.	Code	Course Title	Hrs/Week			Total Credits	Marks		
			L	T	P		Internal Marks	External Marks	Total Marks
Theory Papers									
1.	ECL-403	Embedded System Design	4	-	-	4	20	80	100
2.	ECL-405	Wireless Mobile Communication	4	-	-	4	20	80	100
3.	ECL-407	Optical Communication System	4	-	-	4	20	80	100
4.		**Departmental Elective-I**	4	-	-	4	20	80	100
5.		**Open Elective-I**	4	-	-	4	20	80	100
6.	LLG-001	**Current Issues and Societal Development-1**	3	-	-	-	-	-	-
Lab									
6.	ECP-441	Advanced Communication Lab	-	-	2	1	10	40	50
7.	ECP-445	Data Networking Lab	-	-	2	1	10	40	50
8.	ECP-447	Embedded System Design Lab			2	1	10	40	50
9.	ECP-449	*Minor Project	-	2	4	4	20	80	100
10	IPT-451	#Industrial Practical Training Seminar II	-	-	-	4	100	-	100
Total			23	2	14	31	250	600	850

Total Contact Hours = 39, Total Credit = 33, Project load will be treated as 2 hours for project Coordinator and 1 hour for each participating teacher. Each batch of (max of 3) students shall design, develop and realize Minor Project. Student has to submit a project report in specified format at the stipulated time. The internal evaluation system consists of project coordinator and respective supervisor in departmental committee.

Note:

1. # Assessment of Industrial Practical Training-II, undergone at the end of VI Semester, will be based on seminar, viva-voce, report and certificate of the Professional Training obtained by the student from the industry, institute, research lab, training center etc. The viva-voce for evaluation of Industrial Practical Training Seminar-II will be conducted in this semester.
2. Departmental and Open Elective paper will be offered in 7th Semester, if atleast two third of the total students opt for the same. It is advised that decision about Elective subject for 7th Semester is done before the 15th April before end of 6th semester.
3. *The students will submit a synopsis at the beginning of the semester for approval from the departmental project committee in a specified format, thereafter she will have to present the progress of work through seminar and progress report.

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Eight Semester

B.Tech Electronics and Communication Engineering 4th Year (ECE 8th Sem)

S. No.	Code	Course Title	Hrs/Week			Total Credits	Marks		
			L	T	P		Internal Marks	External Marks	Total Marks
Theory Papers									
1.	ECL-404	Satellite Communication & Broadcasting	4	-	-	4	20	80	100
2.	ECL-440	Modeling and Simulation of Communication Systems	4	-	-	4	20	80	100
3.		**Departmental Elective-II**	4	-	-	4	20	80	100
4.		**Open Elective-II**	4	-	-	4	20	80	100
Lab									
5.	ECP-424	Satellite Communication Lab	-	-	2	1	10	40	50
6.	ECP-426	*Major Project	-	2	4	4	20	80	100
7.	ECP- 428	#Independent Study Seminar	2	-	-	2	100	-	100
8.	GFP-426	General Proficiency	-	-	-	3	-	100	100
Total			18	2	6	26	210	540	750

Total Contact Hours = 26, Total Credit = 26, Project coordinator will be assigned the project load of, maximum of 2 hours per week including his own guiding load of one hour. However, the guiding teacher will be assigned maximum of one hour of teaching load irrespective of number of students/groups under him/her.

(w.e.f academic session 2015-16)

Note:

1. Departmental and Open Elective-II paper will be floated in 8th Semester, if atleast two third of the total students opt for the same. It is advised that decision about elective subject for 7th Semester is done before the 15th November before end of 7th semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.
2. *The students will submit a synopsis at the beginning of the semester for approval from the departmental project committee in a specified format, thereafter she will have to present the progress of work through seminar and progress report.
3. # Each student will select a topic from emerging areas of Engineering and Technology and study it independently. Student will give a seminar talk on the selected topic. Independent Study Seminar load will be treated as 2 hours for Seminar Coordinator and each associated teacher. Internal assessment will be effected by the following committee of two persons:

   Independent Study Seminar Coordinator: Convener
   One faculty from the deptt: Member
4. The evaluation of the student for General Fitness for the Profession shall be carried out by a team consisting of Dean of faculty, Chairperson of the department and external examiner appointed by the University.
5. The students will be allowed to use non-programmable scientific calculator. However, sharing/ exchange of calculator is prohibited in the examination.
6. Electronic gadgets including cellular phones are not allowed in the examination.

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List of Elective-I (Sem VII)

S.No.	Code	Course Title	L	T	P	C
		Departmental Elective-1	4			4
1.	ECL-451	Intelligent Instrumentation	4		-	4
2.	ECL-443	Wireless LANS	4		-	4
3.	ECL-441	Switching Circuits and Fault Diagnosis	4		-	4
4.	ECL-491	Bio-Medical Instrumentation	4		-	4
5.	ECL-409	Television Engg	4		-	4
6.	ECL-439	Communication Switching System	4		-	4
7.	ECL-455	Analog MOS Circuits	4		-	4
8.	ECL- 411	Electronics Product Design	4		-	4
9.	ECL-429	Fundamentals of RF Design	4		-	4
10.	ECL-423	Audio and Video Engg.	4		-	4
11.	ECL-419	Biomedical Signal Processing	4		-	4
12.	ECL-417	Industrial Electronics	4		-	4
13.	ECL-431	Active Network Synthesis	4		-	4
14.	ECL-453	Multirate Systems and Filter Banks	4		-	4
		Open Elective-1				
1	CSL-471	Management Information System	4		-	4
2	HUL-455	Entrepreneurship	4		-	4
3	MAL-451	Combinatorics & Graph Theory	4		-	4
4	HUL-457	Organizational Behavior and HRM	4		-	4
5	CSL-401	Software Engineering	4		-	4
6	CSL-403	Network Management & Security	4		-	4
7	PHL-477	Industrial Plasma Engineering	4		-	4
8	CSL-477	Cyber Security	4		-	4
9	CSL-451	Computer Hardware Technologies	4		-	4
10	ECL-477	Renewable Energy Sources	4		-	4
11	ECL-478	Solar Photovoltaic System and Technology	4		-	4

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List of Elective (Sem VIII)

S. No.	CODE	COURSE TITLE	L	T	P	C
		Departmental Elective-2				
1	ECL-462	Genetic Algorithms & Applications	4		-	4
2	ECL-454	Radar and Sonar Engg	4		-	4
3	ECL-~~2606~~ 414	Digital Image Processing	4		-	4
5	ECL-408	Digital Design Through Verilog	4		-	4
6	ECL-412	DSP Processors and Architectures	4		-	4
7	ECL-434	ASIC Design	4		-	4
8	ECL-436	Nano Technology and Applications	4		-	4
9	ECL-444	Reliability of Electronics & Communication Systems	4		-	4
10	ECL-452	High Speed Digital Design	4		-	4
11	ECL-454	Speech Signal Processing	4		-	4
12	ECL-456	Signal Compression Technique	4		-	4
13	ECL-458	Digital MOS Circuits	4		-	4
		Open Elective-II				
1	ECL-2629	Soft Computing Techniques	4		-	4
2	ECL-2621	Wireless Sensor Network	4		-	4
3	CSL-414	Multimedia Communication Systems	4		-	4
4	EEL-2607	PC Interfacing and Data Acquisition	4		-	4
5	ECL-2609	Modeling and Simulation of Dynamic system	4		-	4

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General Note

1 Some lab experiment across the Electronics and Communication Engineering curricula in each laboratory along with hardware/trainer kit must be performed using any general purpose textual and graphical programming package and dedicated simulation environment e.g. Scilab/Matlab/Simulink/Xcos/LabView/ PSPICE/Multisim/NGspice/LTSpice/MULTISIM/Orcad/Proteus or other open source PCB design tools etc.
2 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
3 Electronic gadgets, including cellular phones are not allowed in the examination.
4 **Each faculty member in Electronics and Communication Engineering Department involved as Coordinators/Teachers associated with evaluation work of Minor and Major Project/Independent Study Seminar/Industrial Practical Training I&II will be assigned 2 hours load per week per semester.**
5 Minor/Major Project/Independent Study Seminar/Industrial Practical Training I&II report submitted by the students should be typed on both sides of the paper.
6 The students will submit a synopsis at the beginning of the semester for approval from the departmental project committee in a specified format, thereafter she will have to present the progress of work through seminar and progress report.
7. **Guidelines for Industrial Practical Training- I &II**
   a. Each student has to undergo Professional Training (Industrial Practical Training I) of at least 4 weeks from the industry/institute/research lab/training center/In-house electronics workshop/PCB making and assembling/use of CAD software etc. during summer vacation after fourth semester; however, viva-voce for evaluation of Industrial Practical Training-I will be conducted in fifth semester.
   b. Assessment of Industrial Practical Training-I, undergone at the end of IV Semester, will be based on seminar, viva-voce, report and certificate of the Professional Training obtained by the student from the industry, institute, research lab, training center etc. The evaluation of Industrial Practical Training Seminar-I will be conducted in fifth semester.
   c. Each student has to undergo Professional Training (Industrial Practical Training-II) of at least 4 weeks from the industry/institute/research lab/training center/In-house electronics workshop/Design and Simulation tool etc. during

Industrial Practical Training-II shall be carried out in the VII Semester.

d. Assessment of Industrial Practical Training-II, undergone at the end of VI Semester, will be based on seminar, viva-voce, report and certificate of the Professional Training obtained by the student from the industry, institute, research lab, training center etc. The viva-voce for evaluation of Industrial Practical Training Seminar-II will be conducted in 7th semester.

8. **Guidelines for Departmental and Open Elective paper**
   a. Students will be permitted to opt for any one elective run by the other department. However, the department shall offer those elective for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise.
   b. Departmental and Open Elective-I paper will be offered in 7th Semester, if atleast two third of the total students opt for the same. It is advised that decision about Elective subject for 7th Semester is done before the 15th April before end of 6th semester.
   c. Departmental and Open Elective-II paper will be floated in 8th Semester, if atleast two third of the total students opt for the same. It is advised that decision about elective subject for 7th Semester is done before the 15th November before end of 7th semester.
   d. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.
9. Each student will select a topic from emerging areas of Engineering and Technology and study it independently. Student will give a seminar talk on the selected topic. Independent Study Seminar load will be treated as 2 hours for Seminar Coordinator and each associated teacher. Internal assessment will be effected by the following committee of two persons:

Independent Study Seminar Coordinator:	Convener
One faculty from the deptt:	Member

10. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of sports is given in General Proficiency & Ethics Syllabus.
11. The evaluation of the student for General Fitness for the Profession shall be carried out by a team consisting of Dean of faculty, Chairperson of the department and external examiner appointed by the University.
12. Each student has to undergo a Skill Development Workshop (ECP-333) on career competency development activities for ensuring employment and employability across domain.
13. There will be one end semester examination of 3 hours duration in each theory based subject.
14. The choice of students for any elective shall not be binding on the department to offer it. The department may also offer any other elective subject with the consent of Course coordinator/ Faculty.
15. The Department will follow 80-20 (external-internal marks) syllabi and scheme of examination instead of adopting the 50-50 scheme wef Academic Session 2015-16 as per Resolution No.-3 of Academic Council Meeting received vide reference no. BPSMV/Acad/15/2646-70 dated 09/07/2015.

16. There will be nine questions in theory paper in total from all four units of syllabus. First question is compulsory and set from all four units and contain five subparts. Students will have to attempt any five questions in all selecting at least one question from each unit.
17. Evaluation and grading for all theory/practical/viva voce etc. wherever applicable evaluation shall be 20% internal and 80% external. The minimum passing marks for any subject (paper) shall be 40% in the external examination and 40 % in the aggregate of internal and external examinations of that subject instead of old minimum pass percentage of 50%. In case a student(s) fails to acquire 40% in the aggregate of internal and external of subject (paper), she will be awarded re-appear in the external examination of that paper.
18. There will be no re-appear in internal examination. Marks obtained in internal examination/assessment shall be carried forwarded in case of re-appear (either less than 40% in external or less than 40% in aggregate of internal and external). Candidate has to obtain passing marks in external assessment and in total of external and internal assessment. It was further resolved that if a candidate even after obtaining passing marks in external examination failed to acquire passing marks in the total of internal and external assessment she has reappear in the external papers only to improve her result.
19. Weightage for internal assessment (examination)

S.No	Component	Marks
1	*Internal test	10% of the total marks 100 *i.e* 10 marks
2	**Assignment/seminar/quiz/group disc etc	5% of the total marks 100 *i.e* 5 marks
3	Attendance-	5% of the total marks 100 *i.e* 5 marks
3(a)	Less than 75%	00 marks
3(b)	75% and above and less than 80%	02 marks
3(c)	80% and above and less than 85%	03 marks
3(d)	85% and above	05 marks

* Lab performance of students in case of lab practical's
**file record and sample prepared in lab practical's

20. As per resolution no (2) of 1st meeting of Departmental Committee held on 28/09/2015 each faculty members of the department will display the attendance records of students on the notice board in the devised prforma on monthly basis in first week of every month under intimation to the office of department. At the end of semester each faculty member will display a consolidated list of attendance of whole semester on the notice board taking into consideration the attendance condoned by the Chairperson, if any.
21. **Role and responsibility of project coordinator for B.Tech programme**
The following role and responsibilities of project coordinator/dissertation phase-1&2 are approved as per resolution no (2) of 1st meeting of departmental committee held on 28/09/2015:

a. The coordinators will distribute the students among faculty as per procedure resolved by departmental committee, invite the synopsis and hold the presentation of students for the same duly approved by the respective mentor immediately within a week after commencement of the academic session under intimation to the office of department.
b. The coordinator will display a list of approved projects/dissertation on the notice board for information of students and staff immediately containing students name , roll no, project title and supervisor.
c. The coordinator will give a chance and hold the presentation of leftover students and display a list of approved projects/dissertation of left over students on the notice board for information of students and staff immediately.
d. The coordinator will compile the requirement of consumables and Electronic Component of projects immediately as submitted by the respective students groups duly approved by the supervisor.
e. Moreover, separate Technical and Laboratory Staff is assigned to minor/major project of each programme. The technical staff of department will assist the project coordinator and provides hands on activities to the students as needed and keep a record of all above stated activities in letter and spirit. The concerned technical staff and Lab attendant stay whole time in project lab and assist the students in compilation of their project work. Finally, the concerned technical staff appointed in the lab will maintain a record entry of the all consumables issued to students and details of project dissertation completed in department in each academic session.
f. The project coordinator ensures the timely submission of all project and dissertation as per approved guidelines, layout and award marks as per criteria laid down in Syllabi and Scheme of Examination.

The B.Tech Minor and Major projects coordinator will ensure and maintain a record of student's attendance as per provision contained in UG and PG ordinance.

22. As per Resolution No.-3 of 13th Academic Council Meeting minutes received vide reference no. BPSMV/Acad/14/1-25 dated 02/01/2015 promotion policy is as follows:
    a) For promotion to 7th semester, if completed all papers of 1st and 2nd semester
23. Each subject/course in Electronics and Communication Engineering is of ¾ credit is of 100 marks having 20 internal and 80 external.
24. Each Laboratory in scheme of B.Tech Electronics and Communication Engineering of 2 credits is of 50 marks having 10 internal and 40 external.
25. Industrial practical training minor project/general proficiency/major project is of 100 marks.
26. Add on papers Foreign Language, Legal Literacy, Environmental studies etc shall be treated as qualifying papers but their marks shall not be added in the total marks of the entire course.

27. Grand Total of marks and Credits for the B.Tech Electronics and Communication Engineering is as follows:

S.No	Semester	Total contact Hours	Credits	Marks

1	I	29	24	750
2	II	33	25	750
3	III	34	25	850
4	IV	30	26	800
5	V	30	28	950
6	VI	30	26	800
7	VII	35	31	850
8	VIII	26	26	750
Total			211	6500

All end examinations (Theory & Practical) are of three hours duration

28. The other detailed information pertaining to B.Tech Electronics and Communication Engineering is available in UG ordinance.

Sem-1st

365
D-16

ECL-100 BASIC ELECTRONICS ENGINEERING

L T P Total Credits: 4

3 1 -

370
D-17

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVES:

1. To impart the fundamental concepts of Basic Electronic Engineering.
2. To study the various electronics component, signals, networks, diodes, transistors, digital systems along with applications

UNIT 1 ELECTRONIC COMPONENTS, SIGNALS, NETWORKS:

Passive Components: Resistance, Capacitors and Inductors of various types, component Specifications, application, response to dc and sinusoidal/current excitation, star delta connection.

Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, ideal/non-ideal, voltage/current sources, independent/dependent voltage current sources, step, ramp, impulse, analysis of special waveforms.

Networks: KCL, KVL, Superposition, Thevenin, Norton, Maximum power transfer theorems for AC and DC circuit, loop and node analysis of simple networks, selectivity, duals and analog.

UNIT 2 JUNCTION DIODE CHARACTERISTICS:

Review of semi conductor physics, energy band model, n and p type, Mass action law, continuity equation, Hall effect, abrupt and linearly graded junctions, PN junction biasing, energy band diagram of p-n diode, volt-ampere characteristics, temperature dependence of V-I characteristic, Drift & Diffusion current, excess carriers in semiconductors-generation and recombination, Diffusion & Transition capacitances, switching mode operation of p-n junction, breakdown mechanisms in semi conductor diodes.

UNIT 3 DIODE CIRCUITS:

Diode as Rectifier, Half wave, Full wave and Bridge, output waveforms, definition & derivations of I_{dc} V_{dc}, Vrms, I_{rms}, efficiency, ripple factor, peak inverse voltage, Inductor filter, Capacitor filter, L-section filter, Pi-section filter, multiple L-section and multiple Pi section filter, and comparison of various filter circuits in terms of ripple factors: Multipliers: Clipper: Clamper, Peak detector.

UNIT 4 BASIC DIGITAL ELECTRONICS:

Binary logic, Positive, Negative, Logic gates: symbol, equation & truth table, Tristate Inverter, Boolean Algebra, DeMorgan's Theorems, implementation of Boolean equation using Basic gate and Universal gate, review of number systems, Binary, Octal, Decimal, Hexadecimal, conversion from one to another, complement arithmetic, Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, implementation using K map, Gates-Functional Block Approach.

REFERENCE BOOKS:

1. S. Salivahanan, N. Suresh Kumar, A Vallavraj, Electronic Devices and Circuits, TMH.
2. Van Valkenburg, Network Analysis, PHI.
3. Malvino & Leach, Digital Electronics, Tata McGraw Hill.

01/03/19

NOTE: There will be nine questions in total from all four units. First question is compulsory having five subparts and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

MAL-101 MATHEMATICS – I

L T P Total Credits: 4

3 1 -

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVE:

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

UNIT 1

Infinite Series: Convergence and Divergence, comparison, D' Alembert's ratio, Intrgral, Raabe's, Logrithmic and Cauchy root test. Alternating series, Absolute and Conditional Convergence.

Applications of Differentiation: Taylor's and Maclaurin's series, Asymptotes, Curvature.

UNIT 2

Partial Differentiation & its Applications: Functions of two or more variables: partial derivatives, total differential and differentiability, derivatives of Composite and Implicit functions, Jacobians, Higher order partial derivatives.

Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers and differentiation under integral sign.

UNIT 3

Applications of Single & Multiple Integration: Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration. Double Integral in polar coordinates, application of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variable, Beta and Gamma functions and relationship between them.

UNIT 4

Vector Calculus: Differentiation of vectors, scalar and vector point functions gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations.

Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Guass theorems (without proof) and their simple applications.

BOOKS SUGGESTED:

1. E. Kreyszig, Advanced Engineering Mathematics, Wiley Eastern.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
3. S S Shastri, Engineering Mathematics Part-I, Prentice Hall.
4. Piskunov, Differential and Integral Calculus.
5. R K Jain and SRK Iyengar, Advanced Engineering mathematics.
6. Michal D Greenberg, Advanced Engg. Mathematics.

7. H C Taneja, Advance Engg. Mathematics Vol-I.

NOTE: There will be nine questions in total from all four units. First question is compulsory having five subparts and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-100 INTRODUCTION TO COMPUTERS & PROGRAMMING IN C

L T P
3 1 -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1 INTRODUCTION:
Overview of a computer system. Block diagram and major parts of computer, history of computer development, introduction to binary, octal & hexadecimal numbers, ASCI code. Levels of programming languages–machine language, assembly language, high level language; need of operating system, tree structure of storage, Introduction to algorithms and flow charts, introduction to assembler, compiler and interpreter.

UNIT 2 BASICS OF C LANGUAGE:
C character set, Identifiers and keywords, data types, constants, variables and arrays, declarations, expression statements, symbolic constants, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators, bit operators, Control flow structures, If statement, if....else statement, while statement, do.....while statement, for statement, switch statement, nested control statement, break operator, continue operator, comma operator, go to statement.

UNIT 3 FUNCTIONS AND ARRAYS:
Function declaration, definition & scope, recursion, call by value, call by reference, Storage classes; automatic, external (global), static & registers, Arrays, pointers, array & pointer relationship, pointer arithmetic, dynamic memory allocation, pointer to arrays, array of pointers, pointers to functions, array of pointer to functions, pre-processor directives; #include, #define, macro's with arguments, the operator # and ##, conditional compilations, multiple file programming.

UNIT 4 STRUCTURES AND LIBRARY FUNCTIONS:
Structures, unions, structures passing to functions, bit fields, file handling [text(ASCII), binary], standard library functions from stdio.h, stdlib.h, conio.h, ctype.h, math.h, string.h, process.h.

TEXT BOOKS:
1. A.S. Tanenbaum, Structured Computer Organization, PHI.
2. V. Rajaraman, Fundamentals of Computers, 3rd edition, PHI.
3. Yashwant Kanetkar, Let us C, BPB Publications, 2002.

REFERENCE BOOKS:
1. E. BalaGuruswamy, Programming in ANSI C, TMH, 1999.
2. Al Kelly and Ira Pohl, A Book on C, (4th Ed.), Addison Wesley, 1999.

3. Byron S. Gottfried, Theory and Problems of programming with C Language, Schaum Series, TMH, 1998.
4. Kernighan and Richie, The C programming Language, 2nd edition, PHI.

NOTE: There will be nine questions in total from all four units. First question is compulsory having five subparts and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

PHL-100 ENGINEERING PHYSICS

L T P
3 1 -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

The aim of this course is to develop scientific temper and analytical capability through learning physical concepts and their applications in engineering and technology. Comprehension of some basic physical concepts will enable the students to logically solve engineering problems.

UNIT 1

Overview of vibration with emphasis on damped and forced oscillations, resonance, coupled oscillations, normal modes.

Wave Mechanics: Failure of classical physics, qualitative review of relevant experiments, de Brogile waves, uncertainty principle, wave function and Schrodinger equation, probability interpretation, potential barrier and quantum tunneling, potential well, qualitative summary of simple harmonic oscillator and Hydrogen atom

UNIT-2

Dielectric and Magnetic Properties of Materials: Dielectric constant and polarization of dielectric materials, types of polarization (Polarizability), Claussius Mussoti–Equation, frequency dependence of dielectric constant, dielectric losses, dielectric material, Langevin's theory for dia and paramagnetic material, Phenomena of hysteresis and its applications.

Crystal structure of solids, Energy band theory, classification into metals, semiconductor, insulators, Fermi energy and its variation with temperature, Hall effect and its applications, semiconductor statistics, equilibrium properties of semiconductors.

UNIT –3

Superconductivity: Temperature dependence of resistivity in superconducting materials, Meissner effect, Type–I and Type-II superconductors, Temperature dependence of critical field, BCS theory (qualitative), High temperature superconductors, Characteristics of superconductors in superconducting state, London equations, Applications of Superconductors.

Nanomaterials: Basic principle of nanoscience and technology, creation and use of bucky balls, structure, properties and uses of carbon nanotubes, Applications of nanotechnology.

UNIT – 4

Fiber optics: General ideas of optical fiber, types of fibers, acceptance angle and cone, Numerical aperture, Propagation mechanism and communication in optical fiber, Attenuation, Signal Loss in optical fiber and dispersion.

Lasers: Spontaneous emission. Stimulated emission. Population inversion. CW and pulsed lasers. Helium-Neon. Nd- YAG. Semiconductor lasers. applications of lasers (include holography)

REFERENCE BOOKS:

1. S P Taneja. Modern Physics for Engineer. R Chand Pub.
2. K D Prasad. Antenna and wave Propagation.
3. A S Vasudev. Modern Engineering Physics. S Chand.
4. Satya Prakash. Quantum Mechanics. Pragati Publication.

NOTE: There will be nine questions in total from all four units. First question is compulsory having five subparts and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

HUL-100 COMMUNICATION SKILL IN ENGLISH

L T P
3 - -

Total Credits: 3

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

To provide an adequate mastery of communicative English Language training primarily - reading and writing skills. secondarily listening and speaking skills.

UNIT –1

ORAL COMMUNICATION: Basic concepts. scope and significance. discussion on topic of contemporary relevance. interviews. GD: Body Language: Gestures. postures. facial expression. tone. pitch. rhythm.

WORD STUDY & WRITING: Word formation. Illustrative use of words. Paragraph. letter. precise and technical writing.

UNIT –II SENTENCE STRUCTURE & GRAMMAR: Common Errors. Punctuation. Parts of speech. Subject verb concord. Introduction to tenses. Articles.

UNIT –III

COMPOSITION: Re-arranging jumbled sentences to form a coherent paragraph. .Officials Letter (representations/complaints etc). Summary.

VOCABULARY: One word substitutes. words often confused. list of adjective. list of adverbs. prefixes and suffixes. verbal phrases.

UNIT –IV SPOKEN ENGLISH

1. Essentials of good speaking: dialogues. public speaking and formal presentation.
2. Vowels. Consonants. Phonetics Syllables. Transcription of 'received pronunciation' of common English words. including those with '-ed' and '-s' endings. into IPA
3. Primary stress placement on words
4. IPA transcription of weak forms
5. Use of falling. rising and falling-rising tones in ordinary Statements. question. orders and requests.
6. Situational speaking (pair work)
7. Listening for specific purposes.
8. Vocabulary

REFERENCE BOOKS:

1. English for Engineers and Technologist- Ana Univ. Orient Blackswan.
2. Enrich your English communication skills Book -1 by CIEFL. OUP. 2005.
3. N.Krishnaswamy. Modern English Grammar: a book of grammar. usage and composition. CIEFL. Hyd.
4. Alexander. L G Longman English grammar London: Longman. 1988.
5. Balasubramanin T. A text book of English phonetics for Indian students. New Delhi. Macmillion. 1981.
6. Bansal R K and J B Harrison. spoken English for India. orient London.

NOTE: There will be nine questions in total from all four units. First question is compulsory having five subparts and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-100 BASIC ELECTRONICS LAB

Total Credits: 1

L T P
- - 2

Total Marks: 50

External Marks: 40
Internal Marks: 10

LIST OF EXPERIMENTS:

1. Identification. Specifications. Testing of passive R. L. C Components (Colour Codes). Potentiometers. Switches (SPDT. DPDT. and DIP). Coils. Gang Condensers. Relays. Bread Boards.
2. Identification. Specifications and Testing of Active Devices. Diodes. BJTs.
3. Soldering practice–Simple Circuits using active and passive components.
4. Single layer and Multi layer PCBs (Identification and Utility).
5. Study and operation of:
   (a) Multimeters (Analog and Digital)
   (b) Function Generator
   (c) Regulated Power Supplies
6. C.R.O for Measurement of electrical quantities:
   (a) Voltage measurement.
   (b) Frequency measurement
   (c) Phase measurement
   (d) Component Testing
7. Familiarization of PC hardware: function of different part of PC.
8. Study of different type of storage media: CDROM. CDRW. floppy disk. Zip drive. Hard Disks etc.
9. To study V-I characteristic of diode.
10. To study half wave and full wave rectifier.
11. To verify truth table of different logic gates.
12. To study operation of PA systems.

NOTE: Ten experiments are to be performed. out of which at least seven experiments should be performed from above list. Remaining three experiments may either be

performed from the above list or designed and set by the concerned faculty as per the scope of the syllabus ECL-100.

CSP-100 COMPUTER PROGRAMMING LAB

L T P Total Credit: 1
- - 2
External Marks: 40 Total Marks: 50
Internal Marks: 10

LIST OF EXPERIMENTS:

1. Understand the concept of operating system and learn related commands.
2. Write C programs for following:
   Addition, subtraction, multiplications, division of 2 numbers.
3. Find max and min of three numbers.
4. Using while loop, find
   S= 1 + 3 + 5 + ... Upto N
   S= x + x2/2 + x3/3 ....N terms.
5. Repeat these exercise using do-while loop.
6. Using for loop, calculate
   S x - x3/3! + x5/5! .... N terms.
7. Using loops, print following design

   (a)
   1
   12
   123
   ...N lines

   (b)
   *
   ***
   *****
   ... N lines.

8. Read 2 numbers. Read the choice of operation. Add them if + is pressed. Subtract if - is pressed. Similarly for multiplication (*) and division (/).
9. Repeat exercise 7 such that program gets repeated again and again until user wants to exit.
10. Using function, compute nCm.
11. Using 1-d array read n numbers and find average. Also find the largest of these numbers. Use functions to implement these operations.
12. Implement following operations on matrices
    (a) Addition of two matrices (b) Transpose of a matrix
    (c) Multiplication of two matrices.

NOTE: At least ten experiments have to be performed in the semester: out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set by the concerned faculty as per scope of syllabus CSL-100.

MEP-100 WORKSHOP PRACTICE

L T P
- - 2

Total Credit: 1

Total Marks: 50

External Marks: 40
Internal Marks: 10

COURSE OBJECTIVES:

1. To learn and exercise with different machines tools and various machining processes.
2. Study of different welding processes, hammering and its applications.

LIST OF EXPERIMENTS/JOBS:

1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable fo r butt welding and lap welding.
7. To perform pipe welding.
8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
9. To prepare simple engineering components/ shapes by forging.
10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/planner.
12. To prepare a job involving side and face milling on a milling machine.

NOTE:

At least ten experiments/ jobs are to be performed/prepared by students in the semester. Out of which at least eight experiments/jobs should be performed/prepared from the above list. remaining two may either be performed/ prepared from the above list or designed and set by the concerned faculty as per the scope of the syllabus of Manufacturing Processes and facilities available.

PHP-100 PHYSICS LAB

L T P — Total Credit: 1

\- - 2

External Marks: 40 — **Total Marks: 50**

Internal Marks: 10

COURSE OBJECTIVES:

The purpose of this laboratory is to develop scientific temper and analytical capability among the engineering students.

LIST OF EXPERIMENTS:

1. To determine the wavelength of sodium light by Newton's rings experiment.
2. To find the specific rotation of sugar solution by using Polarimeter.
3. To find the refractive of a material of a given prism using spectrometer.
4. To find the wavelength of sodium light using Fresnel Biprism
5. To find the capacity of an unknown capacitor by flashing and quenching potential of argon/neon.
6. To measure the band gap of a semiconductors.
7. To determine the Hall coefficient using Hall Effect.
8. To determine the resistivity of a semiconductor by four probe method.
9. To find the wavelength of various colours of white light with the help of a plane transmission diffracting grating
10. To convert given galvanometer into an ammeter of given range.
11. To find high resistance by leakage method.
12. To calibrate a voltmeter and an ammeter by using potentiometer.
13. Verification of laws of stretched string- Sonometer.
14. To find the Frequency of A.C. mains-Sonometer.
15. Study of characteristics of LED and LASER sources.
16. Study of characteristics of p-i-n and avalanche photo diode detectors.

17. To study the shunting effect of a voltmeter on voltage measurement.
18. Evaluation of numerical aperture of a given fiber.
19. Magnetic field along the axis of a current carrying coil-Stewart and Gee's method.
20. To study characteristic of a thermistor
21. To study I-V characteristic and rectification properties of a semiconductor.

NOTE:
At least 12 experiments are to be performed by students in the semester. Out of which at least ten experiments should be performed from the above list. remaining two experiments may either be performed from the above list or designed and set by the concerned faculty as per the scope of the syllabus of PHL-100.

HUP-100 ENGLISH LANGUAGE COMMUNICATION LAB

Total Credit: 1

L T P
- - 2

Total Marks: 50

External Marks: 40
Internal Marks: 10

LIST OF EXPERIMENTS:

1. Impart communicative skills.
2. Train students to perform in simple day-to-day situations.
3. Overcome common errors in listening/speaking through learning resource centre.
4. Use English language effectively.
5. Help learners to chisel their basic skill of reception/production.

S.No	TOPIC	AIM	PROCEDURE	AIDS (LRC)
1.	Learn to introduce yourself	To offer greeting and enable learners to introduce themselves effectively	Limitation. Pair work. Group work	Listening/speaking activities. use of Visuals.
2.	Learning Pronunciation	To train how to speak correct	Imitation. Miming. Demonstration	Listening/Speaking Activities

		English sounds		
3.	Basic Communication Patterns	Basic structures: My name is ___ I am ___ My father is	Pattern practice. limitation	Handouts. Cassettes. CDs
4.	Listening telephonic conversation	To teach syllabic stress of numbers and alphabets	Miming. Pair work. other activities	Cassettes. CDs
5.	Listening for information	To train for sentence stress and rhythm	Tasks. activities	Handouts. cassettes. CDs
6	Learning vocabulary	To teach vocabulary in an interesting way to enhance the word-bank of the learner	Games. Pair work. activities	Handouts. songs. listening/speaking tasks

NOTE: Each student has to prepare and maintain a CD record covering all the aspect of lab work.

Sem. 3rd

384
D-16

463
D-18

396
D-17

MAL-201
L T P
4 - -

MATHEMATICS-III

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

Objective of this course is to inculcate the students an adequate understanding of the basic concepts of probability theory to make them develop an interest in the area which may find useful to pursue their studies. Also it is intended to stimulate the students understanding of the Z transform. A study of some important partial differential equations is also included to make the student get acquainted with the basics of PDE.

UNIT 1: FOURIER SERIES AND FOURIER TRANSFORMS:

Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series, Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

UNIT 2: FUNCTIONS OF COMPLEX VARIABLE:

Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions, Limit and Continuity of a function, Differnetiability and Analyticity.

Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations, Harmonic functions, application to flow problems: Integration of complex functions, Cauchy-Integral formula.

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series, Zeroes and singularities of complex functions, Residues.

UNIT 3: PROBABILITY DISTRIBUTIONS & HYPOTHESIS TESTING:

Conditional probability, Bayes theorm and its applications, expected value of a random variable, Properties and application of Binomial, Poisson and Normal distributions.

Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test for goodness of fit.

UNIT 4: LINEAR PROGRAMMING:

Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method, Assignment problems, Transportation problems and Game Theory

TEXT BOOKS:

1. F Kreyszig, Advanced Engineering Mathematics.
2. B.S. Grewal, Higher Engineering Mathematics.
3. S.D. Sharma, Operation Research

REFERENCE BOOKS:

1. R.K. Jain, S. R. K. Iyenger, Advance Engineering Mathematics.
2. Michael D. Greenberg, Advanced Engineering Mathematics.
3. H.A. Taha, Operation Research.
4. Johnson, Probability and statistics for Engineers, PHI.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-201 **ELECTRONICS DEVICES AND CIRCUIT-I** **Total Credits: 3**

L T P
3 - -

External Marks: 80 **Total Marks: 100**
Internal Marks: 20

COURSE OBJECTIVE:

The aim of this course is to provide a basis for understanding the characteristics, operation of semiconductor devices. This course brings together the quantum theory of solids, semiconductor material physics, and semiconductor device physics. The objections of course are as follows

1. To impart the basic concepts of semiconductor physics
2. To create an insight into the working of different conventional electronic device.
3. To understand the operational charac eristics of a semiconductor.
4. To understand the working of PN junction diodes and special purpose diodes.
5. To understand the working physics of BJT and FET both in ideal and non-ideal conditions.

UNIT 1 BIPOLAR DEVICE CHARACTERISTICS:

Construction, principle of operation, V-I characteristics, equivalent circuit of BJT using h parameters. Ebers Moll model, Base width modulation. Transistor as amplifies, salient features of different configuration of BJT, Phototransistor.

BJT biasing, criteria for fixing operating po nt, fixed bias, collector to base bias, self bias, methods of Bias stabilization, thermistor and sensito compensation, Thermal run away, Thermal stability, Transistor applications.

UNIT 2: MOS DEVICE CHARACTERISTICS:

Junction Field Effect Transistor: Basic structure, operating principal, I-V characteristics, FET parameters, FET as voltage variable resisto, FET small signal model.

MOSFET: Basic structure, Enhancement a id Depletion mode MOSFET, I-V characteristics, transfer characteristics, threshold voltage, MOSFE as switch, VMOS.

Biasing: Biasing of JFET and MOSFET, fixed bias, self bias, voltage divider, Comparison of BJT, JFET and MOSFET devices, analysis of JFET and MOSFET amplifiers.

UNIT 3: TRANSISTORS AT LOW AND HIGH FREQUENCY:

Transistor h parameters model of CE, CB, CC configurations and analysis, frequency response of transistor amplifies at low and high frequency, effect of emitter capacitor in CE configuration, Emitter follower, Miller's theorem and its dual: high frequency model of transistor, π model and T model, Transistor capacitance, the gain ba idwidth product, emitter follower at high frequency.

UNIT 4 VOLTAGE REGULATORS:

Basic Regulator Circuit, Block schematic of a regulated power supply, zener diode as voltage regulator, Series and Shunt voltage regulators, Short Circuit Protection, Current Limiting, Specifications of Voltage Regulator Circuits, IC 723 Voltage Regulators, DC to DC, Switching regulators, Voltage Multipliers, SMPS.

Special Semiconductor Devices: Introduction to diode, Thyristor, Diac, Triac, SCR, GTO, IGBT, optocouple.

Special Semiconductor Diodes: Photod ode, Tunnel Diode, Varactar Diode, LED, UJT.

TEXT BOOKS:

1. J. Millman and C. C. Halkias, Electronic Devices and Circuits, TMH, 1998.
2. R. L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, Pearson/Prentice Hall,

3. Millman and Grabel. Microelectronics. Tata McGraw Hill. 1988.
4. Sedra A.S. and.C. Smith. Microelectronic Circuits. Oxford University Press. 5th Edition

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-203 NETWORK ANALYSIS AND SYNTHESIS

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVES:

1. To expose the students to the basic concepts of electric circuits and their analysis in time and frequency domain.
2. To introduce the concept of filter circuits and design of passive filters.
3. To introduce the techniques of network Synthesis.

UNIT 1

Transient Response: Analysis using Laplace transformation. Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations.

Network Functions: Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero, Locations for driving point functions and transfer functions, Time domain behaviour from the pole-zero plot.

UNIT 2

Two Port Networks: Relationship of two-port variables, short-circuit admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

Topology: Principles of network topology, graph matrices, network analysis using graph theory, Duality and dual networks.

UNIT 3

Filter fundamentals, analysis of ladder and lattic network, butterworth and chebyshev approximation, normalized specification, frequency transformation, types of frequency selective filter, linear phase filter, passive filter design, high-pass, low-pass, band-pass, and band-reject Filters, M derived filter, equalizers and attenuators, active filter design.

UNIT 4

Network Synthesis: Concept of stability, Network realizability, Hurwitz polynomials, Positive real functions, properties of RC, RL and LC network, Foster & Cauer forms of realization, applicability of Foster and Cauer form.

Problem solving using MATLAB, Simulink and toolbox/Pspice/LabView/Scilab/Xcos in context of all units.

TEXT BOOKS:

1. Umesh Sinha, Network Analysis and Synthesis, Satya Prakash Publication.
2. F. F. Kuo, Network Analysis and Synthesis, John Wiley & Sons Inc.

REFERENCE BOOKS:

1. Van Valkenburg, Introduction to modern Network Synthesis, John Wiley.
2. Dasoer Kuh, Basic Circuit Theory, McGraw Hill.
3. D.Roy Choudhury, Networks and Systems, New Age International.
4. Vasudev K. Aartre,"Network Theory and Filter Design", Wiley-Eastern Ltd., 2nd Edition, 1993.
5. L. P. Huelsman, Active and Passive Analog Filter Design, McGraw Hill, 1993.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-205 DATA STRUCTURE AND ALGORITHM

L T P Total Credits: 3

3 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVE:

1. To give ideas of basic data structures
2. To impart knowledge about algorithm specification

UNIT – I

Fundamentals of algorithm analysis: Big 'O' notations. Time and space complexity of algorithms. Elementary data structures and their applications

Arrays: ordered lists, representation of arrays, sparse matrices, linked lists: singly and doubly linked lists, stacks, queues, multiples stacks and queues. Applications: polynomial arithmetic, infix, postfix and prefix arithmetic expression conversion and evaluations.

UNIT – II

Trees: Binary trees: Definition, traversal, threaded binary tree, Counting Binary Tree.

Graphs: Representation, traversal, connected components, shortest path and transitive closure, topological sort, activity network, critical path, path enumeration, Dijkstra's Algorithm, Floyd Warshall's Algorithm, Minimum Spanning, Tree Definitions.

UNIT – III

Searching & Sorting: Binary Search Tree, Insertion & Deletion, AVL Trees, Hash function, Hash table, Internal sort: Radixsort, Insertion sort, Exchange sort, Selection sort, Quicksort, Shellsort, Mergesort, Heaport, External sort: K-way mergesort, balanced mergesort, polyphase mergesort

UNIT – IV

Files: Files, Queries and sequential organization: Cylinder surface indexing, Hashed Indexed, Tree Indexing, B-Trees, Trie Indexing, Sequential file organizational, random file organization, Hashed file organization, Inverted files, cellular partitions.

TEXT BOOKS:

1. E. Horowitz and S. Sahani, Fundamentals of Data Structures, Galgotia Booksource Pvt. Ltd. 1999.
2. R. L. Kruse, B. P. Leung, C. L. Tondo, Data Structures and program design in C, PHI, 2000.

REFERENCES BOOKS:

1. Schaum's outline series, Data Structure, TMH, 2002
2. Y. Langsam et al., Data Structures using C and C++, PHI, 1999.

3. Yashwant Kanetkar. Data Structure through C. BPB. 2005.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-205 DIGITAL CIRCUITS & SYSTEMS

L T P Total Credits: 3

3 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVES

The purpose of this course is to develop a strong foundation in analysis and design of digital circuit and system. At the end of the course students should be able to:

1. To understand fundamental concept of digital circuit and system.
2. Able to design analyze and interpret combinational and sequential circuit.
3. Digital circuits of medium complexity.

UNIT 1

Combinational Circuit Designs: Fundamentals of Digital Techniques, number system, various codes, Sum of products and product of sums, Minterms and Maxterms, Design using gates, Karnaugh map and Quine Mcluskey methods of simplification, Problem formulation and design of combinational circuits, Adder/Subtractor, Encoder/decoder, Multiplexer/Demultiplixer, Code-converters, BCD arithmetic circuits, Drivers for display devices.

UNIT 2

Sequential Circuits: Flip Flops: S-R, J-K, T, D, master-slave, Conversion of Flip Flop, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter, Timing signal, Analysis of clocked sequential circuits- their design.

Fundamental Mode Sequential Circuits: Design of Synchronous and Asynchronous sequential circuits, State equivalence, minimization, state assignment, Circuit implementation, Registers-Shift registers, Stable, Unstable states, Output specifications.

UNIT 3

Digital Logic Families: RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS, BiCMOS logic families, Calculation of noise margin and fan-out, Tristate logic, interfacing of CMOS and TTL families, tristate logic.

UNIT 4

A/D and D/A Converters: Sample and hold circuit, weighted resistor and R-2 R ladder D/A Converters, specifications for D/A converters, A/D converters: Quantization, parallel, successive approximation, counting type, dual-slope ADC, specifications of ADCs.

Programmable Logic Devices and Semiconductor Memories: ROM, PLA, PAL, FPGA and CPLDs, RAM, Semiconductor memories.

TEXT BOOK:

1. R. P. Jain, Modern Digital Electronics, 3rd Edition, Tata Mcgraw Hill.
2. Taub & Schilling, Digital Integrated Electronics, MGH.

3. Malvino and Leach, Digital Principles and Applications, McGraw Hill.
4. Morris Mano, Digital Design, Third Edition, Prentice Hall, 2002.
5. R J Tocci, Digital Systems: Principles and Applications, Fourth Edition, PHI, 1988.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

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ECL-207 SIGNALS AND SYSTEMS

L T P Total Credits: 3

3 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVES

The purpose of this course is to introduce students to the fundamentals of signals and systems which are basic to analog and digital signal processing. The main objective of this subject is to help the students to mathematically analyze different types of signals and their associated systems. At the end of this course, the students will be able to understand the

1. To give basic ideas about classification of different signals and systems
2. 3. To impart basic knowledge about the representations and transforms of the signals
4. Spectral analysis of periodic and aperiodic signals using Fourier series.
5. Analysis and characterization of the CT system through Laplace transform.
6. Analysis and characterization of the DT system through Z transform.

UNIT 1

Classification of Signals and System: Continuous and discrete time signals, Classification, transformation of indepdent variables, special Signals-Complex exponentials and sinusoidal, Step, Ramp, Pulse, Impulse, signum function.

Continuous and Discrete Time systems: Properties, Linearity, stability, causality, memory, invertibility, time invariance, Analysis of LTI System-impulse response- convolution graphical analysis-properties of convolution, Differential equation and difference equation representation, Realization of LTI system, related problems.

UNIT 2

Fourier Analysis: Fourier Analysis of CT Signals-Fourier Series, spectrum of CT time signal, Fourier Analysis of DT Signals-Discrete-Time Fourier series-Frequency response of discrete time LTI systems.

Fourier Transforms: Fourier Transform and properties, Deriving FT from Fourier series, Fourier transform of arbitrary signal, standard signals, periodic signals, impulse function and Signum function, Applications of Fourier analysis to AM, SSB, PAM, Frequency response of LTI systems.

UNIT 3

Laplace Transform: Definition-existence, conditions-ROC and properties-Application of Laplace transform for the analysis LTI system, Significance of poles & zeros, relation between L.T's, and F.T. of a signal, related problems.

Z-Transform: Z-Transform and its inverse: Definition- existence-ROC and properties- Application of Z Transform for the analysis of DT LTI systems, state equation and matrix

UNIT 4

Signal Transmission Through Linear Systems: Response of a linear time invariant (LTI) 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, Hilbert Transforms, Pre Envelope, BP signals and systems, Phase and Group delay, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

Random Signals and Systems: Review of random variables and pdf, Random processes, statistical averages, Stationary processes, Ergodic processes, Random processes and LTI systems, Random processes in frequency domain Power spectrum of stochastic processes, variance Auto correlation and spectral densities -Properties Power spectral density, Gaussian, Rayleigh, Rice probability density-and White processes, Band limited and band pass processes.

Problem solving using MATLAB, Simulink and toolbox in context of all units.

TEXT BOOKS:

1. B.P. Lathi, Signals, Systems and Communications, BS Publications, 2003.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, Signals and Systems, PHI, 2nd Edition.

REFERENCE BOOKS:

1. I J Nagrarth, Signals and Systems, Tata McGraw Hill Publication.
2. C L. Philips, J.M.Parr, Signals, Systems & Transforms, Pearson education, 3rd Edition, 2004.
3. Douglas K. Lindner, Signals and Systems, McGraw Hill International Publication, 1999.
4. S Haykin and Barry Van Veen, Signals and Systems, John Wiley & Sons Inc., 1999.
5. A. Papoulis, Probability, Random variables, and stochastic Processes, McGraw-Hill.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-223 NETWORK THEORY LAB

L T P Total Credits: 1

- 2

External Marks: 40 Total Marks: 50

Internal Marks: 10

COURSE OBJECTIVES:

To inculcate strong practical skills on passive files. two part networks. transient and frequency analysis of different RLC circuits.

LIST OF EXPERIMENTS:

1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. To find the resonance frequency. band width of RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameter of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency responses of HPF and determine the half-power frequency.
9. To plot the frequency responses of band-pass filter and determine the band-width.
10. To calculate and verify "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and verify its response.
12. Introduction of P-Spice /MATLAB. Simulink/LabView in context of Course ECL-203.

NOTE: Ten experiments are to be performed. out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set as per the scope of the syllabus.

EEP-225 ELECTRICAL WORKSHOP

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVE:

1. To familiarize various electrical measurement equipments and measurement methods
2. To obtain the performance characteristics of dc and ac machines

LIST OF EXPERIMENTS:

1. To study basic household wiring using switches, fuse, indicator-lamp, etc..
2. Introduction of tools, electrical materials, symbols and abbreviations.
3. To study stair case wiring.
4. To study house wiring *i.e.* batten, cleat, casing-caping and conduit wirings.
5. To study fluorescent tube light.
6. To study high pressure mercury vapour lamp (HPMV).
7. To study sodium lamp.
8. To study repairing of home appliances such as heater, electric iron, fans etc.
9. To study construction of moving iron, moving coil, electrodynamics & induction type meters.
10. To design and fabricate single phase transformer.
11. To study fuses, relays, contactors, MCBs and circuit breakers.
12. Insulation testing of electrical equipments.

NOTE: Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set as per the scope of the syllabus.

ECP-221 DIGITAL ELECTRONICS LAB

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVES:

1. To understand, the logical behaviors of digital circuits and apply them in appropriate applications.
2. To provide experience on design, testing, and analysis of digital electronic circuits

LIST OF EXPERIMENTS:

1. Study of TTL gates–AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design & realize a given function using K-maps and verify its performance.
3. Design of half adder and full adder using NAND gates.
4. To verify the operation of multiplexer and demultiplexer.
5. To verify the operation of comparator.
6. To verify the truth tables of S-R, J-K, T & D type flip flops.
7. Set up R-S & JK flip flops using NAND Gates.
8. To verify the operation of bi-directional shift register.
9. To design & verify the operation of 3-bit synchronous counter.
10. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
11. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
12. Study of IC counters 7490, 7492, 7493 and 74192.
13. To design & realize a sequence generator for a given sequence using J-K flip-flops.
14. Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
15. Design a 4-bit shift-register and verify its operation. Verify the operation of a ring counter and a Johnson counter.
16. Code converters - Binary to Gray and gray to Binary using mode control.
17. Study of MUX and DeMUX Circuits and ICs

NOTE: At least ten experiments are to be performed: atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set as per the scope of the syllabus.

ECP-227 ELECTRONIC DEVICE & CIRCUIT LAB-I

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVE:

To inculcate strong practical skills on the fundamental operation of BJT, JFET, MOSFET and special device like UJT, DIAC, TRIAC, Zener Diode and their characteristics.

LIST OF EXPERIMENTS:

1. Study of unit step response of RC and RL circuits.
2. Study of switching characteristics of a pn junction diode and a bipolar transistor.
3. Study of diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of 3-terminal IC regulator.
6. Study of CE transistor characteristics in CE configuration.
7. Study of the characteristics of transistor in common base configuration.
8. Study of CE amplifier for voltage, current & power gains and input, output impedances.
9. Study of CC amplifier as a buffer.
10. Graphical determination of small signal h parameters of bipolar junction transistor.
11. Study & design of a DC voltage doubler.
12. Study of V-I characteristics of a photo-voltaic cell.
13. Measurement and study of output characteristics of a MOSFET.
14. Measurement and study of output characteristics of a JFET.
15. To plot characteristics of thyristor.
16. To plot characteristics of UJT.
17. To plot characteristics of Diac & Triac.
18. Study of photo-resist in metal pattern for planar technology/PCB technology.
19. Common source characteristics of a JFET - measurement of transconductance gm and drain to source resistance r_{ds}, use of FET as VVR.

NOTE: At least ten experiments are to be performed: atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set as per the scope of the syllabus. Each experiment will have two parts- a simulation part and a hardware realization part.

ECP -229 Programming with MATLAB

L T P Total Credits: 1

- - 2

External Marks: 40 Total Marks: 50

Internal Marks: 10

COURSE OBJECTIVE:

The objective of this laboratory course is to make the students familiar with Matlab, toolboxes, blocksets and Simulink.

1. To learn and understand the programming using Matlab technical computing environment.
2. To apply textual and graphical programming environment in engineering problem solving methodology across Electronics and Communication Engineering.

Unit 1: Matlab Fundamentals:

Introduction, platforms and versions, launching MATLAB, window, help features, types of file, creating directory and saving files, notation, syntax and operations, constants, variables and expression, some built in function, commands, problems.

Unit 2: Handling Vectors and Matrics:

Addition, subtraction, multiplication, vector products and transpose, commands, problems.

Unit 3: Plotting Using Matlab:

Basic plotting command, simple line plot, logarithmic axis scaling, symbol plots, Multiple curves on the same plot, plotting the data, labelling it with the legend command, Loading data into MATLAB for plotting, plots the load command, contour plots, surface plots, GUI, problems.

Unit 4: Matlab Script:

Creating a script m-file, MATLAB functions, basics, Functions versus Scripts, Anatomy of a MATLAB function, calling MATLAB Functions, local variables, Global variables, control statements, conditional statements: If, Else, Else if, repetition statements: While, For loop

Unit 5: GUI Development Environment

Building Graphical User Interface, Design of GUI application, component, add menus, figures, text buttons and edit boxes to your dialog.

Unit 6: Overview of Toolboxes:

The symbolic math toolbox, control system toolbox, signals processing toolbox, communication toolbox, MATLAB applications, animation, problems.

Unit 7: Simulink

Simulink block libraries, creating and running a model in Simulink, debugging, constructing a subsystem, masking a subsystem, Simulink analysis tool, numerical issues etc

Reference Books:

1. Dabney. James B. and Harman. Thomas L. Mastering Simulink. Pearson Education. 2004.
2. Steven T Karris. Introduction to Simulink with engineering applications. Orchard Publications. 2006.
3. Misza Kaleehman. Practical Matlab applications for engineers. CRC Press. 2009.
4. Palamids A. and Veloni A.. Signals and systems laboratory with Matlab. CRC Press. 2010.
5. S. Jain. Modeling and simulation using Matlab-Simulink. Wiley India. 2011.
6. Michal A. Gray. Introduction to the simulation of dynamics using Simulink. Chapman & Hall/CRC. 2011.

NOTE: At least 10 experiments are to be performed by students in the semester as per the scope of the syllabus.

Sem - 4th

HUL-202 ENGINEERING ECONOMICS & MANAGEMENT

L T P Total Credits: 3

3 - -

1178/M-19 1185/M-17 1202/M-18

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVE:

To Impart fundamental economic principles that can assist engineers to make more efficient and economical decisions.

UNIT-1

Definition of Economics, Role of economics in Science, Engineering and Technology, circular flow of economic activity, Production possibility curve Economic laws and their nature, Micro and Macro economics, Globalization, Privatization, Liberalization.

Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance, the concept of equilibrium.

UNIT-2

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand, the indifference curve theory, consumers surplus.

UNIT-3

Definitions of Management, Characteristics of management, Management Vs. Administration, Management-Art, Science and Profession, Importance of Management, Development of Management thoughts, Principles of Management, The Management Functions, Inter-relationship of Managerial functions.

Nature and Significance of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion - Seniority Vs. Merit, Training - objectives and types of training.

UNIT-4

Production Management: Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

Marketing information system, Marketing Management, objectives & Functions of marketing, STP concept.

Marketing Research- Definition; objectives; Importance; Limitations; Process, Advertising Defination, objectives, functions, criticism.

TEXT BOOKS:

1. P.N. Chopra, Principles of Economics, Kalyani Publishers.
2. K.K. Dewett, Modern Economic Theory, S.Chand.

REFERENCE BOOKS:

1. Stonier and Hague, A Text Book of Economic Theory, Longman's Landon.
2. M.L. Jhingan, Micro Economic Theory, S.Chand.
3. H.L. Ahuja, Micro Economic Theory, S.Chand.
4. S.K. Mishra, Modern Micro Economics, Pragati Publications.
5. A.B.N. Kulkarni & A.B. Kalkundrikar, Econon ic Theory, R. Chand & Co..
6. Rudar Dutt & K.P.M. Sundhram, Indian Economy.
7. Mishra & Puri, Indian Economy.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attemot any five questions in all selecting at least one question from each unit.

ECL-202 ELECTRONIC DEVICES & CIRCUIT-II

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVE:

The purpose of this course is to introduce to the students about basics of biasing transistor circuits, feedback amplifiers, large signal amplifiers, tuned amplifiers, oscillators, wave shaping circuit using transistor and analyzing different electronic circuits. At the end of this course the students will learn and apply

1. Operating point calculations and working of basic amplifiers.
2. Working of different types of feedback amplifiers and oscillators.
3. Frequency response and design of tuned amplifiers.
4. Basic working and design of wave shaping circuits.

UNIT 1

Single Stage and Multi Stage Amplifiers: Analysis of transistor amplifier circuit. Frequency response of CE, CB, CC Amplifier, JFET Amplifiers, Common drain and common gate amplifier, Gain band width product:

Multi stage amplifiers, Methods of Coupling, n–Stage Cascaded Amplifier, Equivalent Circuits, Amplifier Analysis, High Input Resistance Transistor Circuits, Cascode Transistor Configuration, CE-CC Amplifiers, Two Stage RC Coupled JFET amplifier (CS configuration), Difference Amplifier.

UNIT 2

Feedback Amplifiers: Concept of feedback, different types, positive, negative, transfer gain with feedback, voltage, current, series and shunt feedback, Feedback in amplifiers-its effect on amplifier performance-typical feedback arrangements-emitter follower-darlington emitter follower cascade amplifier.

Power Amplifier: Class A, AB, B, C and D, efficiency of Class A amplifier with resistive and transformer coupled load, efficiency of Class B, Transformer coupled audio amplifier, Push pull amplifier, MOSFET power amplifiers, Thermal stability, heat sink design.

UNIT 3

Oscillators: Barkhausen Criterion, Mechanism for start of oscillation and stabilization of amplitude, Analysis of RC oscillators using cascade connection of low pass and high pass filters, Wein Phase shift and twin-T network, Analysis of LC oscillators, Colpitts, Hartley, Clapp, Miller Oscillator, Frequency range of RC and LC Oscillator, Quartz Crystal, Construction, Equivalent circuit of Crystal, Crystal Oscillator circuits, use of Logic Gates as oscillator.

UNIT 4

Tuned Amplifiers: Single tuned capacitive coupled amplifier, Tapped single tuned capacitance coupled amplifier, Single tuned transformer coupled or inductively coupled amplifier, CE double tuned amplifier.

Pulse and Wave Shaping: Pulse shaping using RC circuits, differentiating and integrating circuits-clipping and clamping circuits using diodes, sweep circuits-Transistor sweep circuits-voltage and current sweep-Miller sweep circuit-Bootstrap sweep circuit-UJT as relaxation oscillator.

Multivibrators: Astable, monostable, bistable, schmitt trigger

TEXT BOOKS:

1. Millman and Grabel, Microelectronics, Tata McGraw Hill, 1988.
2. Sedra A.S. & K.C. Smith, Micro Electronic Circuits, Oxford University Press, 5th Edition.
3. J Millman & C Halkias, Electronic Devices and Circuits, Tata McGraw Hill, 1998.

4. R L Boylestad & L. Nashelsky, Electronic Devices and Circuits, Prentice Hall, 2006.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-204 **ELECTROMAGNETIC FIELD THEORY**

L T P **Total Credits: 4**

4 - -

External Marks: 80 **Total Marks: 100**

Internal Marks: 20

COURSE OBJECTIVE:

To enable the students, to have a fair knowledge about the theory and problems of electromagnetism and waveguides. The aim of this course is to introduce the students the basics of the electromagnetic fields and waves to understand the electromagnetic communication engineering (radio, microwave and optical)

1. To impart the knowledge of electric, magnetic fields and the equations governing them as well as time varying field.
2. To develop understanding about guided waves and transmission lines.
3. Understand the basic concepts of electric field and magnetic field
4. Need for impedance matching and different impedance matching techniques
5. Different types of waveguides

UNIT 1. INTRODUCTION:

Overview of vector analysis, orthogonal co-ordinate systems- rectangular, cylindrical, spherical transformations, Flux, circulation open and closed surface, Divergence, gradient, curl, stokes theorem, Coulomb's Law, Gauss's Law, potential function, field due to a continuous distribution of charge, equi-potential surfaces, Gauss's Theorem, Poison's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary conditions, the electro-static uniqueness theorem for field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole.

UNIT 2: STEADY & TIME VARYING FIELDS:

Steady Magnetic Fields: Biot-Savart law, Ampere's law, Gauss's law for magnetic flux, boundary conditions, Faraday Induction law, Ampere's work law, Ampere's law for a current element, magnetic field due to volume distribution, magnetic vector potential, far field current distribution, equation of continuity.

Time Varying Fields: Continuity equation, inconsistency of Ampere's law & displacement current, Maxwell's equations, integral, phasor & differential, solution for free space conditions, EM waves in a homogeneous medium, propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave propagation in conducting media, good conductor and good dielectric, depth of penetration, polarization, linear, circular and elliptical.

UNIT3. REFLECTION AND REFRACTION OF EM WAVES:

Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (normal incidence and oblique incidence), Brewster's angle and total internal reflection, reflection at conductive medium, surface impedance, transmission-line analogy, Poynting theorem real and complex Poynting vector interpretation-application, interpretation of E x H, power loss in a plane conductor.

UNIT 4.TRASMISSION LINE THEORY:

Transmission lines: Analogy between circuit theory & EM theory, Transmission line as a distributed circuit, transmission line equation, characteristic impedance, VSWR, impendence matching, quarter wave and half wave transformer, stub matching, single stub matching, double stub matching and tuning- pulses on a transmission line, smith chart and its application, Impedance matching using Smith Chart.

TEXT BOOK:

1. Jordan and Balmain. Electro-magnetic Waves and Radiating System. PHI.
2. Hayt. Engineering Electromagnetic. TMH.
3. Krauss J.DF. Electro-Magnetics. McGraw Hill.
4. K.D. Prasad. Antennas and Wave Propagation. Satya Prakashan. New Delhi. 2001.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-206 **LINEAR INTEGRATED CIRCUITS**

L T P **Total Credits: 4**

4 - -

External Marks: 80 **Total Marks: 100**

Internal Marks: 20

COURSE OBJECTIVE:

To enable the students to understand the fundamentals of integrated circuits and designing electronic circuits using it.

1. To develop the skill of analysis and design of various circuits using operational amplifiers.
2. To develop design skills to design various circuits using different data conversion systems.
3. To design simple circuits like amplifiers using op-amps, waveform generating circuits, filter circuits for particular application.
4. To gain knowledge in designing a stable voltage regulators

UNIT 1

Basics of OP amp: ICs-Analog, Digital, Hybrid: Amplifier fundamentals, Block schematic of OP amp. Differential amplifier-dual input balanced output and unbalanced output, Analysis, Constant current bias, Current mirror circuits, Active Load, Level Shifters, Power amplifier stages, differential amplifier with swamping resistor, power supply requirements, Ideal & practical Op-amp, symbol and terminals, Op-amp parameters, AC and DC performance parameters of op-amp, ideal op amp, Equivalent circuit of op amp, Circuit simulation and problem solving using PSPICE.

UNIT 2

Bias current and offset-drift-compensation, Use of offset minimizing resistor and its design, Frequency response of Op amp, stability of op amp, frequency compensation, Slew-rate and its effect: Open loop and closed loop configuration: Different feedback configurations-Voltage series feedback and voltage shunt feedback, concept of virtual ground, Differential amplifiers with one op amp and 3 op amps, typical data sheet 741, Circuit simulation and problem solving using PSPICE.

UNIT3

OP amp applications: Sign changer, Scale changer, phase shift circuit, voltage follower, Summing amplifier, Subtractor, Integrator, differentiator, V/I converters, I/V converters, Log amplifier, Antilog amplifier, Instrumentation amplifier.

Non linear circuits: Comparators, Schmitt trigger, precision rectifier, window detector, clipper, clampers, zero crossing detectors.

Waveform Generators: Astable, Monostable, biastable, Triangular and saw tooth, RC phase shift, Wien bridge oscillators, Sample and hold circuit.

Filters: Transfer functions–LPF, HPF, BPF, BRF; Butter worth-Chebyshev: Active Filters, I and II order, All Pass filters, Switched Capacitive Filters, Circuit simulation and problem solving using PSPICE and MATLAB.

UNIT 4

Specialized ICs and applications: 555 timers–Functional block diagram-Astable multivibrator, monostable multivibrator.

Phase Lock Loop: 566 VCO chip-Mathematical block diagram, derivation of capture range, lock range and pull in time capture and lock range; applications: Frequenc

multiplication and division-AM demodulation-FM detection-FSK demodulation. Analog multiplier circuits and applications.

TEXT BOOK:

1. R F Coughlin. Op amps and Linear Integrated circuits. Pearson Education/PHI.
2. Ramakant A. Gayakwad. OP-AMP and Linear IC's. Prentice Hall. 1994.
3. Gray. Analog Integrated Circuits. John Wiely 2nd Edition.
4. Sedra and Smith. Microelectronic Circuit. Oxford 3rd Edition.
5. D A Bell. Opamps and Linear integrated Circuits. PHI Part A. second Edition.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-208 COMMUNICATION SYSTEMS

L	T	P	Total Credits: 4
4	-	-	

External Marks: 80 **Total Marks: 100**

Internal Marks: 20

COURSE OBJECTIVE:

The objectives of the course are to learn and understand the fundamental of Communication system. At the end of this chapter student will be able to learn and understand:

1. To study the basics of analog communication systems
2. To impart the basic concepts of basic analog modulation schemes
3. To develop understanding about performance of analog communication system.
4. Various amplitude modulation and demodulation systems
5. Various angle modulation and demodulation system
6. Basics of Noise theory and performance of various receivers

UNIT1. INTRODUCTION:

The essentials of a communication system, modes and media's, base band and pass band signals, modulation process-need, band width requirements. Analogue vs Digital communication. External noise, Internal noise, S/N ratio, noise figure.

Random Signal Theory: Random signals, concept of probability, continuous random variables, probability distribution function, probability density function, joint probability density functions, Statistical average and moments. Ergodic processes, correlation function, power spectral density, central limit theorem, response of linear system to random signals.

UNIT 2. AMPLITUDE MODULATION:

Definition, time domain and frequency domain description, single tone modulation, power and current relations in AM waves, Modulation Index, generation of AM waves, generation of Double Side-Band Suppressed Carrier (DSBSC) waves, square law modulator, Switching modulator, Detection of AM waves; square law detector, envelope detector, coherent detection of DSBSC waves, single side band modulation, generation of Single Side-Band (SSB) waves, demodulation of SSB waves, VSB Noise in analog communication system, Noise in DSB & SSB system.

UNIT 3 ANGLES MODULATION:

Frequency Modulation: single tone FM, spectrum analysis of sinusoidal FM wave, narrow band FM, wide band FM, 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 & AM, Noise in AM, FM, Pre-emphasis & de-emphasis circuits.

UNIT 4 TRANSMITTER AND RECEIVER:

Radio Transmitter-Classification, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter-Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter, Receiver types-TRF, Superhetrodyne

RF section and characteristics- Frequency changing and tracking. IF. AGC. FM Receiver. sensitivity. selectivity. fidelity. Comparison with AM Receiver. Amplitude limiting.

TEXT BOOKS:

1. Simon Haykins. Communication systems. 4th Edition. John wiley & sons.
2. Singh and Sapre. Communication systems. TMH.
3. Taub and Schilling. Communication system. TMH.

REFERENCE BOOKS:

1. Kennedy. Electronic Communication Systems. TMH.
2. Frenzel. Communication Electronics. TMH.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

1183/M-17 1193/M-18 1179/M-19

MAL-202 **NUMERICAL METHODS**

L T P **Total Credits: 3**

3 - -

External Marks: 80 **Total Marks: 100**

Internal Marks: 20

UNIT I: Solution of algebraic and transcendental Equations using Bisection method. Secant method. Regula falsi method. Newtons Raphson method and their order of convergence. Method of least squares.

UNIT II: Finite difference operators and their relations. Newton- Gregory formula for forward & backward interpolation for equal intervals. Newton's divided difference formula. Lagranges formula for unequal interval.

Solution of System of linear equations using Gauss Elimination. Triangulization. Cholesky Method (Direct Method). Jacobi. Gauss siedal. Relaxation Method (Indirect Method)

UNIT III: Numerical solution of ordinary differential equation using Picard method. Euler method. modified Euler method. Taylors series Method. Runge Kutte Method. Milne Simpson Method. Adam Bashforth Method.

Solution of B.V.P. using finite difference method & Shooting Method.

UNIT IV: Numerical differentiation: Derivative using forward. Backward & central difference formula (Sterling. Bessels's. Newton divided difference formula)

Numerical Integration: Newton's cotes quaderature formula: Trapezoidal rule. Simpsons one third rule. Simpsons three eight rule. booles rule. weddles rule and Error in quadrature formula

TEXT BOOKS:

1. F. Gerald and Patrick G.Wheatley. Applied Numerical Analysis: Curtis. Pearson Education Ltd.
2. E. Balagurusamy. Numerical Method. T.M.H.

REFERENCE BOOKS:

1. M.K. Jain. S.R.K. Iyenger and R.K. Jain. Numerical Methods for Scientific and Engg Computations.Wiley Eastern Ltd.
2. S.S. Sastry. Introductory Methods of Numerical Analysis. P.H.I.
3. B.S. Grewal. Numerical Methods in Engg & Science.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-242 LINEAR INTEGRATED CIRCUITS LAB

L T P — **Total Credits: 1**

\- - 2

External Marks: 40 — **Total Marks: 50**

Internal Marks: 10

COURSE OBJECTIVE:

To design and implement the electronic circuits to gain knowledge on performance of the circuit and its application.

LIST OF EXPERIMENTS:

1. Study of OP AMPs- IC741, IC555, IC565, IC566, IC1496–functioning parameters and specifications.
2. Measurement of op-amp parameters - CMRR, slew rate, open loop gain, input and output Impedances.
3. OP AMP Applications-Adder, Subtractor, Comparator Circuits.
4. Integrator and Differentiator Circuits using IC 741.
5. Instrumentation amplifier - gain, CMRR and input impedance.
6. Active Filter Applications–LPF, HPF (first order).
7. Active Filter Applications–BPF, Band Reject (Wideband) and Notch Filters.
8. IC 741 Oscillator Circuits–Phase Shift and Wien Bridge Oscillators.
9. Function Generator using OP AMPs.
10. IC 555 Timer Monostable Operation Circuit.
11. IC 555 Timer Astable Operation Circuit.
12. Schmitt Trigger Circuits using IC 741 and IC 555.
13. IC 565 PLL Applications.
14. IC 566 VCO Applications.
15. Voltage Regulator using IC 723.
16. Three Terminal Voltage Regulators – 7805, 7809, 7912.
17. Four bit DAC using OP AMP.
18. Circuits using op-amps for waveform generation.
    i) Astable multivibrators
    ii) Monostable multivibrators.
    iii) Wein bridge oscillator
    iv) Triangular, square wave form generators.
19. Second order Active RC filters High pass, low pass.

20. Active notch filter realization using op-amps.
21. Wein bridge oscillator with amplitude stabilization.
22. RC phase shift oscillator.
23. Design of PLL for given lock and capture ranges & frequency multiplication
24. Precision limiters using op-amps.
25. Log and Antilog Amplifiers.
26. Single op-amp second order LPF and HPF-Sallen-Key configuration
27. Narrow band active BPF-Delyiannis configuration
28. Active notch filter realization using op-amps

NOTE: At least ten experiments are to be performed atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set as per the scope of the syllabus.

ECP-246 COMMUNICATION SYSTEM LAB

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVES:
To help the students to design and implement communication circuits. To give hands on training on simulation software.

INSTRUCTIONAL OBJECTIVES:
To carry out analog modulation and demodulation experiments using discrete electronic components, trainer kit and textual and graphical programming simulation environment.

LIST OF EXPERIMENTS:
1. To study amplitude modulation and demodulation using trainer kit and textual and graphical programming simulation environment.
2. To study frequency modulation and demodulation using digital phase detector, phase locked loop, synchronous detector using trainer kit and textual and graphical programming simulation environment.
3. Spectral analysis of AM and FM signals using spectrum analyzer.
4. To study RF Mixer using JFET/BJT.
5. To study balanced modulator and demodulator.
6. Implementation of intermediate frequency amplifier.
7. SSB generation and demodulation using integrated circuits.
8. To study selectivity and fidelity of superhetrodyne receiver.
9. To study PAM modulation and demodulation using textual and graphical programming simulation environment.

NOTE: Atleast ten experiments are to be performed: atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set as per the scope of the syllabus. A term project.

comprising of an application oriented electronic circuit, is to be designed and completed as part of this practical subject.

ECP-248 **Electronics Circuit Simulation Lab**

L T P **Total Credits: 1**

0 0 2

External Marks: 40 **Total Marks: 50**

Internal Marks: 10

COURSE OBJECTIVE:

Simulation using Pspice/MATLAB/Multisim or any other software.

LIST OF EXPERIMENTS:

1. Familiarization with the EDA tool.
2. Learning to capture schematic and use simulation commands.
3. Simulation of digital gates and flip flop.
4. Simulation of a class A amplifier.
5. Design and simulation of a 2-digit BCD adder/ substractor
6. Design and simulation of op-amp based square wave generator.
7. Design and simulation of op-amp based phase shift oscillator.
8. Design and simulation of op-amp based low pass, high pass and band pass filters.
9. Design and simulation of a 2-stage, Class-A amplifier.
10. Design and Simulation of 4-bit carry took ahead adder.
11. Design and simulation of 555 astable and monostable multivibrators.
12. Study of effect of no. of inputs on switching response of CMOS gates.
13. Design and simulation of clock generator circuit.
14. Design and simulation of 2-bit dynamic RAM.
15. Experiments on circuits and analysis (a) Mesh analysis
16. Verification of Norton and Thevenin's theorem
17. Superposition, Reciprocity and Maximum power transfer theorem

18. AC – DC transient analysis for R – C, R – L circuits
19. Series and parallel resonance circuits
20. Experiments on application of Diodes and Transistors
21. Application of Diodes (clippers, clampers and rectifiers)
22. RC coupled amplifiers, Emitter follower, FET amplifiers, Feedback amplifiers
23. and Power amplifiers
24. Multivibrators
25. Monostable, Bistable and Schmitt trigger, Astable
26. RC and LC Oscillators
27. Wave form generators
28. Application of Operational amplifiers(Op - amps)
29. Simulation of AM, FM and PM
30. Simulation of FSK and PSK
31. Simulation of PCM and ADPCM

LabView/Pspice/MATLAB/Simulink/multisim or any other package based computational project development related to mathematical modelling, design, and simulation in the domain of electronics major course and laboratory experiments in context of the same.

NOTE: Atleast ten experiments are to be performed. Out of which atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set as per the scope of the syllabus.

ECP-244 ELECTRONICS DEVICES & CIRCUIT LAB-II

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

INSTRUCTIONAL OBJECTIVES

The objective of the lab is to train the students to analyze electronic circuit and understand their functionality. To study experimentally the working of amplifiers, regulators and analyze their behavior by plotting graphs.

LIST OF EXPERIMENTS:

1. Feed back voltage regulator with short circuit protection.
2. Emitter follower with and without complementary transistors – Frequency and phase Response driving a capacitive load.
3. Single stage BJT/FET amplifier.
4. Two stage RC coupled amplifier– Frequency response.
5. Cascode amplifier – Frequency response.
6. Phase shift oscillator using BJT/FET.
7. Hartley / Colpitts oscillator using BJT/FET.
8. Power amplifier – Class A & class AB.
9. Crystal oscillator.
10. Tuned amplifier.

11. Second order Active RC filters High pass, low pass.
12. Active notch filter realization using op-amps.
13. Wein bridge oscillator with amplitude stabilization.
14. RC phase shift oscillator.

NOTE: At least ten experiments are to be performed atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set as per the scope of the syllabus.

ECL-308 DIGITAL SYSTEM DESIGN

L T P
3 1 0

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

At the end of the this course students are able to simulate and implement typical combination and sequential digital systems in PLDs and express the design in VHDL.

UNIT1

Introduction: Introduction to computer-aided design tools for digital systems. Hardware description languages: introduction to VHDL. data objects. classes and data types. operators. overloading. logical operators. Types of delays entity and architecture declaration. Introduction to behavioural. dataflow and structural models.

UNIT 2

VHDL Statements: Assignment statements. sequential statements and process. conditional statements, case statement array and loops. resolution functions. packages and libraries. concurrent statement

Subprograms: Application of functions and procedures. Structural modelling. component declaration. structural layout and generics.

UNIT 3

Combinational Circuit Design: VHDL Models and simulation of combinational circuits as multiplexers. demultiplexers. encoders. decoders. code converters. comparators. implementation of Boolean functions etc.

Sequential Circuits Design: VHDL models and simulation of sequential circuits shift registers. counters etc.

UNIT 4

Design of Microcomputer: Basic components of a computer. specifications. architecture of a simple microcomputer system. implementation of a simple microcomputer system using VHDL.

Design with CPLDs and FPGAs: Programmable logic devices: ROM. PLAs. PALs. CPLD and FPGA. Design implementation using CPLDs and FPGAs.

REFERENCE BOOKS:

1. Bhasker. A VHDL Primmer. Prentice Hall. 1995.
2. Charles. H. Roth. Digital System Design using VHDL. PWS. 1998.
3. Navabi Z. VHDL-Analysis & Modelling of Digital Systems. McGraw Hill.
4. Perry. VHDL-IV Edition. TMH. 2002.
5. Ercegovac Lang & Moreno. Introduction to Digital Systems. John Wiley. 1999.
6. Brown and Vranesic. Fundamentals of digital Logic with VHDL Design. TMH. 2000.
7. R.P Jain. Modern Digital Electronics- III Edition. TMH. 2003.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL- 201 COMPUTER ORGANIZATION & ARCHITECTURE

L	T	P	Total Credits: 4
3	1	-	

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT – I

Introduction and overview: Review of digital components. Evolution of computers.

Register Transfer and Micro operation: Register transfer language, register transfer, bus and memory transfer, arithmetic micro operations, logic micro operations, shift micro operations.

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input-output and interrupts, design of basic computer, design of accumulator logic.

UNIT – II

Microprogrammed Control Unit: Control memory, address sequencing. Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes. Parallel Processing, pipelining, arithmetic pipeline. RISC Pipeline, Vector Processing, and Array Processors.

UNIT – III

Computer Arithmetic: Introduction, addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operation, S and decimal arithmetic operations.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor.

UNIT – IV

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

Multiprocessors: Characteristics of multiprocessor, Interconnection Structure, Intel processor Communication and Synchronization

TEXT BOOKS:

1. M Mano, Computer System and Architecture, PHI, 1993.
2. A. Patterson and John L. Hennessy, Morgan, Computer Organization and Design, 2nd Edition, Kauffmann, 1997.

REFERENCES BOOKS:

1. Malvino, Digital Computer Electronics: An Introduction to Microcomputers, TMH.
2. J. P. Hayes, Computer Architecture and Organization, McGraw Hill, 1998.
3. W. Stallings, Computer Organization & Architecture, PHI, 2001.
4. Dandamudi, Fundamental of Computer Organization & Design, Wiley Dreamtech, 2005.
5. C Hamacher, Z Vranesic, S Zaky, Computer Organization, 5th Edition, 2002.
6. Nicholas Carter, Computer Architecture, T.M.H, 2002.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-303 DIGITAL COMMUNICATION

L T P
3 1 0

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

To provide a comprehensive coverage of digital communication systems. The objectives of course are as follows:

1. To impart the basic concepts of various digital modulation schemes.
2. To develop understanding about digital transmitters and receivers.
3. Pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
4. Base band pulse transmission which deals with the transmission of pulse amplitude modulated signals in their base band form.
5. Pass band data transmission methods.

UNIT 1

Principles of Digital Data Transmission: Sampling of Band pass and low pass. Pulse modulation–PAM-PPM-PWM: Multiplexing–TDM, FDM. Uniform and nonuniform quantisation. PCM. DPCM. delta & adaptive delta modulation. calculation of quantisation noise. noise. in PCM and Delta modulation.

Digital Multiplexing: Line Coding. PSD of On/Off Signal. Bipoplar signal. Pulse shaping. Nyquist first and second criterion for zero ISI. Regenerative repeaters. Detection error probability. M-ary system. Scrambling. Digital carrier system.

UNIT 2: **Base Band Data Transmission**: Binary data transmission. system-Inter symbol interference-Nyquist pulse shaping criteria–line coding. pulse shaping. scrambling techniques. regenerative repeaters. Eye diagram: Equalization-Adaptive equalization. Detection of error probability: Gaussian probability function-properties-error function complementary error function: Digital Modulation Techniques. DPSK. BPSK. QPSK. QASK. MSK. M-ary-FSK. M-Arry-PSK. BFSK. Comparison of Various Digital Modulation Techniques. Optimum Binary Receiver. Coherent and non coherent detection of ASK. FSK. PSK. DPSK.

UNIT 3: **Information Theory:** Discrete messages. information. entropy. information rate. Source coding-Kreft inequality. Shannon-Fano and Huffman coding. Shannon's theorem. Channel capacity. Types of channels. Symmetric channels. Binary Symmetric Channel. capacity of Gaussian channel- Trade off between band width and signal to noise ratio. Capacity of a channel with infinite band width. Use of orthogonal signal to attain Shannon's limit. Efficiency of orthogonal signal transmission.

UNIT 4: Codes for Error Detection and Correction: Parity check coding. Linear block codes. Error detecting and correcting capabilities. Hamming codes. Encoding and decoding of systematic and unsystematic codes: Cyclic codes: Generator polynomial. Generator and Parity check matrices. Encoding of cyclic codes. Syndrome computation and error detection. Decoding of cyclic codes. Convolutional codes: Encoding. decoding of convolutional codes: State. Tree and Trellis diagrams. Maximum likelihood-Viterby algorithm. Sequential decoding burst error correction-Interleaving techniques-Block and convolutional interleaving. Coding and interleaving applied to CD recording-ARQ:- Types of ARQ. Performance of ARQ. Comparision of coded & uncoded system.

TEXT BOOK:

1. Taub Schiling. Principles of Communication Systems. TMH.
2. Simon Haykin. Digital and analog communication system. Willey.
3. B.P.Lathi. Modern Digital and Analog communication system. Oxford 3rd Edition.
4. Singh and Sapre. Communication Systems. TMH.
5. W Tomasi. Morden Electronic communication Systems. Person Education.
6. K Sam Shanmugam. Digital and Analog Communication System. John Wily.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-305 MICROPROCESSOR AND INTERFACING

L T P Total Credits: 3
3 - -
External Marks: 80 Total Marks: 100
Internal Marks: 20

COURSE OBJECTIVE:

To develop the basic understanding & programming concepts of 8085, 8086 microprocessor

UNIT1.

8085 Processor: Introduction to microprocessor, 8085 microprocessor: Architecture, Pin diagram, instruction set, interrupts structure, and assembly language programming.

8086 Microprocessor Architecture: Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; Special functions of general purpose registers, 8086 flag register and function of 8086 Flags, memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

UNIT2.

Instruction Set of 8086: Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

UNIT3.

Interfacing Device: The 8255 PPI chip: architecture, control words, modes and examples, Interfacing Keyboard, Displays, Stepper Motor and actuators, D/A and A/D converter interfacing.

DMA: Introduction to DMA process, Need for DMA, 8237 DMA controller, DMA data transfer Method, Interfacing with 8257.

UNIT 4

Interrupt and Timer: 8259 Programmable interrupt controller, Programmable interval timer chips.

Serial Data Transfer Schemes: Serial data transfer schemes, Asynchronous and Synchronous data transfer schemes, 8251 USART architecture and interfacing, RS232, Sample program of serial data transfer, High-speed serial communications standards, USB.

TEXT BOOKS:

1. Ramesh S Gaonkar, Microprocessor Architecture, Programming and Applications with 8085, Wiley Eastern Ltd.
2. Brey, The Intel Microprocessors 8086- Pentium processor, PHI.
3. Douglas V. Hall, Microprocessors and interfacing, TMH, 2nd Edition, 1999.

REFERENCE BOOKS:

1. Triebel and Singh, The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Applications, PHI.
2. Badri Ram, Advanced Microprocessors and Interfacing, TMH.
3. A.K.Ray and K.M.Bhurchandi, Advanced microprocessor & peripherals, TMH, 2000.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-307 ELECTRONICS MEASUREMENT & INSTRUMENTATION

L T P
3 - 0
Total Credits: 3

External Marks: 80
Internal Marks: 20
Total Marks: 100

COURSE OBJECTIVE:

The objective of this course is to introduce students to the various types of measurements made in electronics and the instruments used for measuring them. The main objective of this subject is to help students identify the different latest measurement techniques available for specific engineering applications.

INSTRUCTIONAL OBJECTIVES:

1. Understand the various measurement techniques available
2. Understand the basic working of instruments used for measurement
3. Understand the errors in measurements and their rectification

UNIT 1.

Basic concepts of measurements and instruments, static characteristics of instruments, accuracy & precision, sensitivity, reproducibility, errors.

Oscilloscope: Block diagram, study of various stages in brief, high frequency CRO considerations, Sampling and storage oscilloscope.

Electronic Instruments: Instruments for measurement of voltage, current & other circuit parameters, Q-meters, RF power measurements, introduction to digital meters.

UNIT 2

Generation & Analysis of Waveforms: Block diagram of pulse generators, signal generators, function generators, wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser.

Frequency & Time Measurement: Study of decade counting Assembly (DCA), digital indicating instruments, digital voltmeter, frequency measurements, period measurements, universal counter.

Display Devices: Nixie tubes, LED's, LCD's, discharge devices.

UNIT 3

Transducers: Classification, Types of Transducers, RLC photocell, thermocouples etc, basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature.

Signal Conditioning: DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system.

UNIT 4

Microcomputer based instrumentation system: Input/Output interfacing, simple, polled & interrupt I/O, interfacing of resistive transducers, light emitting displays, hex keyboard, 8 bit ADC chip, 8 bit DAC chip, interfacing bus standards, case study of a microntroller instrumentation system (temperature controller).

Measurement of Resistance: Wheatstone bridge, Carey Foster Bridge, Kelvin double bridge, measurement of insulation resistance.

AC Bridge: Maxwell inductance bridge, Maxwell Inductance Capacitance Bridge, Anderson, Hay, Desauty Bridge, Schering and Weins Bridge.

TEXT BOOK:

1. A.K.Sawhney, A course in Electrical & Electronics Measurements & Instrumentation, Dhanpat Rai & Sons.
2. WD Cooper, Electronics Instrumentation & Measurement Techniques, PHI

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-309 ANTENNA & WAVE PROPAGATION

L T P
3 1 0

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

The purpose of this course is to enable the students to the basics of antennas and various types of antenna arrays and its radiation patterns. This course enable students to identify the different antennas available for specific communication.

INSTRUCTIONAL OBJECTIVES:

1. To study various antennas, arrays and radiation patterns of antennas.
2. To learn the basic working of antennas
3. To understand various techniques involved in various antenna parameter measurements.
4. To understand the propagation of radio waves in the atmosphere.
5. To impart the basic concepts of radiating structures and their arrays
6. To give understanding about analysis and synthesis of arrays
7. To give idea about basic propagation mechanisms

UNIT I ANTENNA FUNDAMENTALS:

Retarded potentials. Radiation from small electric dipole. Quarter wave monopole and Half wave dipole-current distributions. Evaluation of field components. Antenna parameters-Radiation patterns. Patterns in principal planes. Main lobe and side lobes. Beamwidths. Beam area. Radiation intensity. Beam efficiency. Directivity. Gain and resolution. Antenna apertures. Aperture efficiency. Effective height. fields and patterns of thin linear center-fed antennas of different lengths. Antenna Theorems–applicability and proofs for equivalence of directional characteristics.

UNIT 2 ANTENNA ARRAYS:

Double element arrays–different cases. Principle of pattern multiplication. N element uniform linear arrays–Broadside. End fire arrays. EFA with increased directivity. Derivation of their characteristics and comparison: Concept of scanning arrays Directivity relations (no derivations). Binomial arrays. Effects of uniform and non-uniform amplitude distributions. Design Relations.

UNIT 3 VHF, UHF AND MICROWAVE ANTENNAS:

Arrays with parasitic elements. Yagi-Uda arrays. folded dipoles & their characteristics. reflector antennas: flat sheet and corner reflectors. paraboloidal reflectors–geometry. characteristics. types of feeds. F/D Ratio. Spill over. Back lobes. Aperture blocking. off-set feeds. and Cassegrainian feeds. Horn antennas–Types. optimum horns. design characteristics of pyramidal horns: lens antennas - geometry. features. dielectric lenses and zoning. Applications.

UNIT 4 WAVE PROPAGATION:

Frequency ranges and types of propagations. ground wave propagation–characteristics. sky wave propagation–Formation of Ionospheric layers and their characteristics. Mechanism of reflection and refraction. Critical frequency. MUF & Skip distance–Calculations for flat and spherical earth cases. Optimum frequency. UHF. Virtual height. Ionosphere abnormalities. Ionospheric absorption. Fundamental equation for free-space propagation. Basic transmission loss calculations. space wave propagation. troposphere wave propagation. Duct propagation.

TEXT BOOKS:

1. J D. Kraus and R J Marhefka. Antennas for All Applications. TMH. 3rd Edn. 2003.
2. E.C. Jordan and K.G. Balmain. Electromagnetic waves and radiating Systems. PHI. 2nd . 2000.
3. C.A. Balanis. Antenna Theory. John Wiley & Sons. 2nd Edn. 2001.
4. John D. Kraus. Antennas. McGraw-Hill. 2nd Edn. 1988.
5. F.E. Terman. Electronic and Radio Engineering. McGraw-Hill. 4th Edn. 1955.
6. K.D. Prasad. Antennas and Wave Propagation. Satya Prakashan. New Delhi. 2001.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-331 DIGITAL SYSTEM DESIGN LAB

L T P **Total Credits: 1**
0 0 2
External Marks: 40 **Total Marks: 50**
Internal Marks: 10

COURSE OBJECTIVE:

To gain expertise in design, analysis, development and simulation of digital circuits in different modeling style with VHDL using Xillinx Software.

LIST OF EXPERIMENTS:

Design, Simulation and Synthesis of combinatorial networks and sequential networks through the use Electronic Design Automation (EDA) tools.

1. Design, simulation and synthesis of a Full adder.
2. Design, simulation and synthesis of an Odd Parity generator for a 4-bit word.
3. Design, simulation and synthesis of a 2:1 Multiplexer.
4. Design, simulation and synthesis of a 3-to-8 line Decoder.
5. Design, simulation and synthesis of a T flip-Flop that toggles with falling edge of clock.
6. Design, simulation and synthesis ofa 4 –bit counter.
7. Design, simulation and synthesis of a Set/Reset Flip Flop.
8. Design, simulation and synthesis of a tristate driver.
9. Design, simulation and synthesis of a JK flip flop with reset.
10. Design, simulation and synthesis of an n bit Register.
11. Design, simulation and synthesis of serial to parallel transfer of 4 bit binary number.
12. Design, simulation and synthesis of parallel to serial transfer of 4 bit binary number.
13. Design, simulation and synthesis of 2 bit ALU containing 4 arithmetic and 4 logic operations.
14. Implement any three (given above) on FPGA/CPLD kit

NOTE: Ten experiments are to be performed out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set by the concerned faculty as per the scope of the syllabus.

ECP-325 MICROPROCESSOR & INTERFACING LAB

L T P
0 0 2

Total Credits: 1

External Marks: 40

Total Marks: 50

Internal Marks: 10

COURSE OBJECTIVE:

The objective of this laboratory is to introduce students about Microprocessors and Microcontrollers programming, interfacing and various applications system.

LIST OF EXPERIMENTS:

1. Study of 8085 and 8086 Microprocessor kit.
2. Write a program using 8085 and verify: (a) Addition of two 8-bit numbers. (b) Addition of two 8-bit numbers (with carry).
3. Write a program using 8085 and verify: (a) 8-bit subtraction (display borrows) 16-bit subtraction (display borrows).
4. Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.
5. Write a program using 8085 for multiplication of two 8-bit numbers by bit rotation method and verify.
6. Write a program using 8085 for division of two 8-bit numbers by repeated subtraction method and test for typical data.
7. Write a program using 8085 for dividing two 8-bit numbers by bit rotation method and test for typical data.
8. Introduction to MASM/TASM
9. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double word division and verify.
10. Write a program using 8086 for finding the square root of a given number and verify.
11. Write a program using 8086 for copying 12 bytes of data from source to destination and verify.
12. Write a program using 8086 and verify: (a) Finding the largest number from an array. (b) Finding the smallest number from an array.
13. Write a program using 8086 for arranging an array of numbers in ascending and descending order and verify.

14. Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.
15. Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.
16. 8259--Interrupt Controller: Generate an interrupt using 8259 timer.
17. 8279--Keyboard Display: Write a small program to display a string of characters.

NOTE: At least ten experiments have to be performed in the semester out of which seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set teacher as per the scope of the syllabus.

ECP-327 COMMUNICATIONS ENGG LAB-II

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVE:
To help the students to experiment on digital communication systems using kits and to use software's to simulate them.

INSTRUCTIONAL OBJECTIVES:
To carry out experiments on various digital communications modulation schemes using trainer kits, textual and graphical software to simulate the digital modulation techniques.

LIST OF EXPERIMENTS:
1. To study Pulse Amplitude Modulation and demodulation.
2. To study Pulse Width Modulation and demodulation.
3. Study of Pulse Position Modulation and demodulation.
4. Sampling Theorem-verification.
5. Study of Time division multiplexing.
6. To study pulse code modulation.
7. Study of Differential pulse code modulation.
8. Study of Delta modulation.
9. Study of Differential phase shift keying.
10. To study Frequency Shift Keying.
12. Study of ASK and QASK.
13. Study of PSK and QPSK.
14. Project related to the scope of the course.

15. Digital link simulation. error introduction & error estimation in a digital link using MATLAB(SIMULINK)/ComSim.

NOTE: At least ten experiments are to be performed. Seven experiments should be performed from the above list and the remaining three experiments can be either from the above list or set as per the scope of the syllabus.

ECP-329 ELECTRONICS MEASUREMENT & INSTRUMENTATION LAB

L T P
0 0 2

Total Credits: 1

External Marks: 40

Total Marks: 50

Internal Marks: 10

COURSE OBJECTIVE:

The aim of this course is to introduce students to the various types of measurements made in electronics and the instruments used for measuring them. The main objective of this lab is to help students identify the different latest measurement techniques available for specific engineering applications

LIST OF EXPERIMENTS:

1. Measurement of displacement using LVDT.
2. Measurement of distance using LDR.
3. Measurement of temperature using R.T.D.
4. Measurement of temperature using Thermocouple.
5. Measurement of pressure using Strain Gauge.
6. Measurement of pressure using Piezo-Electric Pick up.
7. Measurement of distance using Capacitive Pick up.
8. Measurement of distance using Inductive Pick up.
9. Measurement of speed of DC Motor using Magnetic Pick up.
10. Measurement of speed of DC Motor using Photo Electric Pick up.
11. Instrumentation amplifier using Op-Amps-gain and CMRR
12. Active notch filter/Narrowband active filter (using Op-Amp)
13. Analog to digital converter circuit
14. Digital to analog converter circuit
15. Frequency to voltage converter. Voltage to frequency converter
16. Astable and monostable multivibrators using IC 555
17. Voltage regulators: IC 723. 78XX. 79XX family
18. Design of PLL for given lock and capture ranges. frequency multiplication

NOTE: At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set by the concerned faculty as per the scope of the syllabus.

IPT-325 **Industrial Practical Training Seminar-I**

L T P **Total Credits: 2**

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External Marks: **Total Marks: 100**

Internal Marks: 100

At the end of 4th semester each student would undergo four weeks Professional Training-I (Industrial Practical Training-I) in an Industry/Institute/ Professional Organization/Research Laboratory/ In-house electronics workshop/PCB making and assembling/use of CAD software etc. during summer vacation after fourth semester with the prior approval of the Training and Placement Officer of the University. Each student in the Department submits a typed report along with a certificate from the organization. The typed report should be in a prescribed format.

The report will be evaluated in the 5th Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the Department. The Internal assessment will be effected by the following committee of three persons:

Training and Placement Officer of the Department:	Convener
Two faculties from the deptt:	Member

The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization. The student will interact with the committee through presentation to demonstrate his/her learning. Teachers associated with evaluation work will be assigned 2 periods per week load.

ECP-333 **Skill Development Workshop**

L T P **Total Credits: 1**

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External Marks: **Total Marks: 50**

Internal Marks: 50

The workshop will focus on career competency development activities for ensuring employment and employability across domain such as:

- Co-ordinate for overall development of students like resume writing, personality development activities, mock interviews techniques, employment opportunities in industries/ institutions and latest educational trends and foreign opportunities
- Providing guidance and assistance to the students for preparing reasoning, analysis the aptitude and logical skills, verbal ability and written ability
- Employability skills, career planning, Entrepreneurship opportunities
- Entrepreneurship in Management, Engineering social work etc.

Sem - 6th

ECL-312 Design and Simulation Tools

L T P

3 1 -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

Prerequisite:

Basic knowledge of computer programming and Electronics and Communication system.

Course Objectives:

The course provides exposure to textual and graphical programming environment for Electronics and Communication system design and simulation. Using textual and graphical programming simulation tool the students can design and analyze various analog and digital circuits. After successful completion of the course students should be able to:

1. Focus on autonomous and active "learning by doing" using engineering problem solving methodology steps for simulation of various Electronics and Communication system.
2. Design and simulation the various Electronics and Communication system block circuits using like textual and graphical programming environment.
3. Use open source environment to simulate various Electronics and Communication system.

Unit-1 Engineering Problem Solving Methodology

Introduction and steps of engineering problem solving methodology. Usage of Engineering Problem Solving Methodology in Electronics and Communication Engineering. Brief overview of open source and commercial simulation tools. Introduction to various textual and graphical Simulation and Design tools for Electronics and Communication Engineering, feature and their usage.

Unit 2: Problem Solving Using Textual Programming Environment

Elements of MATLAB Programming

Introduction, handing of arrays and matrices, string, cell array and structure, file I/O, handling two dimensional plotting, loop and control statement, polynomial, Matlab programming using m file script and function, MATLAB programming application in engineering problem solving, writing efficient MATLAB code, parallel MATLAB, Elements of MATLAB programming, Writing m files for Electronics and Communication System Simulation.

Input, export, I/O and application program interface, memory usage, debugger and profiler, efficient coding using vectorization technique, calling C-function, object oriented programming, symbolic processing, report generation.

Graphical User Interface

GUI development environment, Component of GUI, Design of GUI application for Electronics and Communication System, interfacing with graphical programming environment.

Elements of Scilab Programming

Introduction, Scilab Environment, Handing of arrays and matrices, string, cell array and structure, file I/O, Menus and dialog boxes, string, Handling plotting, Loop and control statement, polynomials, Application of Scilab programming in Engineering Problem Solving, Writing SCI files for Electronics and Communication System Simulation.

Unit-3: Problem Solving Using Graphical Programming

Overview of commercial and open source graphical programming environment, problem solving using graphical programming environment Simulink, Overview of Simulink block libraries and their component, Modelling and simulation of dynamic system using Simulink,

subsystem and masking. Creation of customized functionality using S-function implementation. Simulink example for analog and digital and communication. signal processing. circuit and system.

Unit 4: Virtual Instrumentation Using LabView

Graphical system design overview using LabView. modular programming. repetition and loops. arrays. plotting data. structure. file I/O. Date acquisition IMAQ. GSD application.
Introduction of Xcos. palettes. Dynamic system modelling using Xcos.
Application of graphical programming environment Simulink/LabView/Xcos in Electronics and Communication system simulation.

Text and Reference Books:

1. Stephen L. Campbell et al.. Modelling and Simulation in Scilab/Xcos. Springer.
2. James. B. Dabney. Thomas. L Harman: Mastering Simulink. Pearson Education. 2004.
3. Steven. T. Karris: Introduction to simulink with engineering applications. Orchard publications. 2006.
4. Misza Kalechman: Practical MATLAB applications for engineers. CRC Press. 2009.
5. Palamids. A.. Veloni. A.: Signals and systems laboratory with MATLAB. CRC Press. 2010.
6. Jain. S.: Modeling and simulation using MATLAB-Simulink. Wiley India. 2011.
7. Klee Harold. Aleen Randal: Simulation of dynamical system with MATLAB and Simulink. 2nd edition. CRC Press. 2011.
8. Michal. A.. Gray: Introduction to the simulation of dynamics using Simulink. Chapman & Hall/CRC. 2011.
9. Hema Ramachandran and Achuthsankar S. Nair. Scilab. S. Chand. 2012
10. Bober. W.. Stevens. A.: Numerical and Analytical Methods with MATLAB for Electrical Engineers. CRC Press. 2013.
11. Jovitha Jerome. Virtual Instrumentation Using LabView. PHI Learning Private Ltd. 2010.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-302 MICROWAVE ENGINEERING

L T P

3 1 0

Total Credits: 4

External Marks: 80

Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVES:

1. To introduce the students, to the basics of microwave devices, microwave measurements and modeling of RF circuits used in communication systems.
2. To give the basic ideas about the characteristics and applications of microwave frequency bands.
3. To understand the working of various microwave passive and active devices and circuits.

UNIT 1

Introduction: Microwave frequencies, Standard frequency bands, Behaviour of circuits at conventional and microwave frequencies.

Microwave Tubes: Limitation of conventional tubes, Construction, operation and characteristic of Klystron amplifier, reflex klystron, magnetron, TWT, BWO, CF amplifiers.

UNIT 2

Microwave Components: Introduction, comparison with transmission lines, propagation in TE & TM mode, rectangular wave guide, TEM mode in rectangular wave guide, characteristic impedance, circular waveguides, Wave-guide tees, corners, bends, twists, circulars and isolators, directional couplers, hybrid ring, S-parameters, attenuators, cavity resonators, mixers & detectors, matched load, phase shifter, wave meter.

UNIT 3

Semiconductor Microwave Devices and Circuits: Strip lines and micro strip circuits, microwave transistors and integrated circuits, varactor diodes, step-recovery diodes, tunnel diode, Gunn diode, IMPATT diode, TRAPATT diode, PIN diode, schottky barrier diodes, MASER, parametric amplifiers.

UNIT 4

Microwave Measurements: Description of Microwave bench–Different blocks and their features, power measurement: calorimeter method, bolometer bridge method, Impedance measurement, Measurement of frequency and wavelength, Measurement of unknown loads, Measurement of reflection coefficient, VSWR.

Radar Systems: Fundamentals, radar equations, Block diagram and operation, Radar frequencies, Prediction of range performance, Pulse repetition frequency and Range ambiguities, MTI and pulse Doppler radar, CW radar, FMCW radar, tracking radar, Applications of Radar.

TEXT BOOKS:

1. Samuel Y Liao, Microwave Devices and Circuits, Prentice Hall India.
2. F.E. Terman, Electronic and Radio Engineering, McGraw-Hill, 4th Edition, 1955.
3. M .Kulkarni, Microwave devices and Radar Engineering, Umesh Publication.
4. Sanjeev Gupta, Microwave Engineering, Khanna Publication.
5. Dennis Roddy, Microwave Technology, PHI.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL 304 DIGITAL SIGNAL PROCESSING

L T P

3 1 -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

The purpose of this course is to introduce the concepts of digital signal processing and DSP Processor. The mathematical analysis of FIR and IIR filter design and simulation using MATLAB are dealt with in detail.

INSTRUCTIONAL OBJECTIVES:

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

1. To impart foundation of discrete signal, system and transform used in digital domain.
2. Design and hardware realization of digital filters
3. Frequency response and design of FIR and IIR filters.
4. Finite word length effect
5. DSP Processor- TMS320C5X.

UNIT 1 Introduction:

Limitations of analog signal processing, advantages of digital signal processing.

Sampling Of Continuous Time Signals: Sampling theorem, frequency domain representation, reconstruction of band limited signal from its samples, discrete time processing of continuous time signals, changing the sampling rate using discrete time processing, Applications of DSP.

Discrete Fourier Transform: Discrete-Time Fourier Transform, DFT as a linear transformation–relationship to other transforms–properties of DFT–Linear filtering methods based on DFT–frequency analysis of signals using DFT- Efficient computations of the DFT-FFT algorithms–direct computation, divide-and-conquer approach, radix-2, radix-4 and split radix algorithms–implementation of FFT algorithms–Applications of FFT.

UNIT 2 Realization of Digital Filters:

Structure for Discrete Time Systems: Solution of difference equations of digital filters, System function, stability criterion, frequency response of stable systems:

Realization–direct, canonic, cascade and parallel forms, lattice and transposed structures, signal flow graph representation

Finite Precision Effects: Fixed point and floating rrepresentation, errors due to rounding, truncation, quantization of filter coefficients, round off effects in digital filters, limit cycle oscillations, scaling for overflow prevention.

State space analysis of discrete filter

UNIT 3 IIR Digital Filters:

Fundamentals, analog filter approximations–Butterworth and Chebshev, design of IIR filters from analog filters, bilinear transformation method, step and impulse invariance techniques, spectral transformations.

FIR Digital Filters: Characteristics, frequency response, Design of FIR filters using window techniques, Frequency sampling technique, Comparison of IIR & FIR filters.

UNIT 4 Multirate DSP:
Decimation, interpolation, sampling rate conversion, filter design and implementation for sampling rate conversion.
DSP Processors: Introduction to programmable DSPs: Multiplier and multiplier accumulator (MAC), Modified bus structures and memory access schemes in DSPs multiple access memory, multiport memory, VLSI Architecture, pipelining, special addressing modes, On-chip peripherals.
Problem solving using MATLAB, Simulink and toolbox in context of all units.

TEXT BOOKS:
1. Proakis, J.Gard and D.G.Manolakis, Digital Signal Processing: Principals, Algorithms and Applications, 3rd Edn, PHI, 1996.
2. Robert J. Schilling, L. Harris, Fundamentals of Digital Signal Processing, Thomson.
3. S. Salivahanan et al., Digital Signal Processing, TMH, 2000.
4. M.Mulkarni & Umesh Gupta, Digital Signal Processing, IK Publisher.
REFERENCES:
1. A.V. Oppenheim and R.W. Schaffer, Discrete Time Signal Processing, PHI, 1989.
2. Thomas J. Cavicchi, Digital Signal Processing, John Wiley, 2004.
3. B. Venkata Ramani, M. Bhaskar, Digital Signal Processors, Architecture, Programming & Applications, TMH, 4th reprint, 2004.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-306 COMPUTER NETWORK

L T P Total Credits: 3

3 - 0

External Marks: 80 Total Marks: 100

Internal Marks: 20

Course Objectives:

1. To give the basic ideas of data communication networks-queuing theory, architecture and protocol
2. To understand the concept of switching networks

UNIT – 1

Introduction-Uses of Computer Networks, Network Architecture, Reference Model (ISO-OSI, TCP/IP-Overview, IP Address Classes, Subneting), Domain Name service internet security and authentication, firewalls, internet and Ethernet.

The Physical Layer: Theoretical basis for data communication, transmission media, Twisted Pair, Baseband Coaxial Cable, Broadband Coaxial Cable, Fibre Cable, Structured Cabling, Cable mounting, Cable testing, narrowband and broadband ISDN and ATM.

UNIT – 2

The Data Link Layer: Data link layer design issues, error detection and correction, data link protocols, sliding window protocols, Examples of Data Link Protocols.

Medium Access Sub layer: Aloha protocols, LAN protocols, IEEE standards, fibre optics network, satellite networks, packet radio networks.

The Network Layer: Network layer design issues, routing algorithms, congestion control algorithm, internetworking, the network layer in the internet, the network layer in ATM networks, IP version 4 and 6, SONET/SDH, FDDI.

UNIT-3

Transport Layer: Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control.

Session Layer: Protocol design issues, connection management, remote procedure calls.

Presentation Layer: Design issues, abstract, syntax notation, data compression technique, cryptography.

UNIT-4

Application Layer Services: Principles of Application Layer Protocols DNS, DHCP, FTP, TFTP, SMTP, SNMP, HTTP, WWW.

Data communication-introduction. data communication hardware. serial interfaces: RS-232. RS-449 & RS-530 CCITT X.21. Parallel interfaces. the telephone network-Network. data modems: synchronous modems. asynchronous modems. modem synchronization.

TEXT BOOKS:

1. A. S. Tananbaum. Computer Networks. 3rd Ed. PHI. 1999.
2. D. E. Comer and D. L. Stevens. Internetworking with TCP-IP: Design. Implementation and Internals. Prentice Hall. 1990.

REFERENCE BOOKS:

1. U. Black. Computer Networks-Protocols. Standards and Interfaces. PHI. 1996.
2. W. Stallings. Computer Communication Networks. PHI. 1999.
3. Laura Chappell. Introduction to Cisco Router Configuration. Techmedia. 1999.
4. Michael A. Miller. Data & Network Communications. Vikas Publication. 1998.
5. William A. Shay. Understanding Data Communications and Networks. Vikas Publication.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-308 **CONTROL SYSTEM** **Total Credits: 4**

L T P

3 1 0 **Total Marks: 100**

External Marks: 80

Internal Marks: 20

COURSE OBJECTIVE:

To give an introduction to the analysis of linear control systems. This will permit an engineer to exploit time domain and frequency domain tools to design and study linear control systems.

INSTRUCTIONAL OBJECTIVES:

At the conclusion of this course, the students will be able to:

1. Describe the various time domain and frequency domain tools for analysis and design of linear control systems.
2. Describe the methods to analyze the stability of systems from transfer function forms.

UNIT 1

System Analysis: Introduction to control system. Systems, subsystems, and stochastic and deterministic systems- Principles of automatic control. Open loop and closed loop systems.

Transfer Function Approach: Mathematical models of physical systems and transfer function approach. Determination of transfer functions for simple electrical, mechanical, electromechanical, hydraulic and pneumatic systems. Analogous systems. MIMO systems: Block diagram algebra, block diagram reduction. Signal flow graphs. Mason's gain formula.

UNIT 2

Time Domain Analysis: Standard test signal. Transient response of first order & second order control system for unit step, impulse and ramp signals. Performance- characteristics in the time domain-effects of PD, PI & PID, steady state response-error constant-generalised definition of error coefficients, stability analysis in s-domain. The concept of stability. Routh stability criterion, qualitative stability and conditional stability.

Root Locus: Basic theory and properties of root loci, procedure for the construction of root loci, complete root locus diagram.

UNIT 3

Frequency Domain Analysis: Frequency response-Bode plot. Polar plot. Correlation between time and frequency response. Stability in frequency domain. 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.

Control Design Technique: Design and compensation of feedback control system:- approaches to compensation- cascade compensation networks and their design in the frequency domain- simple design in S-plane.

UNIT 4

State Variable Methods: Introduction, state variable description of linear dynamic systems-representation in matrix forms-block diagram and signal flow graph representation of state equations - Transfer matrix from state equations - transition matrix general solution for linear time invariant state equations.

Control System Components: - Error detectors, servomotor, tachogenerator, servo amplifier, magnetic amplifier, stepper motor, rotating amplifier, - Basic principles of adaptive control systems. Problem solving using MATLAB, simulink and toolbox in context of all units.

TEXT BOOKS:

1. Ogata K. Modern Control Engineering. Prentice Hall/Pearson.
2. Kuo B. C. Automatic Control System. Prentice Hall.
3. Nagarath and Gopal. Control System Engineering. Wiley Eastern.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-310 **VLSI DESIGN**

L T P — Total Credits: 3

3 - 0

External Marks: 80 — Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVE:

1. To introduce the technology, design concepts, electrical properties and modeling of Very Large Scale Integrated circuits.
2. To study the issues in devices used for VLSI design.
3. To introduce the various building blocks and test methods in a digital IC design.
4. To introduce the various steps in IC fabrication, starting from the raw material to the finished product as well as physical principles involved in these processes
5. To learn the basic MOS Circuits.MOS process technology
6. To learn the concepts of modeling a digital system using Hardware Description Language.

UNIT 1

Introduction: Review of MOS technology: MOS transistor, type, operation and equivalent circuit of MOS transistor, PMOS, NMOS, CMOS & BiCMOS device fabrication process. Equivalent circuit for MOSFET and CMOS.

VLSI Fabrication: Crystal growth, wafer preparation, epitaxy, oxidation, lithography, etching, diffusion, ion implantation, metallization.

UNIT 2

MOS Transistor Theory: MOS device design equations, MOS transistor, Evaluation aspects of MOS transistor, threshold voltage, MOS transistor transconductance & output conductance, figure of merit, alternative forms of pull-up, CMOS and BiCMOS-inverters, determination of pull-up to pull-down ratio for an n-MOS inverter driven by another n-MOS inverter & by one or more pass transistor, Latch up in CMOS circuitry.

UNIT 3

VLSI Circuit Design Processes: Overview of VLSI design methodology, VLSI design flow, Design hierarchy, Stick Diagrams, Design Rules and Layout, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Basic circuit concepts, Sheet Resistance RS and its concept to MOS, Area Capacitance Units, Calculations - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

UNIT 4

Subsystem Design: Subsystem Design, Shifters, Adders, incrimenter/decrementer, ALUs, Multipliers, Parity generators, left right/shift serial/ parallel registrar, Comparators, Zero/One Detectors, Counters.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, Essentials of VLSI circuits and systems, PHI, 2005.
2. Weste and Eshraghian, Principles of CMOS VLSI Design, Pearson Education, 1999.
3. J P Uyemura, Chip design for submicron VLSI: CMOS layout & simulation, Thomson.
4. John P. Uyemura, Introduction to VLSI Circuits and Systems, John Wiley, 2003.
5. John M. Rabaey, Digital Integrated Circuits, PHI, EEE, 1997.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-324 DIGITAL SIGNAL PROCESSING LAB

L T P — Total Credits: 1

0 0 2

External Marks: 40 — Total Marks: 50

Internal Marks: 10

COURSE OBJECTIVE:

To provide an introduction to DSP and DSP Devices (specifically the TMS 320C). The emphasis is on using Matlab as a platform for understanding DSP techniques before applying these techniques on a DSP device.

LIST OF EXPERIMENTS: Perform the experiments using MATLAB/Scilab, Simulink, Xcos and LabView:

1. To study the architecture of DSP chips– TMS 320C SX/6X instructions.
2. To represent basic signals (unit step, impulse, ramp, exponential, sine and cosine).
3. To develop program for discrete convolution & correlation.
4. To verify linear convolution & circular convolution.
5. To design FIR filter (LP/HP) using windowing technique: rectangular window, triangular window and Kaiser Window
6. Write a MATLAB program to generate sum of sinusoidal signals.
7. Write a MATLAB program to find frequency response of analog LP/HP filters.
8. To compute power density spectrum of a sequence.
9. To find the FFT of given 1-D signal and plot.
10. To understand stability test.
11. To understand sampling theorem.
12. To design analog filter (low-pass, high pass, band-pass, band-stop).

13. To design digital IIR filters (low-pass, high pass, band-pass, band-stop).
14. To Implement IIR filter (LP/HP) on DSP Processors
15. To design a program to compare direct realization values of IIR digital filter.
16. To develop a program for computing parallel realization values of IIR digital filter.
17. To develop a program for computing cascade realization values of IIR digital filter.
18. To develop a program for computing inverse Z-transform of a rational transfer function.
19. Study of pre-emphasis of speech signal.
20. Study of digital signal processing kit (TMS/ADSP).
21. Study of digital signal processing toolbox.
22. Implementation of FIR/digital filters using DSP kit.
23. Getting familiar with LabView Environment.
24. Digital FIR/IIR filter design using LabView.
25. Real time date exchange using LabView.
26. Discrete Fourier transfer/Discrete wavelet transform using LabView
27. Dual tone Multi-frequency (DTMF) system design using LabView hybrid programming
28. Getting familiar with code composer studio.
29. Generation and reconstruction of Signals using LabView.
30. Getting familiar with graphical programming environment Simulink and to study continuous and discrete block library component for discrete system realization using Simulink.
31. Realization of digital FIR/IIR filter using Simulink
32. Discrete signal and system generation and implementation using Simulink

NOTE: At least 12 experiments have to be performed in the semester; out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

ECP-326 VLSI DESIGN LAB

L T P Total Credits: 1
0 0 2
External Marks: 40 Total Marks: 50
Internal Marks: 10

COURSE OBJECTIVE:

1. To know and understand VHDL and design circuits using it.
2. To gain expertise in design and development and simulation of digital circuits with VHDL.

LIST OF EXPERIMENTS:

1. Introduction to layout design rules.
2. Layout design of basic logic gates.
3. Layout design of any combinational circuit.
4. Introduction to SPICE simulation and coding.
5. SPICE simulation of basic analog and digital circuits.
6. Analog circuit simulation using Cadence tools.
7. Verification of layouts (DRC, LVS).
8. Back annotation.

Tools Used: Cadence tools, Mentor Graphics tools.

NOTE: At least ten experiments have to be performed in the semester: At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed and set by the concerned institution as per the scope of the syllabus.

ECP-328 MICROWAVE LAB

L T P Total Credits: 1
0 0 2
External Marks: 40 Total Marks: 50
Internal Marks: 10

COURSE OBJECTIVE:

To know and understand how communication is being established at microwave frequencies.

INSTRUCTIONAL OBJECTIVES

1. To have a detailed practical study on microwave equipments and components.

LIST OF EXPERIMENTS:

1. To study microwave components.
2. To study the characteristics of reflex Klystron.
3. 3. To measure frequency of microwave source and demonstrate relationship among guide dimensions, free space wave length and guide wavelength.
4. To measure VSWR of unknown load and determine its impedance using a smith chart.

5. To match impedance for maximum power transfer using slide screw tuner.
6. To measure VSWR, insertion losses and attenuation of a fixed/variable attenuator.
7. To measure insertion loss, isolation of a three port circulator.
8. To measure the Q of a resonant cavity.
9. To study the V-I characteristics of GUNN diode.
10. To study the characteristic of Directional Coupler.
11. To study the scattering parameters of Circulator.
12. To study the scattering parameters of E plane, H plane, Magic Tee.
13. To plot the polar pattern and the gain of Horn antenna.
14. To plot the radiation pattern of Microstrip antenna.
15. To measure the insertion loss and attenuation.

NOTE: Ten experiments have to be performed in the semester. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ECP-330 **Simulation and Design Lab**

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVE:
Each student will compile independently a simulation based project using design and simulations tool pertaining to the course ECL-312 at end of semester.

Sem - 7th

ECL-403 EMBEDDED SYSTEM DESIGN

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

COURSE OBJECTIVE

The purpose of this course is to expose the concepts of embedded system principles Operating System RTOS Software Development Tools.

To introduce the student with knowledge about architecture, interfacing and programming with 8051 microcontrollers. After studying this subject, the student should be able to design microprocessor / controller based system for any relevant applications.

INSTRUCTIONAL OBJECTIVES

At the end of the course, student will know about

1. Embedded hardware
2. Real-Time Operating System
3. Software architecture
4. Development tools and debugging techniques.
5. Controller area network

UNIT I: INTRODUCTION TO AN EMBEDDED SYSTEMS DESIGN

Introduction to Embedded system, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.

UNIT II: RTOS & ITS OVERVIEW

Real Time Operating System: Task and Task States, tasks and data, semaphores and shared Data Operating system Services-Message queues-Timer Function-Events-Memory Management, Interrupt Routines in an RTOS environment, basic design Using RTOS.

UNIT III: MICROCONTROLLER

Processor Architectures: Harvard V/S Princeton , CISC V/S RISC:8051 Microcontroller: Architecture, basic assembly language programming concepts, Instruction set, Addressing Modes, Logical Operation, Arithmetic Operations, Subroutine Interrupt handling, Timing subroutines, The I²C Bus, The CAN bus, SHARC link Ports, Ethernet, Myrinet, Internet.

UNIT IV: EMBEDDED SYSTEM DEVELOPMENT

Embedded system evolution trends, Introduction to-assembler-compiler-cross compilers and Integrated Development Environment (IDE), Debugging strategies, Simulators, Introduction to Bluetooth: Specification, Core Protocol, Cable replacement protocol, IEEE 1149.1 (JTAG) Testability: Boundary Scan Architecture

TEXT BOOKS:

1. Raj Kamal, Microcontrollers Architecture, Programming, Interfacing and System Design, Pearson Education, 2005.
2. Mazidi and Mazidi, The 8051 Microcontroller and Embedded Systems, PHI, 2000.

REFERENCES:

1. A.V. Deshmuk, Microcontrollers (Theory & Applications), WTMH, 2005.
2. John B. Peatman, Design with PIC Microcontrollers, Pearson Education, 2005.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-405 WIRELESS MOBILE COMMUNICATION

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

1. To provide a strong background in the basics of wireless mobile communication
2. To impart knowledge about the existing GSM and CDMA mobile communication technology

UNIT 1

Introduction: Evolution of mobile radio communications, examples of wireless comm. systems, Generation of cellular networks, radio propagation characteristic, model for path loss, shadowing and multi path fading.

UNIT 2

Cellular Mobile Systems: Spectrum allocation, basic cellular systems, performance criteria, Frequency reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity, analog cellular system, digital cellular system.

UNIT 3

Multiple Access Techniques: Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, synchronization of spread spectrum systems, packet radio protocols, CDMA, capacity of a cellular CDMA systems.

Digital Communication: Mobile radio propagation, small scale fading and multipath propagation, multipath delay spread, Doppler spread, coherence bandwidth, coherence time, digital communication through fading multipath channels, RAKE demodulator, Diversity techniques for wireless radio systems.

UNIT 4

Wireless Networking: Introduction, 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, ISDN , Wi-Fi, Wi-Max.

Cellular Standards and Wireless Networks: GSM, IS-95, GPRS, EVDO, UMTS, IMT, LTE, signaling, call control, mobility management and location tracking.

Intelligent Cell Concept and Application: Intelligent cell concept, applications of intelligent micro-cell systems, in-building communication, CDMA cellular radio networks, advanced intelligent networks

TEXT BOOKS:

1. Theodore S. Rappaport, Wireless Communications, Pearsons.
2. W.C.Y.Lee, Mobile Cellular Telecommunication, McGraw Hill.

REFERENCE BOOK:

1. Jochen Schiller, Mobile Communications, Pearson.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-407 OPTICAL COMMUNICATION SYSTEM

L T P
4 - 0

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

1. To introduce the students to various optical fiber modes, configurations and various signal degradation factors associated with optical fiber.
2. To study about various optical sources and optical detectors and their use in the optical communication system.
3. To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
4. To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
5. To learn the various optical source materials, LED structures, quantum efficiency, laser diodes.
6. To learn the fiber optical receivers such as PIN, APD diodes, noise performance in photo detector, receiver operation and configuration.
7. To learn the fiber optical network components, variety of networking aspects, FDDI, SONET/SDH and operational principles WDM.
8. To provides the basic theory of optical fibres and principle of various components in optical communication system.
9. To give basic idea about system aspects and design concepts of fiber optical system

UNIT1

Introduction: Electromagnetic spectrum for optical communication, block diagram of optical communication system, basics of transmission of light rays, Advantages of fiber communication.

Optical Fibers: Optical laws and definitions, Optical fibers: structures, types, optical fiber modes and configurations, mode theory, single mode and graded index fibers, fiber materials, optical fibers fabrication.

UNIT 2

Signal Degradation in Optical Fibers: Signal distortion in optical fibers-attenuation, absorption, scattering and bending losses, Core and cladding losses, pulse broadening in graded index fiber, mode coupling attenuation, fiber bend loss, dispersion; fiber couplers and connectors.

Optical Sources: LEDs-structures, materials, figure of merits, characteristics & modulation, Laser Diodes-modes & threshold conditions, resonant frequencies, structures, characteristics and figure of merits, single mode lasers, modulation of laser diodes, temperature effects, light source linearity, Power modulation, power bandwidth product, Injection Laser Diodes- modes, threshold conditions, external quantum efficiency, reliability of LED & ILD.

UNIT 3

Optical Detectors: Principles of optical detection, quantum efficiency, responsivity, general principles of PIN photodetector, intrinsic absorption, materials and designs for PIN photodiodes, impulse and frequency response of PIN photodiodes, noise in PIN Photodiodes, multiplication process, APD Design, APD bandwidth, APD noise.

Optical System Design: Considerations. component choice. multiplexing. point-to-point links. system considerations. link power budget with examples. overall fiber dispersion in multi mode and Single mode fibers. Rise time budget with examples.

UNTI 4.

WDM Concepts & Components: Principles of WDM. Necessity. types of WDM. passive optical components. Tunable sources and filters. attenuation and dispersion.

Advances in Optical Fiber Systems: Telecommunications & broadband application. SONET/SDH. MUX. Analog & Digital broadband. EDFA. optical switching.

Fiber Optical Measurements: Test equipments. Measurement of attenuation. Dispersion. NA. EYE pattern Technique.

TEXT BOOK:

1. John M Senior. Optical Fiber Communications. PHI.
2. John Gowar. Optical Communication Systems. PHI.

REFERENCE BOOKS:

1. Gerd Keiser. Optical Fiber Communications. TMH.
2. Selvarajan. Kar. Srinivas. Optical fiber Communication. TMH.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-441 ADVANCED COMMUNICATION LAB

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

LIST OF EXPERIMENTS:

1. To study an Optical Link.
2. Characterization of LED.
3. Characterization of Laser Diode.
4. Intensity modulation of Laser output through an optical fiber.
5. Measurement of Data rate for Digital Optical link.
6. Measurement of NA.
7. Measurement of losses for Analog Optical link.
8. To study of TV Receiver.
9. To study of various section of TV Receiver.
10. Study of tuner section of a colour TV.
11. Study of VIF section of a colour TV.
12. Study of sound section of a colour TV.
13. Study of chorma section of colour TV.
14. Study of component of tape recorder/ CD player/ VCD player/ colour TV.
15. PN and Orthogonal code generators
16. Digital TDM
17. Cyclic encoder and decoder
18. Spreader and de-spreader for CDMA

NOTE: At least ten experiments have to be performed in the semester: At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ECP-447 EMBEDDED SYSTEM DESIGN LAB

L T P
0 0 2

Total Credits: 1

External Marks: 40
Internal Marks: 10

Total Marks: 50

COURSE OBJECTIVE:
To know and understand main programming feature of 8051 microcontroller and embedded stsem using hardware and software tools.

LIST OF EXPERIMENTS:

8051 Micro Controller

1. Write an Assembly language Programme (ALP) to generate 10kHz square wave.
2. Write an ALP to generate 10 kHz frequency using interrupts.
3. Write an ALP to interface one Microcontroller with other wring serial/parallel communication.
4. Write an ALP for temperature & pressure measurement & to display on intelligent LCD display
5. Study of Development tools/environment for Microcontroller Programme.
6. Develop an embedded system for traffic light controller using Micro controller.
7. Interfacing of DAC/ ADC with 8051 microprocessor.
8. Develop an embedded system for the automatic motion of a car (Model of car) & Subsequent display on LCD using Microcontroller.

ECP-449 MINOR PROJECT

L T P

0 2 4

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

The objective of minor project is to estimate the ability of the students to transform the theoretical knowledge acquired so far into a working model of an electronics/instrumentation system. It enables the students to gain experience in organisation and implementation of a small project and thus acquire the necessary confidence to do the main project in the final year. The minor project can be analytical work, simulation, hardware design or a combination of these in the emerging areas of Electronics and Communication Engineering under the supervision of a faculty from the ECE Department. Project work can be carried out individually or by a group of maximum of three students. The project work commences from the beginning of 7th semester and has to be completed by the end of the 7th semester.

There will be an internal and external evaluation of the project that includes demonstration and oral examination of the project work. The departmental project evaluation committee may also carry out continuous assessment of the project through progress seminars conducted during the semester.

Internal Assessment

The project will be evaluated internally through a panel of examiners consisting of the following:

Project coordinator : Convener

Respective Supervisor : Member

External Assessment

The project will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department : Chairperson

Project coordinator : Member Secretary

External expert : To be appointed by the University on recommendation of BOS

There will be a pre-submission presentation of the project work before the departmental committee including concerned supervisors. 10% of the total marks to be awarded by the guide and the remaining 10% by the internal evaluation committee. Remaining 80% of the marks are to be awarded by the external examiner.

Project coordinator will be assigned the project load of, maximum of 2 hours per week including his own guiding load of one hour. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Chairperson, Department of Electronics and Communication Engineering.

Industrial Practical Training Seminar -II

IPT-451

Total Credits: 4

L T P
0 0 0

Total Marks: 100

Internal Marks: 100

PURPOSE

To expose the students to the industrial working environment and make them for industry ready.

IMPLEMENTATION

At the end of 6th semester each student would undergo four weeks Professional Training-II (Industrial Practical Training-II) in an Industry/Institute/Professional Organization/Research Laboratory/In-house electronics workshop/PCB making and assembling/use of CAD software/design and simulation tool etc during summer vacation after sixth semester with the prior approval of the Training and Placement Officer of the University. Each student in the Department submit a typed report along with a certificate from the organization. The typed report should be in a prescribed format.

The report will be evaluated in the VII Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the Department. The Internal assessment will be effected by the following committee of three persons:

Training and Placement Officer of the Department: Convener

Two faculties from the deptt: Member

The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization. The student will interact with the committee through presentation to demonstrate his/her learning. Teachers associated with evaluation work will be assigned 2 periods per week load.

Departmental Elective-I

ECL-451 INTELLIGENT INSTRUMENTATION

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

UNIT 1.

Introduction: Definition of an intelligent instrumentation system: feature of intelligent instrumentation: components of intelligent instrumentation: Block diagram of an intelligent instrumentation.

UNIT 2.

Interfacing Instruments & Computers: Basic issue of interfacing: Address decoding: Data transfer control: A/D converter: D/A converter: other interface consideration.

UNIT 3.

Instrumentation/Computer Networks: Serial & parallel interfaces: Serial communication lines: Parallel data bus: IEEE 488bus: Local area

Networks. Star networks. Ring & Bus networks. Fiber optic distributed networks. Field bus: Communication Protocols for very large systems: communication network rationalization.

UNIT 4.

Software Filters: Description of Spike Filter. Low pass filter. High pass filter etc.

TEXT BOOK:

1. Principles of measurement and Instrumentation: Alan S. Morris: PHI

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-443

WIRELESS LANS

Total Credits: 4

L T P
4 - -

Total Marks: 100

External Marks: 80
Internal Marks: 20

UNIT 1

Radio Technologies: Overview. Spread Spectrum. Channel Sets. 802.11 IEEE Standards. Association Process. Diversity Antennas.

Wireless LAN Topologies: What is a WLAN?. Single Cell of Coverage. Multiple Cells of Coverage. Wireless Repeater. System Redundancy (Hot Standby). Peer to Peer (Ad Hoc) . Multi-Rate and Gear Shifting. Overlapping Coverage . 340/350 Comparison. In Line Power . Home Base Station.

UNIT 2

Wireless LAN Products: Access Points. Client Devices. Accessories.

Basic Antenna Theory: Directionality. Gain. Cisco Antennas.

UNIT 3

Client Device Configuration: Windows Drivers. Aironet Client Utility.

Basic Access Point Configurations: Access Point LEDs. Setup of Network Ports. Statistics. Setup of Association Parameters. Firmware Upgrade and Distribution. SNMP Setup. Set Up of Event Logs.

UNIT 4

Home Base Station Configuration: Base Station Client Utility. BSM Configuration. BSE Configuration. Client Configuration.

Security: 802.11 and WEP. WEP Configuration. 802.11 Security Issues. Next Generation Security. 802.1x. EAP/LEAP. Radius Serve.

REFERENCES:

1. Microwave Engineering, 2nd edition. David M. Pozar. John Wiley & Sons

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-441 SWITCHING CIRCUITS AND FAULT DIAGNOSIS

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Switching Circuits: Functional Decomposition of Switching Functions. Symmetric Networks. Reduced and Minimal Network for Symmetric Functions. Identification of Symmetric Functions. Threshold Logic. Elementary Properties of Threshold Functions. Synthesis of Threshold networks. Identification and realization of Threshold Functions.

UNIT 2

Hazards: Static and Dynamic Hazards in digital circuits.
Fault Diagnosis Test for Combinational Circuits: Fault Detection in Combinational Circuits. Fault Location Experiments. Boolean Differences. Fault detection by Path Sensitization. Detection of multiple faults. Failure Tolerant Design. Quadded Logic.

UNIT 3

Sequential Circuits: Finite State Model. Synchronous Sequential Machines. Synthesis of Synchronous Sequential Circuits. Capabilities, minimization and transformation of sequential machines. Asynchronous sequential circuits.

UNIT 4

Fault Diagnosis Test for Sequential Circuits: Distinguishing Sequences. Homing Sequences. Synchronizing Sequences. Checking Experiments for Machine Identification. Diagnosable machine. Design of testable and fault tolerant systems. Application of Linear Sequential Circuits to Error Correction.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-491 BIO-MEDICAL INSTRUMENTATION

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Components of Medical Instrumentation System. Bioamplifier. Static and dynamic characteristics of medical instruments. Biosignals and characteristics. Problems encountered with measurements from human beings.

Organisation of cell. Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential. Conduction through nerve to neuro-muscular junction.

UNIT 2

Bioelectrodes Biopotential Electrodes-External electrodes. Internal Electrodes. Biochemical Electrodes.

Mechanical function. Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart.

UNIT 3

Cardiac Instrumentation Blood pressure and Blood flow measurement. Specification of ECG machine Einthoven triangle, Standard 12-lead configurations. Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

Therapeutic equipment. Pacemaker. Defibrillator. Shortwave diathermy. Hemodialysis machine.

UNIT 4

Neuro-Muscular Instrumentation Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Intrepretation of EEG and EMG.

Respiratory Instrumentation Mechanism of respiration. Spirometry. Pnemuotachograph Ventilators.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements–Leslie Cromwell and F.J. Weibell. E.A. Pfeiffer. PHI. 2nd Ed. 1980.
2. Medical Instrumentation. Application and Design - John G. Webster. John Wiley. 3rd Ed.. 1998.

REFERENCES:

1. Principles of Applied Biomedical Instrumentation–LA Geoddes and L.E. Baker. John Wiley.1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur. TMH. 2nd Ed.. 2003.
3. Biomedical Telemetry–Mackay. Stuart R.. John Wiley. 1968.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-409 TELEVISION ENGINEERING

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT I

Introduction: TV transmitter and receivers, synchronization. Television pictures: Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution; Composite video signal: Horizontal and vertical sync, scanning sequence; Colour signal generation and Encoding: Perception of brightness and colours, additive colour mixing, video signals for colours, luminance signal, colour difference signals, encoding of colour difference signals, formation of chrominance signals, PAL encoder.

Composite Video Signal: Video signal dimensions, horizontal sync details, vertical sync details, scanning sequence details, functions of vertical pulse train, sync details of 525 line system.

UNIT 2

Signal Transmission and Channel Bandwidth: Amplitude Modulation, channel bandwidth, VSB, Transmission efficiency, complete channel bandwidth, reception of VSB, frequency modulation, FM channel bandwidth, channel bandwidth for color transmission, allocation of frequency bands for television signal transmission, television standards.

Picture Tube: Monochrome picture tube, beam deflection, screen phosphor, face plate, picture tube characteristics, picture tube circuit controls; Camera Tubes: Basic principal, Image orthicon, Vidicon, Silicon Diode Array Vidicon, Monochrome TV camera, color camera, CCD Image.

UNIT 3

Basic Television Broadcasting: Television transmitter, positive & negative modulation; Television Receiver: Receiver sections, VSB correction, choice of intermediate frequencies, picture tube circuitry & controls, sound signal separation, sound section, Sync processing & AFC circuit, vertical Deflection circuit, Horizontal deflection circuit.

TV Antennas: Transmission antennas, receiver antennas, color television antennas.

Monochrome TV Receiver: RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits; PAL-D Colour Receiver: Electron tuners, IF subsystem, Y-signal channels, Chroma decoder, Separation of U & V Colour Phasors, synchronous demodulators, Subcarrier generation, raster circuits.

UNIT 4

Essentials of Color Television: Compatibility, natural light, color perception, three color television camera, the luminance signal, values of Luminance & color difference signals on colors, display tubes (Delta gun, PIL, Trinitron), Color signal transmission bandwidth.

Television Applications: Cable television, CCTV, picture phone & fascimile, television via satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits, HDTV, Concept of plasma and flat TV display

TEXT BOOK:

Monochrome and Color Television: R.R.Gulati; New Age.

TV and Video Engineering: Dhake; TMH.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-411 ELECTRONICS PRODUCT DESIGN

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT 1 FROM REQUIREMENT TO PRODUCT: Definitions of Science, Engineering, and Technology- Engineering design as real life problem solving- Requirement analysis of Electronic products- Formulation of product requirement specifications and target specifications. The design process- Computer Aided Design- Product conceptualization- Product architecture- Product synthesis- Design analysis- Portable Electronic Design Factors. Product Life Cycle. Representation of development tasks using standard tools showing timing and dependencies.

UNIT 2 ELECTRONIC PRODUCT DESIGN: Various dimensions of Electronic Product Design- Industrial design and Engineering design- DFx methodologies in product design- Quality by design analysis- Sketches and Engineering drawing of Electronic products. Aesthetics and Ergonomics- Inputs, control and display interface. Electronic interconnection and Packaging of components. Integrated circuits. Printed circuits and Functional products- Cables and connectors- Design Engineering and Test Documentation – Component Specification/ Bill of materials.

UNIT3 THERMAL DESIGN OF ELECTRONIC EQUIPMENT: Heat generation and modes of heat transfer in Electronic products- Selection of Power Semiconductor Devices based on thermal considerations- Selection/Design of Heat Sinks- Factors affecting the design of heat sinks and its cooling effectiveness- Assembly of components on heat sinks- Electrical analogue of thermal circuits- Enclosure design of Electronic Equipments and thermal considerations- Design guidelines for Ventilations- Forced cooling- Heat pipes for electronic cooling applications- Cooling of power intensive IC chips- Thermal Considerations in PCB design.

UNIT 4 EMI AND DESIGN FOR ELECTROMAGNETIC COMPATIBILITY: Electric Field Interference, Magnetic Field Interference, Conducted noise etc. in Electronic Equipment- Sources of EMI, inter and intra system EMI- Noise performance of passive components- Cabling, Shielding and Grounding - Cables, Connectors, components and equipments for interference suppression/minimization- Intrinsic noise sources and their management- EMI standards and Regulations- PCB design guidelines for EM compatibility.

ELECTRONIC DESIGN AUTOMATION TOOLS: PCB design process- Design rules for analog, digital, high-frequency, power-electronic and MW PCBs. Introduction to PC based Electronic Design Automation Tools: Schematic Capture, Circuit Simulation, Layout Design etc. Features of such packages with reference to popular EDA tools such as Orcad- Designing PCBs for manufacturability- Design considerations for power efficiency. Introduction to SPICE simulation of circuits- Circuit description- Modeling ofactiveand passive circuit elements. Circuit analysis- DC, AC, Transient and Parametric analysis.

REFERENCES BOOKS

1. Product Design & Development- Karl T. Ulrich & Steven D. Eppinger, MGH.
2. Product Design & Manufacturing- John R. Lindberg, PHI.
3. PCB Design & Technology- Walter C. Bosshart, TMH
4. Noise Reduction Techniques in electronic systems- Henry W. Ott.

5. Electronic Product Design for Automated Manufacturing- R Stillwell. Marcel Dekker Pub.
6. Portable Electronics Product Design and Development – Bert Haskell. MGH

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL- 429 FUNDAMENTALS OF RF DESIGN

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-1

Components: Behavior at High Frequencies: Wire, Resistors, Capacitors, Inductors, Torroids, and their winding, Impedance Transformation, Coupling of resonant circuits,, Transmission lines & Impedance Matching: Transmission line theory, The Smith Chart and impedance matching, Microwave Filter Theory: Filter theory, Transmission Line Transformations and microwave filters, Computer-Aided Design and Analysis Interconnection of networks Analysis techniques Optimization Use of SPICE.

UNIT-2

The Transistor at Radio Frequencies: Equivalent Circuit, Y-Parameters, S-Parameters, and other relevant two-port parameters, RF Transistor Data Sheets, Microwave Printed Circuits & Microwave Solid State Devices: Bipolar Microwave Transistor, MESFET, MODFET/HEMT Microwave IC's, Microwave Diodes, and MODAMPs, Striplines, Micro strips, Printed Microwave Components, Surface Acoustic Wave device.

UNIT-3

High frequency Amplifier Design, Small Signal RF Amplifier Design: Biasing, Designs using Y and S Parameters, Broadband Amplifiers, Single Stage, Multistage designs, Gain and stability analysis using S parameters, Wide Bandwidth Design Fundamental limitations on matching Transmission line transformers Use of feedback in RF amplifier design, Design for specified gain, bandwidth, and SWR.

UNIT-4

RF Power Amplifiers: RF Power Transistor Characteristics, Biasing, Design, Matching to Coaxial Feed lines Large Signal Amplifiers Amplifier classes and efficiency Dynamic range Intermodulation distortion Third-order intercept Design of large signal linear amplifiers, Design of large-signal class-C amplifiers Design of switch-mode amplifiers Power combiners Directional couplers Hybrids.
Phase-locked loop, Oscillator, Synthesizer, Phase noise, PLL structures & Architectures, Direct Digital: Synthesis Microwave Measurements: Power, Noise, Spectrum Analyzers, Network Analysers Software Radio and DSP in Receivers.

REFERENCE BOOKS

1. Smith J, Modern Communication Circuits, McGraw Hill, 1986.
2. Bowick, RF Circuit Design, H W SAMS 1994.
3. Chung & Levien, Microwaves Made Simple: Principles & Applications, Artech House 1985

4. R S Carson, High Frequency Amplifiers (Wiley, 1982) (2nd ed).
5. G Vendelin, Design of amplifiers and Oscillators by the S-parameter Method. (Wiley, 1982)
6. Herbert L Krauss, Charles W Bostian & Frederick H Raab, Solid State Radio Engineering, (John Wiley & Sons, 1980).
7. Robert. T. Collin, Foundations for Microwave Engineering, McGraw Hill 1992

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL- 423 AUDIO AND VIDEO ENGINEERING

L T P Total Credits: 4
4 - -
External Marks: 80 Total Marks: 100
Internal Marks: 20

UNIT-1

Audio Engineering: Audio frequency range-loudness-pitch-decibel-sound pick up devices microphones–types condenser–carbon–piezo electric-direction pattern– parameters of microphone:- frequency range- sensitivity-impedance-noise. Sound reproduction devices: loud speaker-typical specifications Production of speech signal:-Simple view of speech production spectrogram Acoustics of speech production. Uniform tube model-discrete time model–vocal fold/Vocal tract interaction Characteristics of hearing - acuity threshold and masking of detection.

Speech coding and Compression:- companding-adaptive quantization-differential and residual quantization–Vector quantization. Frequency domain coding: Sub band coding. Model based coding: linear predictive coding–VQ LPC coder. MPEG: Block diagram of audio encoder decoder. **Recording of sound**: recording media-magnetic–optical storage systems Coding and decoding applied to CD.

UNIT-2

Elements of Television system:- Basic block schematic of television, transmitter and receiver, camera , picture tube, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, maximum video frequency, resolution and bandwidth. Composite video signal - vertical and horizontal synchronization Television camera: - Working principle of CCD- its working - Color television camera: block schematic explanation Modulation -Positive and negative modulation and its comparison, high level and low level modulation and its comparison, Vestigial side band transmission. Transmission of sound signal.

UNIT 3

Colour Television: Compatibility consideration. Color response of human eye. Three color theory, additive mixing of colors, chromaticity diagram. Luminance and chrominance, color difference signal and its generation. Frequency interleaving and Colour burst signal colour TV picture tubes: CRT, LCD and plasma displays. Monochrome and colour reception:block schematic-Block schematic Basic colour television systems: PAL and NTSC-block schematic explanation.

UNIT 4

Video coding and video compression: Demand for video compression- video image representation quantization of image data intraframe compression techniques: DPCM - DCT based transform coding - Motion compensation -H. 261 video conference coding standard - MPEG video

compression. Digital audio broadcasting- Block schematic explanation-Audio compression and source encoding – HDTV: pixel transmission rate – video compression for HDTV.

REFERENCES BOOKS

1. Multi Media Communication Fred Halsal Pearson Education.
2. Basic Television Engineering: Bernad Grob, Mc Graw Hill.
3. Monochrome and colour television: R R Gulati, Wiley Eastern.
4. Discrete time Speech Signal Processing :Thomas Quatieri Pearson Education .
5. Digital Communication B salkar: Pearson Education.
6. The Electronics Hand Book: J C Whitaker IEEE press.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-419 BIOMEDICAL SIGNAL PROCESSING

L T P — Total Credits: 4

4 - -

External Marks: 80 — Total Marks: 100

Internal Marks: 20

UNIT-I

Introduction: Importance of Computer in Signal Processing, Basic Electrocardiography lead system, ECG Signal Characteristic, Single Sampling, Signal Conversion.

Digital Filter: Z-transform, elements of digital filters, Type of digital filters, Transfer function of a difference equation Z-plane pole-zero plots.

IIR Filters: Generic Equations, One pole and two pole filters integrators.

UNIT-II:

Integer Filters: Basic Design Concept, Low Pass, High Pass, Band Pass, Band reject filters, Effect of cascading of filters, fast operating design techniques.

Adaptive Filters: Principal noise canceller model, GO Hz, Adaptive Canceling, Applications.

UNIT-III:

Signal Averaging: Signal averaging as a digital filter, a typical averager, Software for single averaging, limitations, Data Reduction Techniques-Turing point Algorithm, AZTEC Algorithm, Fan Algorithm, Huffman coding, Fourier Transform, Correlation, Convolution, Power Spectrum Estimation.

UNIT-IV

ECG-QRS Detection: Power Spectrum of ECG, Band Pass Filtering Techniques, Differentiation Techniques, Template Matching, QRS Detection Algorithm.

ECG Analysis System: ECG Interpretation, ST Segment Analyzer, Portable Arrhythmia Monitor.

REFERENCE:

1. WJ.Tompkin, Biomedical Signal processing, PHI
2. JG. Prokis, Digital Signal processing, PHI
3. Salivahanan, Digital Signal Processing, Tata Mc-Graw Hill.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-439 COMMUNICATION SWITCHING SYSTEM

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT1

Electronic Switching Systems: Basics of a switching system-electronic space division Switching-stored program control-time division switching-time multiplexed space Switching-time multiplexed time switching-two stage, three stage and N-stage combination switching.

Telephone Networks: Subscriber loop, Switching Hierarchy & Routing Transmission systems, Numbering Plan, Charging plan, Signaling teachniques Common Channel Signaling.

UNIT 2

Digital Circuit Switching Networks: Two-stage network - three-stage network-n-stage network-non-blocking switches-blocking probability analysis of multistage switches– lee approximation-improved approximate analysis of blocking switch-examples of digital switching systems-AT & T 5ESS and NTI - DMS 100 switching systems

UNIT3

Elements of Traffic Engineering: Network traffic load and parameters-grade of service and blocking probability-incoming traffic and service time characterization-blocking models and loss estimates - delay systems.

Cellular Mobile Telephony: Analog Switch System for Cellular Mobile, Cellular digital switching, centralized & remote controlled small switching system.

UNIT 4

Signaling: Customer line signaling-outband signaling-inband signaling-PCM signaling - inter register signaling-common channel signaling principles-CCITT signaling system No: 7- digital customer line signaling. Introduction to ATM switching-Strict sense non block switch-self routing switches -Bense network-ATM routers-Design of typical switches.

Text books

1. Viswanathan T., Telecommunication Switching Systems and Networks, Prentice Hall of India Pvt. Ltd.
2. Schwartz M., Telecommunication Networks - Protocols, Modeling and Analysis, Addison Wesley Publishing Company

Reference books

1. Flood J.E., Telecommunications Switching Traffic and Networks, Pearson Education Pvt. Ltd.
2. FreemanR.L., Telecommunication System Engineering, Wiley Inter Science Pub.
3. Das J., Review of Digital Communication, New Age Internal (P) Ltd., Publishers.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-417 INDUSTRIAL ELECTRONICS

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT1.

INTRODUCTION: Role of power electronics, review of construction and characteristics of power diode, Shottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT & SIT.

SCR: Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors: pulse transformer and opto-coupler, commutation techniques.

UNIT 2.

AC REGULATORS: Types of regulator, equation of load current, calculation of extinction angle, output voltage equation, harmonics in load voltage and synchronous tap changer, three phase regulator.

CONVERTERS: One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT3.

INVERTERS: Basic circuit, 120 degree mode and 180 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

CHOPPERS: Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and transistor based choppers.

UNIT4.

CYCLOCONVERTERS: Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

DRIVES: Introduction to electric drives: DC drives - converter and chopper fed dc drives, ac drives - stator voltage control, V/f control, rotor resistance control, static Scherbius system and static Kramer systems.

TEXT BOOK:

1. Power Electronics: MH Rashid: PHI

REFERENCE BOOKS:

1. Power Electronics: PC Sen: TMH
2. Power Electronics: HC Rai: Galgotia
3. Thyristorised Power Controllers: GK Dubey, PHI
4. Power Electronics and Introduction to Drives: A.K.Gupta and L.P.Singh:Dhanpat Rai
5. Power Electronics: P.S Bhimra.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-431 ACTIVE NETWORK SYNTHESIS

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Filter approximations: Butterworth, Chebychev, Bessel and Elliptic approximations to ideal low pass filter characteristics–Frequency transformations to obtain HPF, BPF and BEF from normalized prototype LPF–Delay equalizer.

UNIT 2

Active biquad filters: Active and passive sensitivities, LPF & HPF using Sallen-Key configuration, BPF realization using the Deliyannis configuration, BEF using twin T configuration, all pass filter realizations, KHN and Tow-Thomas configurations, Inductance simulation, Antoniou's gyrator, filter realizations with gyrator

UNIT 3

Effect of op-amp non-idealities: Pole frequency and Q error problems–analysis with finite open loop gain of opamp, active and passive compensation, the Akerberg- Mossberg biquad

UNIT 4

Higher order filter realization: Follow- the-leader structure, Cascade structure, Leap- frog structure, Circuit implementation and practical design considerations taking into account the input dynamic range and output signal-to-noise ratio.

Reference Books:

1. Gobind Daryanani: 'Principles of Active Network Synthesis & Design', John Wiley
2. A S Sedra and P O Brackett: 'Filter Theory and Design: Active and Passive', Matrix Publishers
3. M E Van Valkenberg: Analog Filter design, Oxford University Press.
4. Rolf Schaumann and M E Van Valkenberg: Active Filter Design, Oxford University Press.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-453 MULTIRATE SYSTEMS AND FILTER BANKS

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1:

Multirate System Fundamentals:

Basic multirate operation–up-sampling and down sampling: Time domain and frequency domain analysis: Identities of multirate operations: Interpolator and decimator design: Rate conversion: Polyphase representation.

UNIT 2:

Multirate Filter Banks:

Maximally decimated filter banks: Quadrature mirror filter (QMF) banks-Polyphase representation: Errors in the QMF bank–Aliasing and Imaging: Method of canceling aliasing error: Amplitude and phase distortion: Prefect reconstruction (PR) QMF bank– PR condition: Design of an alias frees QMF bank: Power symmetry in QMF bank.

UNIT 3:

M-channel Perfect Reconstruction Filters Banks:

Filter banks with equal pass band width, filter banks with unequal pass band width-Errors created by the filter banks system- aliasing and imaging, -Amplitude and phase distortion, polyphase representation- polyphe matrix. Perfect Reconstruction System- necessary and sufficient condition for perfect reconstruction. FIR PR Systems. Examples PR Systems.

UNIT 4:

Linear Phase Perfect Reconstruction (LPPR) Filter Banks:

Necessary conditions for linear phase property: Lattice structures for LPPR FIR QMF banks-Synthesis. M-channel LPPR filter bank. Quantization Effects:-Types of quantization effects in filter banks. Implementation- coefficient sensitivity effects, round off noise and limit cycles, dynamic range and scaling.

Text Books:

1. P.P. Vaidyanathan. "Multirate systems and filter banks." Prentice Hall. PTR. 1993.
2. N.J. Fliege. "Multirate digital signal processing." John Wiley 1994.

Reference Books:

1. Sanjit K. Mitra. "Digital Signal Processing: A computer based approach." TMH 1998.
2. R.E. Crochiere.L.R. "Multirate Digital Signal Processing." Prentice Hall. Inc.1983.
3. J.G. Proakis. D.G. Manolakis. "Digital Signal Processing: Principles. Algorithms and Applications.". 3rd Edn. Prentice Hall India. 1999.
4. B.Porat. "Digital Signal Processing." Prentice Hall. 1998.
5. Ali N. Akansu. Richard A. Haddad. "Multiresolution Signal Decomposition: Transforms. Subbands and Wavelets." Academic Press 1992.

6. G. Strang T.Q. Nguyen. "Wavelets and Filter Banks" Wellesley- Cambridge Press.
7. M. Vetterli. J. Kovacevic. "Wavelets and Sub band Coding." Prentice Hall. PTR 1995.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-455 ANALOG MOS CIRCUITS

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Analog MOS models - low frequency model - MOS in saturation - high frequency model -variation of transconductance with frequency-temperature effects in MOST-noise in MOST (shot, flicker and thermal noise)-MOS resistors and resistor circuits-super MOST

UNIT 2

Current sources and sinks - current mirror - cascode current source-transient response of simple current mirror - Wilson current mirror-regulated cascode current source/sink - voltage references - resistor MOSFET and MOSFET only voltage references-band gap references - various biasing schemes for voltage references

UNIT 3

Common source-common gate and source follower amplifiers-class AB amplifier–active load configuration-transimpedance amplifier-cascode amplifier-push pull amplifier- amplifier based signal processing-the differential difference amplifier (DDA)-adder, multiplier, divider and filters using DDA

UNIT 4

Mixed signal circuits-CMOS comparator design-pre amplification-decision and post amplification stages-transient response-clocked comparators-analog multiplier-the multiplying quad-level shifting in multipliers-dynamic analog circuits-charge injection and capacitive feed through in MOS switch-sample and hold circuits-switched capacitor filters-switched capacitor implementation of ladder filters

Reference Books

1. J Baker R., Li H.W & Boyce D.E., `CMOS-Circuit Design, Layout & Simulation', PHI
2. M Ismail & Terri Fiez, Analog VLSI-Signal & Information Processing, MGH
3. Roubik Gregorian & Gabor C Temes, Analog MOS Integrated Circuits for Signal Processing, John Wiley

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

Open Elective-I

CSL-471 MANAGEMENT INFORMATION SYSTEM

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

Unit-1: Foundation of Information System: Introduction to Information System and MIS. decision support and decision making systems. systems approach. the systems view of business. MIS organization within company. Management information and the systems approach.

Unit-2:

Information Technology: A manager's overview. managerial overviews. computer hardware & software. DBMS. RDBMS and Telecommunication.

Conceptual system design: Define the problems. set systems objective. establish system constraints. determine information needs determine information sources. develop alternative conceptual design and select one document the system concept. prepare the conceptual design report.

Unit-3:

Detailed system design: Inform and involve the organization. aim of detailed design. project management of MIS detailed design . identify dominant and trade of criteria. define the sub systems. sketch the detailed operating sub systems and information flow. determine the degree of automation of each operation. inform and involve the organization again. inputs outputs and processing. early system testing. software. hardware and tools propose an organization to operate the system. document the detailed design revisit the manager user.

Unit-4:

Implementation evaluation and maintenance of the MIS: Plan the implementation. acquire floor space and plan space layouts. organize for implementation. develop procedures for implementation. train the operating personnel. computer related acquisitions. develop forms for data collection and information dissemination. develop the files test the system. cut-over. document the system. evaluate the MIS control and maintain the system. Pitfalls in MIS development.

Advanced Concepts in Information Systems: Enterprise Resources Management. Supply Chain Management. CRM . Procurement Management System.

TEXT BOOKS:

- Management Information System by W. S. Jawadekar. 2002. Tata McGraw Hill.
- Information System for Modern Management (3rd edition) - Robert G. Murdick. Joel E. Ross & James R. Claggett. PHI

REFERENCE BOOKS:

- Management Information System: O Brian: TMH

- Management Information System by Davis Olson Mac Graw Hill
- Management Information System by Stasllings. (Maxwell Mc Millman Publishers)
- Information System: a Management Perspective: Alter Addison Wesley

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

HUL-455 ENTREPRENEURSHIP

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-I:

Promotion of Entrepreneurship: Meaning, definition and functions of an entrepreneur, qualities of a good entrepreneur: Role of Entrepreneur in economic development: Government measures for the promotion of small scale industries with special reference to Haryana: Cultural factors in developing entrepreneurship.

UNIT-II:

Ownership and Location of Industrial Units: Different forms of Industrial Organization, Theories of Industrial location, Process of preparing project reports.

Size of Firm and Pricing: Concept of optimum firm, factors determining: Optimum size, Technical, Managerial, Marketing Uncertainties and risk, Pricing Methods, Policies and procedures.

UNIT-III:

Financing of Small Industries: Importance and need: Commercial Banks and term lending in India: Banks and under-writing of capital issues; Brief description about the role of other financial agencies viz: Industrial Finance Corporation of India. State Financial Corporation, Industrial Development Bank of India; Unit Trust of India.

UNIT-IV

Problems Faced by Small Enterprises: Problems connected with Marketing, Management of New Products: Power: Finance: Raw Material: Under-utilization of capacity: Causes of under - utilization: Rehabilitation of Sick Mills.

Government and Business:

(a) **Highlights of Industrial Policy and Licensing Policy.**
(b) International Marketing with special reference to export documentation.

RECOMMENDED BOOKS:

1. Entrepreneurship of Small scale industries–Deshpande Manohar D. (Asian Publishers, New Delhi)
2. Environment and Entrepreneur– Tandon B.C. (Asian Publishers, New Delhi).
3. The Industrial Economy of India - Kuchhal S.C. (Chaitanya, Allahabad).
4. Emerging Trends in Entrepreneurship Development Theories & Practices–Singh P. Narendra (International Founder, New Delhi)
5. Entrepreneur, Banker & Small Scale Industries– Bhattacharya Hrisnikes.
6. Entrepreneurship & Growth of Enterprise in Industrial Estates - Rao Gangadhara

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

MAL-451 COMBINATORICS AND GRAPH THEORY

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-1:
Permutations and combinations. Recurrence relations. Generating functions. decision trees. Graphs. incidence and degree. isomorphism. subgraphs. walks. paths and circuits. connected graphs. Disconnected graphs and component Euler's graph. operations on graphs. Hamiltonian paths and circuits. Travelling salesman problem.

UNIT-2:
Trees. properties of trees. Pendant vertices in tree. Rooted and binary trees. Spanning trees. Fundamental circuits. spanning trees in a weighted graph.
Cut-sets. properties of cut-sets. Fundamental circuits and cut-sets. connectivity and separability. Network flows. 1-isomorphism and 2-isomerphism.

UNIT-3:
Planer graphs. Kuratowski's two graphs. different representation of a planer graph. Detection of planarity. vector space of graph.
Matrix representation of graphs. incidence matrix. submatrix of incidence matrix. Fundamental circuit matrix. cut-set matrix and relationship between all three above.

UNIT 4
Colouring. chromatic number. chromatic polynomials. four color problem. Five color theorem. Directed graphs and their types. Binary relation. Directed paths and connectedness. Euler's digraph.

BOOKS RECOMMENDED:

1. Graph Theory by Narsingh Deo. PHI.
2. Graph Theory by Harry P.. Addison-Wesley.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

HUL-457 ORGANISATIONAL BEHAVIOUR & HRM

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-I:

Understanding Organisational Behaviour: Definition. Goals of Organisational behaviour. Key forces affecting Organisational Behaviour. Fundamental Concepts of Organisational Behaviour.

Motivation: Meaning. Objectives and importance of motivation. Theories of Motivation. Maslow's theory. Mc Greger's Theory Herzberg's theory.

Morale: Meaning: Factors affecting morale. types of morale and productivity. Evaluation of morale. improving morale.

UNIT-2:

Communication: Definition & importance of Communcation: Formal & informal communication. Barriers in communication.

Leadership: Definition & importance. Nature of leadership various approaches to leadership styles.

UNIT-3:

Importance of human resources in industry. Definition of human resource management. mechanical approach towards personnel. Paternalism. Social system approach.

Need for human resource planning. process of human resource planning. Methods of recruitment. Psychological tests and interviewing. Meaning and importance of placement. Meaning and techniques of induction. Training and development : Concepts of training and development. Importance of training and development. Management development its nature. purpose and method.

UNIT-4

Significant factors affecting compensation. Methods of wage payment. Wage differentials. Causes of difference in Wages. Types of wage differentials. Wage incentives. Meaning. Objectives. types of incentive plans.

RECOMMENDED BOOKS:

1. Human Resource and Personnel Management – K. Aswathappa–TMH Publ Company Ltd.
2. Personnel Management: C.B. Mamoria. Himalaya Publishing House.
3. Organisational Behaviour - Dr. L.M. Prasad (Sultan Chand & Sons).

REFERENCE BOOKS:

1. Personnel Management & Industrial Relations: Dr. T.N. Bhagoliwal: Sahitya Bhawan Agra.
2. Personnel Management: V.G. Karnik. Jaico Publishing House.
3. Personnel management & Industrial Relation: Tripathi: Sultan Chand & Sons.
4. Personnel Management - Arun Monappa & Mirza Saiyadain -TMH Publishing Co. Ltd.
5. Principles of Personnel Management - Edwin B. Flippo (McGraw Hill).
6. Organisational Behaviour – K. Adwathappa.
7. Organizational Behaviour – John W. Newsstorn & Keith Davis. TMH. New Delhi.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

PHL-477 INDUSTRIAL PLASMA ENGINEERING

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Introduction to Fourth State: Plasma state of matter, definition, types of plasma, facts and formulas, radiation from plasma, Various source of non thermal plasma.

UNIT 2

Plasma as an Industrial Tool: Plasma as a source of energetic particles, surface modification by ion implementation, Applications of plasma in different field of science, engineering and technology.

UNIT 1

Plasma in Micro Electronics: Evolution of microelectronics, plasma processing in microelectronics, plasma etching in microelectronics, deposition technology, PECVD, Plasma etching and RIE techniques: RTP techniques for annealing, growth and deposition of various films, plasma doping.

UNIT 4

Plasma Technique For Displays: Introduction and overview, Natural and artificial light source, cold plasma as light source, Flat panel display technology, plasma display panels, one dimensional, two dimensional AC PDP model, micro discharge light source, market drivers.

Markets for plasma technology

Texts/References:

1. S.K. Ghandhi, VLSI Fabrication Principles, John Wiley Inc., New York, 1994(2nd Edition).
2. S.M. Sze (Ed), VLSI Technology, 2nd Edition, McGraw Hill, 1988.
3. Plummer, Deal, Griffin "Silicon VLSI Technology: Fundamentals, Practice & Modeling" PH, 2001.
4. P. VanZant, "Microchip Fabrication", 5th Edition, MH, 2000.
5. PI John, Plasma science and creation of wealth, TMH, New Delhi 2005.
6. Industrial Plasma Engineering: Vol 1&2: Applications to Nonthermal Plasma, J R Routh.
7. Plasma Etching: Fundamentals and Applications, Minoru Sugawara, Barry L. Stansfield.
8. Plasma Physics and Engineering, Alexander A. Fridman, Lawrence A. Kennedy, 2004.
9. Handbook Of Plasma Processing Technology: Fundamentals, Etching, Deposition, Stephen M. Rossnagel, J. J. Cuomo, William Dickson Westwood

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-477 CYBER SECURITY

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-1 Introduction to information systems. Types of information Systems. Development of Information Systems. Introduction to information security. Need for Information security. Threats to Information Systems. Information Assurance. Cyber Security. and Security Risk Analysis.

UNIT-2 Application security (Database. E-mail and Internet). Data Security Considerations-Backups. Archival Storage and Disposal of Data. Security Technology-Firewall and VPNs. Intrusion Detection. Access Control. Security Threats -Viruses. Worms. Trojan Horse. Bombs. Trapdoors. Spoofs. E-mail viruses. Macro viruses. Malicious Software. Network and Denial of Services Attack. Security Threats to E-Commerce- Electronic Payment System. e-Cash. Credit/Debit Cards. Digital Signature. public Key Cryptography.

UNIT-3 Developing Secure Information Systems. Application Development Security. Information Security Governance & Risk Management. Security Architecture & Design Security Issues in Hardware. Data Storage & Downloadable Devices. Physical Security of IT Assets. Access Control. CCTV and intrusion Detection Systems. Backup Security Measures.

UNIT-4 Security Policies. Why Policies should be developed. WWW policies. Email Security policies. Policy Review Process-Corporate policies-Sample Security Policies. Publishing and Notification Requirement of the Policies. Information Security Standards-ISO. IT Act. Copyright Act. Patent Law. IPR. Cyber Laws in India: IT Act 2000 Provisions. Intellectual Property Law: Copy Right Law.

References :

1. Charles P. Pfleeger. Shari Lawerance Pfleeger. Analysing Computer Security. Pearson Education India.

2. V.K. Pachghare. Cryptography and Information Security. PHI Learning Private Limited. Delhi India.

3.Dr. Surya Prakash Tripathi. Ritendra Goyal. Praveen Kumar Shukla .Introduction to Information Security and Cyber Law. Willey Dreamtech Press.

4. Schou. Shoemaker. Information Assurance for the Enterprise. Tata McGraw Hill.

5. CHANDER. HARISH." Cyber Laws and It Protection. PHI Learning Private Limited. Delhi India

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-451 Computer Hardware Technologies

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

1. Memory

Memory, memory chips & modules, memory types, advanced memory technologies, troubleshooting memory.

2. Motherboard

PC family tree, motherboard controllers and system resources, input-output ports, IRQ, I/O bus system: ISA, MCA, EISA, VESA local bus, PCI, AGP, PCIX; on board I/O devices, ROMBIOS, ROM POST, CMOS setup.

3. Power Supply

Power supply function and operation, power supply quality and specification, power protection and back-up, backup power system; UPS; troubleshooting power supply.

4. Interfaces and I/O Ports

Floppy disk interface, IDE interface: ATA standards, master-slave configuration, data transfer mode; SCSI interface: SCSI bus, SCSI standards; which is better SCSI or IDE; serial ports, parallel ports, USB, Video adapters, troubleshooting Video adapters.

5. Device drives and peripherals

Floppy disk drive, hard disk drive, CD ROM drive, DVD ROM drive, record able drives, keyboards, mice, printers and monitor, trouble shooting drives and peripherals.

Note:- At least one question must be set from each unit.

BOOKS

1. Craig Zacker & John Rourtre: PC Hardware- The complete reference, TMH.
2. Mark Minosi: The complete PC Upgrade & Maintenance Guide 4/e, BPB publications.
3. S.K. Chauhan: PC Upgrading, maintenance and troubleshooting guide.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-403 NETWORK MANAGEMENT AND SECURITY

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT I

Introduction to network management, network management standards, OSI management framework, simple network management protocol, telecommunication management networks, application level gateways, features of proxies, integrated security management architecture, TCP/IP, v1, v2, v3, RMON, Security in Ipv6-design goals, authentication header, encapsulating security payload.

UNIT-II

Network security requirements, threats, security plan (RFC 2196) security mechanisms, common system problems, Network security mechanism layers, Firewalls-sniffing, spoofing, TCP session, denial of service, anatomy, dual homed gateway configuration, type of firewalls, single choke configuration Packet filtering network address transactions.

UNIT-III

Secure web transactions, Data encryption techniques, Decryption, Symmetric/Private key, DES, IDEA, Public key encryption, One way functions, Trapdoor one way functions, RSA encryption, message integrity, MDs utility, Digital signature, Pretty Good Privacy, Signed and secret message, digital certificates, certification authority.

UNIT-IV

Electronic commerce, electronic payment systems, Secure socket layer, SSL handshake protocol, Secure HTTP, Secure end protocols, credit card based methods, electronic cheques, autonomous payment micro payment, smart cards, m-commerce and security, types of security, acceptable level, Security issues in wirless communications, wireless transport layer security handshake.

REFERENCE BOOKS:

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-401 SOFTWARE ENGINEERING

L T P Total Credits: 4
4 - -
External Marks: 80 Total Marks: 100
Internal Marks: 20

UNIT 1 INTRODUCTION

Introduction to Software crisis & Software processes: Software life cycle models-Build & fix, waterfall prototype evolutionary, spiral model.

UNIT 2 REQUIREMENT ANALYSIS & SPECIFICATIONS

Problem Analysis - DFD, Data dictionaries, ER diagrams, object diagrams: approaches to problems analysis: SRS: specifying behavioral & non-behavioral requirements.

UNIT 3 SOFTWARE DESIGN

What is design? Modularity, Strategy of design, information flow metrics, entropy-based measures, metric analysis, Software Reliability:Importance, Software reliability & Hardware reliability, failures & faults, reliability concepts, reliability models- macro, basic, logarithmic Poisson, calendar time component, micro models: estimating number of residual errors: reliability allocation.

UNIT 4 SOFTWARE TESTING & MAINTENANCE

Introduction, Functional testing, activities during testing, debugging, testing tools, Software Maintenance: Introduction, type of maintenance process, maintenance models, reverse engineering, re-engineering.

REFERENCES BOOKS:

1. R.S.Pressman, Software Engineering-A Practitioner's Approach, 5th Ed. TMH, 2000.
2. Ian sommerville, Software Engineering, 4thEd. Addison Wesley.
3. Pankaj Jalote, An Integrated Approach to Software Engineering 2nd Ed. Narosa Publishing.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-477 Renewable Energy Source

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

Course Objective

To familiarize the students about the fundamental concepts, advantages of using renewable energy sources, various renewable energy technologies, general power scenario and some recent technological development.

UNIT I

Introduction: Basics of energy, conventional energy sources, fossil fuels limitations, renewable energy sources, advantages and limitations, global energy scenario, energy scenario of India, Recent technological development.

UNIT II

Solar Energy: Theory of solar cells, solar cell materials, I-V characteristics of solar cell, PV module and PV array, MPPT, PV systems, Stand alone and grid connected PV systems, applications, solar radiation, flat plate collectors and their materials, applications and performance, solar thermal power plants.

UNIT III

Wind Energy: Wind power and its sources, Types of wind power plants, Types of wind turbine generator units, Site selection, Merits and demerits of wind power generation.

Biomass Energy: Availability of bio-mass and its conversion theory.

Thermo-electrical and thermionic Conversions: Working, Performance and limitations.

UNIT-IV

Various types of energy sources: Overview and application of hydro, geothermal energy, Ocean Wave and Tidal Wave energy

Energy Management system: Energy Management system, Energy Audit, Energy crises, Energy planning, Energy exploited and energy demand, Energy demand management.

Text/References Books:

1. Raja et al. "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. B.H Khan, "Non-Conventional Energy Resources" Tata McGraw-Hill Education.
3. H.P. Garg & Jai Prakash "Solar Energy: Fundamentals and Applications" , Tata McGraw Hill
4. D.S. Chauhan, "Non-Conventional Energy Resources", New Age International.
5. S.Hasan Saeed and D.K.Sharma, "Non- Conventional Energy Resources" S.K.Kataria & Sons.
6. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
7. Peter Auer, "Advances in Energy System and Technology", Vol. I & II Edited by Academic Press.
8. G. D. Rai, Non Conventional Energy Resources, Dhanpat Rai, India, 2006

9. D. P. Kothari, Rakesh Ranjan, Renewable Energy Sources and Emerging Technologies, PHI, India.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-478 Solar Photovoltaic System and Technology

L T P — Total Credits: 4
4 - -

External Marks: 80 — Total Marks: 100
Internal Marks: 20

Course Objective

To learn the fundamentals, design and application of solar photovoltaic systems for power generation on small and large scale electrification.

UNIT I - Solar Cell Fundamentals

Photovoltaic effect-Principle of direct solar energy conversion into electricity in a solar cell. Semiconductor properties, energy levels, basic equations. Solar cell, p-n junction, structure. PV Module, PV Array.

PV module performance Equivalent Circuit model of Solar cell, Modeling and Simulation of solar cell, module and array, I-V characteristics of a PV module, maximum power point, cell efficiency, fill factor, effect of irradiation and temperature.

UNIT II - Manufacturing of PV Cells & Design of PV Systems

Commercial solar cells - Production process of single crystalline silicon cells, multi crystalline silicon cells, amorphous silicon, cadmium telluride, copper indium gallium di selenide cells. Design of solar PV systems and cost estimation. Case study of design of solar PV lantern, stand alone PV system - Home lighting and other appliances, solar water pumping systems

UNIT III - Classification of PV Systems And Components

Classification - Central Power Station System, Distributed PV System, Stand alone PV system, grid Interactive PV System, small system for consumer applications, hybrid solar PV system, concentrator solar photovoltaic. System components - PV arrays, inverters, batteries, charge controls, net power meters. PV array installation, operation, costs, reliability.

UNIT IV- Pv System Applications

Building-integrated photovoltaic units, grid-interacting central power stations, stand-alone devices for distributed power supply in remote and rural areas, solar cars, aircraft, space solar power satellites. Socio-economic and environmental merits of photovoltaic systems. Technological Barriers in implementing Solar PV system. Application of Solar Photovoltaic system in digital India, Government Initiatives and polices.

REFERENCE BOOKS

1. Chetan Singh Solanki., Solar Photovoltaic: Fundamentals, Technologies and Application, PHI Learning Pvt., Ltd., 2009.
2. Jha A.R., Solar Cell Technology and Applications, CRC Press, 2010.
3. John R. Balfour, Michael L. Shaw, Sharlave Jarosek., Introduction to Photovoltaics, Jones & Bartlett Publishers, Burlington, 2011.
4. Luque A. L. and Andreev V.M., Concentrator Photovoltaic, Springer, 2007.
5. Partain L.D., Fraas L.M., Solar Cells and Their Applications, 2nd edition, Wiley, 2010.
6. S.P. Sukhatme, J.K.Nayak., Solar Energy, Tata McGraw Hill, New Delhi, 2010.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

Current Issues and Social development-II
(Environmental Studies and Disaster Management)
General Instructions

- This is an add-on course in the 2nd year of every undergraduate degree course of BPS Women University Khanpur Kalan
- This will be a one semester course
- The candidate must pass this paper to complete her degree.
- The pass percentage of this paper will be the same of other regular papers of the course.
- The paper is of 100 marks. 50 internal assessments and 50 end semester examination.
- The internal assessment marks will be distributed as follows:-

1. Attendance-	5 marks.
2. Two assignments of 5 mark each-	10 marks.
3. Midterm examination-	20 marks.
4. Article writing & presentation-	15 marks
Total marks	**50**

- The end semester examination will be of 50 marks
- The paper will be divided in four units each unit must have two questions
  And the examinee is required to attempt four questions t all selecting one question from each unit all questions carry equal marks.

LLG-002 **Environmental Studies and Disaster Management**

L T P

3 1 -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

Audit Course

Course Objectives:

Have knowledge of environment and an understanding of the disasters and disasters and their management.

Unit I:

- The Multidisciplinary nature of environmental studies
- Definition, scope and importance and need for public awareness
- Natural resources
- Renewable and non renewable resources role of an individual in conservation of natural resources
- Equitable use of resources for sustainable lifestyles

Unit II:

- Ecosystems
- Concept, structure and functions of an ecosystem
- Energy flow in the ecosystem and ecological succession
- Biodiversity and its conservation
- Definition, genetic, species and ecosystem diversity
- Biogeography classification of India
- Biodiversity at global national and local levels
- Environmental pollution
- Causes, effects and control measures of solid waste management: causes, effects and control measures of urban and industrial waste

Unit III:

- Introduction to disaster management
- Natural Hazards: causes, distribution pattern and types

Unit IV:

- Consequences and mitigation measures for:
- Earthquake
- Tsunami
- Cyclone
- Flood
- Drought
- Landslide

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

Current Issues and Societal Development-I

Course Code: LLG-001
L-T-P
4-0-0
Audit Course
External Marks: 80 Total Marks: 100
Internal Marks: 20
Course Objectives: Have a brief knowledge of laws of India and an understanding of the formal dispute redressed mechanisms that exit in India

Unit I

- Law relating to Hindu Marriage-conditions of valid marriage. Prohibited degrees grounds of divorce. Rights of wife.
- Dowry-definition. outlines of law relating to dowry
- Sexual Harassment of Women-guidelines by Supreme Court in Vishaka and other V. State of Rajasthan and others
- Consumer Protection Act. 2000-meaning of consumer. Rights of consumer Remedies available in the Act. Consumer Forums

Unit II

- Fundamental Rights of Citizens meaning. types & enforcement of fundamental rights
- Rights in relation to police-rights in relation to arrest. ball search & seizure and rights of women against police.
- Right to information-meaning. how can ask for information which information can be denied. remedies for not furnishing the information
- Lokayukt-object. Function. powers and duties
- Right of children to free and compulsory education Act. 2009- Object. Scope and main features

Unit III

- Property Rights- Women's property rights right of inheritance. student
- Human Rights- what is human rights. international conventions on human rights
- Right to maintenance- Maintenances under Hindu law Under Section 125 Criminal Procedure Code
- Object and scope of motor vehicle Act 1988. Third party insurance not four

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

Sem - 8th

ECL-404 SATELLITE COMMUNICATION & BROADCASTING

L T P

4 0 0

Total Credits: 4

1323
M-19

External Marks: 80

Internal Marks: 20

Total Marks: 100

COURSE OBJECTIVE:

This course enables students to understand the fundamentals of satellite communication. It enables students to know how to place a satellite in an orbit. The students are taught about the earth and space subsystems. The satellite services like broadcasting are dealt thoroughly. At the end of this course students will gain knowledge in topics such as:

1. Orbital aspects involved in satellite communication. Power budget calculation. Satellite system and services provided.

UNIT 1

Principles of Satellite Communication: Evolution & growth. basic concepts. Synchronous satellite. Satellite frequency allocation. band spectrum. Advantages of satellite communication. active & passive satellite. Modem & Codec. satellite subsystem. Applications and future trends of satellite communications.

Satellite Link Design: Introduction. basic transmission theory. general link design equations. system noise temperature. C/N & G/T ratio. atmospheric & ionosphere effects on link design. Complete link design. Earth station parameters. Design of satellite links for specified C/N. System design example.

UNIT 2

Analog Satellite Communication: Baseband analog signal. FDM techniques. S/N & C/N ratio in FM in satellite link. S/N ratio in FM with multiplexed telephone signal in satellite link. Single channel per carrier. Companded single sideband. Analog FM/FDM TV satellite link. Intermodulation products & their effects in FM/FDM. Energy disposal in FM/FDM systems.

Digital Satellite Communication: Advantages of digital communication. Elements of digital satellite communication systems. Digital baseband signals. Digital modulation techniques. Satellite digital link design. Time Division Multiplexing.

UNIT 3

Multiple Access Techniques: Introduction. Frequency division multiple access (FDMA) Intermodulation. Calculation of C/N. TDMA. TDMA-Frame structure. TDMA-Burst structure. TDMA-Frame efficiency. TDMA-superframe. TDMA-Frame acquisition & Synchronization. TDMA compared to FDMA. TDMA Burst Time Plan. Multiple Beam TDMA satellite system. Beam Hopping (Transponder Hopping) TDMA. CDMA & hybrid access techniques.

Satellite Orbits: Synchronous orbit. Orbital parameters. Satellite location with respect to earth. Look angles. Earth coverage & slant range. Eclipse effect. Satellite placement in geostationary orbit. station keeping. and Satellite stabilization.

UNIT 4

Special Purpose Communication Satellites: BDS. INMARSAT. INTELSAT. VSAT (data broadband satellite). MSAT. SARSAT (Search & Rescue satellite) & LEOs. Satellite communication with respect to fiber optic communication. LANDSAT. Defense satellite.

Satellite Navigation & the Global Positioning System: Radio and Satellite Navigation. GPS principles. GPS receivers and codes. Satellite signal acquisition. GPS navigation message. GPS signal levels. GPS receiver operation. GPS C/A code accuracy. Differential GPS.

TEXT BOOKS:

1. T Pratt. C Bostian and J Allnutt. Satellite Communications. WSE. Wiley Publications. 2003.
2. D.C Agarwal. Satellite Communication. Khanna Publications. 5th Edition.
3. K.N. Raja Rao. Fundamentals of Satellite Communications. PHI. 2004.
4. Dennis Roddy. Satellite Communications. McGraw Hill. 2nd Edition. 1996.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL- 440 MODELLING AND SIMULATION OF COMMUNICATION SYSTEMS

L T P
4 0 0

Total Credits: 4

Total Marks: 100

External Marks: 80

Internal Marks: 20

COURSE OBJECTIVE:

The aim of course is to make students familiar with the concept of modelling and simulation of communication system using Matlab.

UNIT 1

Introduction

Concept of Simulation, System, Model, Types of Model, Univariat & Multivariat Models, Deterministic & Stochastic models, Continuous & Discreet Models, Analog & Digital Simulation, Real Time Simulation, Hybrid Simulation, Advantages & Limitations of Simulation, Steps in Simulation Study.

UNIT 2

Random Number

Pseudo Random Numbers, Generation of random numbers, properties & testing of random numbers, generation of random variables using common distributions, Bounds and approximations of Random processes, Simulation of random variables & random processors, Transformation functions, transformations of random processes, sampling & quantization for simulation.

UNIT 3

Modeling of Communication System

Information sources encoding/decoding, base band modulation and mapping, RF and optical modulation demodulation, Filtering communication channels and models, Noise interference and error, Control coding, Synchronization, Spread spectrum techniques.

UNIT 4

Simulation and Modelling Methodology

Simulation environment, Modelling consideration, Performance evaluation techniques, Error sources in simulation, design of simulation experiment -- length of run, replication, elimination of initial bias, variance reduction techniques.

PSpice: Simulation of analog systems using PSpice.

Books Recommended:

1. M.C. Jeruchim and Others, Simulation of Communication Systems, Plenum Press.
2. Lathi B. P. Modern Digital and Communication Systems.
3. DS Hira, System Simulation.
4. Banks, Carsen, Nelson, Discrete Event System Simulation, Persian Education, Asia.
5. Related IEEE/IEE publications

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECP-424

SATELLITE COMMUNICATION LAB

Total Credits: 1

L T P
0 0 2

Total Marks: 50

External Marks: 40
Internal Marks: 10

COURSE OBJECTIVE:

The aim of lab is to have practical exposure of active and passive satellite communication. PC to PC communication using RS-232.

LIST OF EXPERIMENTS:

1. To set up a active and passive satellite communication link and study their difference.
2. To measure the base-band analog (voice) signal parameters in the satellite link.
3. To measure C/N ratio.
4. To transmit and receive the function generator waveforms through a Sat.Com. link.
5. To measure the digital baseband signal parameters in Sat.Com. link.
6. To send telecommand and receive the telemetry data.
7. To set a PC to PC Sat. Com. Link using RS-232 ports.
8. To measure the propagation delay of signal in a Sat. Com. Link.
9. To measure fading of a received signal.
10. To measure the parameters in an analog FM/FDM TV Sat.Com. link.
11. To measure the S/N ratio.
12. To calculate the figure of merit and FM deviation.

NOTE: At least ten experiments are to be performed, atleast seven experiments are to be taken from the above list and the remaining three based on the syllabus of ECL-404 be developed at the institution level. The students will be required to perform at least eight experiments in the semester.

ECP-426 MAJOR PROJECT Total Credits: 4

L T P

- 2 4 Total Marks: 100

External Marks: 80

Internal Marks: 20

The student of final year of B.Tech shall complete a project on one of the aspect of Electronics and Communication Engineering. The project can be analytical work, simulation, hardware design or a combination of these in the emerging areas of Electronics and Communication Engineering under the supervision of a faculty from the ECE Department. Project work can be carried out individually or by a group of maximum of three students. The project work commences from the beginning of 8th semester and has to be completed by the end of the 8th semester.

There will be an internal and external evaluation of the project that includes demonstration and oral examination of the project work. The departmental project evaluation committee may also carry out continuous assessment of the project through progress seminars conducted during the semester.

Internal Assessment

The project will be evaluated internally through a departmental panel of examiners consisting of the following:

Project Coordinator : Convener

Respective Supervisor : Member

External Assessment

The project will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department : Chairperson

Project Coordinator : Member

External expert : To be appointed by the University on recommendation of BOS

There will be a pre-submission presentation of the project work before the departmental committee including concerned supervisors. 20% of the total marks are to be awarded by the internal evaluation committee. Remaining 80% of the marks are to be awarded by the external examiner.

Each student is expected to prepare a technical paper in the prescribed format, based on the project work. The paper may be prepared as per IEEE standard and can have a maximum of eight pages. Three copies of project report shall be submitted by each student individually.

Project coordinator will be assigned the project load of, maximum of 2 hours per week including his own guiding load of one hour. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Chairperson, Department of Electronics and Communication Engineering.

ECP-428 **Independent Study Seminar**

L T P **Total Credits: 2**

2 0 0

Internal Marks: 100 **Total Marks: 100**

The objective of the seminar is to assess the ability of the student to present a seminar on a topic of current relevance in Electronics and Communication Engineering or related areas. It enables the students to gain knowledge in some of the technically relevant current topics. The objectives of the course remain:

- To learn how to carry out literature search.
- To learn the art of technical report writing.
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Electronics and Communication Engineering and will carry out the task under the observation of a teacher assigned by the department.
She will give a seminar talk on the same before a committee constituted by the Chairperson the Department. The committee should comprise of three faculty members from different specializations. The teacher associated in the committee will be assigned 2 hours teaching load per week. However, guiding students' seminar will not be considered towards teaching load. The topic shall be approved by the Seminar Evaluation Committee consisting of three faculty members of the Department. The committee shall evaluate the presentation of each students for about 30 minutes. The Internal assessment will be effected by the following committee of three persons:

Independent Study Seminar Coordinator of the Department: Convener
Two faculties from the deptt: Member

Each student is expected to prepare a seminar report and a technical paper in the prescribed form and shall be submitted to the department after the approval from the committee. The report must not be reproduction of any original paper. The paper may be prepared as per IEEE standard and can have a maximum of eight pages. The student will undertake a detailed study on the chosen topic by referring papers published in reputed journals and conferences. The one hour theory class of the seminar can be utilised for presenting recent technology developments to the students. Marks should be distributed considering report writing, presentation, technical content, depth of knowledge, and references and their participation in seminar.

The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Chairperson, Department of Electronics and Communication Engineering.

GFP-426 GENERAL PROFICIENCY

L T P

- - -

Total Credits: 3

External Marks: 100

Internal Marks:

Total Marks: 100

There will be an external evaluation of general fitness for the profession at the end of eight semester that includes demonstration and oral examination. The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of her performance/achievements in different walks of life.

The evaluation will be made by the committee of examiners constituted as under:

1. Dean, Faculty of Engineering and Technology : Chairperson
2. Chairperson of the Department : Member
3. External expert : Appointed by the University

A. **The student will present a written report before the committee with following in view:**

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I.	Academic Performance	--------
II.	Extra Curricular Activities/Community Service, Hostel Activities	(12 Marks)
III	Technical Activities/Industrial, Educational tour	(12 Marks)
IV	Sports/games	(16Marks)

B. A student will support his/her achievement and verbal and communicative skill through presentation before the examiners. (40 Marks)

C. **Faculty Counselor Assignment** (20 Marks)

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflects his/her learning graph including followings:

1. Discipline throughout the year
2. Sincerity towards study
3. How quickly the student assimilates professional value system etc.
4. Moral values & Ethics: Syllabus- one lecture/ week on the topics of human values/ ethics is to be delivered.

Open Elective-I

CSL-471 MANAGEMENT INFORMATION SYSTEM

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

Unit-1: Foundation of Information System: Introduction to Information System and MIS. decision support and decision making systems. systems approach. the systems view of business. MIS organization within company. Management information and the systems approach.

Unit-2:

Information Technology: A manager's overview. managerial overviews. computer hardware & software. DBMS. RDBMS and Telecommunication.

Conceptual system design: Define the problems. set systems objective. establish system constraints. determine information needs determine information sources. develop alternative conceptual design and select one document the system concept. prepare the conceptual design report.

Unit-3:

Detailed system design: Inform and involve the organization. aim of detailed design. project management of MIS detailed design . identify dominant and trade of criteria. define the sub systems. sketch the detailed operating sub systems and information flow. determine the degree of automation of each operation. inform and involve the organization again. inputs outputs and processing. early system testing. software. hardware and tools propose an organization to operate the system. document the detailed design revisit the manager user.

Unit-4:

Implementation evaluation and maintenance of the MIS: Plan the implementation. acquire floor space and plan space layouts. organize for implementation. develop procedures for implementation. train the operating personnel. computer related acquisitions. develop forms for data collection and information dissemination. develop the files test the system. cut-over. document the system. evaluate the MIS control and maintain the system. Pitfalls in MIS development.

Advanced Concepts in Information Systems: Enterprise Resources Management, Supply Chain Management. CRM . Procurement Management System.

TEXT BOOKS:

- Management Information System by W. S. Jawadekar. 2002. Tata McGraw Hill.
- Information System for Modern Management (3rd edition) - Robert G. Murdick. Joel E. Ross & James R. Claggett. PHI

REFERENCE BOOKS:

- Management Information System: O Brian: TMH
- Management Information System by Davis Olson Mac Graw Hill
- Management Information System by Stasllings. (Maxwell Mc Millman Publishers)
- Information System: a Management Perspective: Alter Addison Wesley

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

HUL-455 ENTREPRENEURSHIP

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-I:

Promotion of Entrepreneurship: Meaning, definition and functions of an entrepreneur, qualities of a good entrepreneur: Role of Entrepreneur in economic development: Government measures for the promotion of small scale industries with special reference to Haryana: Cultural factors in developing entrepreneurship.

UNIT-II:

Ownership and Location of Industrial Units: Different forms of Industrial Organization. Theories of Industrial location. Process of preparing project reports.

Size of Firm and Pricing: Concept of optimum firm, factors determining: Optimum size. Technical, Managerial, Marketing Uncertainties and risk. Pricing Methods. Policies and procedures.

UNIT-III:

Financing of Small Industries: Importance and need: Commercial Banks and term lending in India: Banks and under-writing of capital issues; Brief description about the role of other financial agencies viz: Industrial Finance Corporation of India. State Financial Corporation, Industrial Development Bank of India: Unit Trust of India.

UNIT-IV

Problems Faced by Small Enterprises: Problems connected with Marketing, Management of New Products: Power: Finance; Raw Material; Under-utilization of capacity: Causes of under – utilization: Rehabilitation of Sick Mills.

Government and Business:

(a) **Highlights of Industrial Policy and Licensing Policy.**
(b) International Marketing with special reference to export documentation.

RECOMMENDED BOOKS:

1. Entrepreneurship of Small scale industries–Deshpande Manohar D. (Asian Publishers, New Delhi)
2. Environment and Entrepreneur– Tandon B.C. (Asian Publishers, New Delhi).
3. The Industrial Economy of India– Kuchhal S.C. (Chaitanya, Allahabad).
4. Emerging Trends in Entrepreneurship Development Theories & Practices–Singh P. Narendra (International Founder, New Delhi)
5. Entrepreneur, Banker & Small Scale Industries– Bhattacharya Hrisnikes.
6. Entrepreneurship & Growth of Enterprise in Industrial Estates– Rao Gangadhara

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

MAL-451 COMBINATORICS AND GRAPH THEORY

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-I:

Permutations and combinations. Recurrence relations. Generating functions. decision trees. Graphs. incidence and degree. isomorphism. subgraphs. walks. paths and circuits. connected graphs. Disconnected graphs and component Euler's graph. operations on graphs. Hamiltonian paths and circuits. Travelling salesman problem.

UNIT-2:

Trees. properties of trees. Pendant vertices in tree. Rooted and binary trees. Spanning trees. Fundamental circuits. spanning trees in a weighted graph.
Cut-sets. properties of cut-sets. Fundamental circuits and cut-sets. connectivity and separability. Network flows. 1-isomorphism and 2-isomerphism.

UNIT-3:

Planer graphs. Kuratowski's two graphs. different representation of a planer graph. Detection of planarity. vector space of graph.
Matrix representation of graphs. incidence matrix. submatrix of incidence matrix. Fundamental circuit matrix. cut-set matrix and relationship between all three above.

UNIT 4

Colouring. chromatic number. chromatic polynomials. four color problem. Five color theorem. Directed graphs and their types. Binary relation. Directed paths and connectedness. Euler's digraph.

BOOKS RECOMMENDED:

1. Graph Theory by Narsingh Deo. PHI.
2. Graph Theory by Harry P.. Addison-Wesley.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

HUL-457 ORGANISATIONAL BEHAVIOUR & HRM

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT-I:

Understanding Organisational Behaviour: Definition. Goals of Organisational behaviour. Key forces affecting Organisational Behaviour. Fundamental Concepts of Organisational Behaviour.

Motivation: Meaning. Objectives and importance of motivation. Theories of Motivation. Maslow's theory. Mc Greger's Theory Herzberg's theory.

Morale: Meaning: Factors affecting morale. types of morale and productivity. Evaluation of morale. improving morale.

UNIT-2:

Communication: Definition & importance of Communcation: Formal & informal communication. Barriers in communication.

Leadership: Definition & importance. Nature of leadership various approaches to leadership styles.

UNIT-3:

Importance of human resources in industry. Definition of human resource management. mechanical approach towards personnel. Paternalism. Social system approach.

Need for human resource planning. process of human resource planning. Methods of recruitment. Psychological tests and interviewing. Meaning and importance of placement. Meaning and techniques of induction. Training and development : Concepts of training and development. Importance of training and development. Management development its nature. purpose and method.

UNIT-4

Significant factors affecting compensation. Methods of wage payment. Wage differentials. Causes of difference in Wages. Types of wage differentials. Wage incentives. Meaning. Objectives. types of incentive plans.

RECOMMENDED BOOKS:

1. Human Resource and Personnel Management – K. Aswathappa–TMH Publ Company Ltd.
2. Personnel Management: C.B. Mamoria. Himalaya Publishing House.
3. Organisational Behaviour – Dr. L.M. Prasad (Sultan Chand & Sons).

REFERENCE BOOKS:

1. Personnel Management & Industrial Relations: Dr. T.N. Bhagoliwal: Sahitya Bhawan Agra.
2. Personnel Management: V.G. Karnik. Jaico Publishing House.
3. Personnel management & Industrial Relation: Tripathi: Sultan Chand & Sons.
4. Personnel Management – Arun Monappa & Mirza Saiyadain –TMH Publishing Co. Ltd.
5. Principles of Personnel Management – Edwin B. Flippo (McGraw Hill).
6. Organisational Behaviour – K. Adwathappa.
7. Organizational Behaviour – John W. Newsstorn & Keith Davis. TMH. New Delhi.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

PHL-477 INDUSTRIAL PLASMA ENGINEERING

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Introduction to Fourth State: Plasma state of matter, definition, types of plasma, facts and formulas, radiation from plasma, Various source of non thermal plasma.

UNIT 2

Plasma as an Industrial Tool: Plasma as a source of energetic particles, surface modification by ion implementation, Applications of plasma in different field of science, engineering and technology.

UNIT 1

Plasma in Micro Electronics: Evolution of microelectronics, plasma processing in microelectronics, plasma etching in microelectronics, deposition technology, PECVD, Plasma etching and RIE techniques; RTP techniques for annealing, growth and deposition of various films, plasma doping.

UNIT 4

Plasma Technique For Displays: Introduction and overview, Natural and artificial light source, cold plasma as light source, Flat panel display technology, plasma display panels, one dimensional, two dimensional AC PDP model, micro discharge light source, market drivers.

Markets for plasma technology

Texts/References:

1. S.K. Ghandhi, VLSI Fabrication Principles, John Wiley Inc., New York, 1994(2nd Edition).
2. S.M. Sze (Ed), VLSI Technology, 2nd Edition, McGraw Hill, 1988.
3. Plummer, Deal, Griffin "Silicon VLSI Technology: Fundamentals, Practice & Modeling" PH, 2001.
4. P. VanZant, "Microchip Fabrication", 5th Edition, MH, 2000.
5. PI John, Plasma science and creation of wealth, TMH, New Delhi 2005.
6. Industrial Plasma Engineering: Vol 1&2: Applications to Nonthermal Plasma, J R Routh.
7. Plasma Etching: Fundamentals and Applications, Minoru Sugawara, Barry L. Stansfield.
8. Plasma Physics and Engineering, Alexander A. Fridman, Lawrence A. Kennedy, 2004.
9. Handbook Of Plasma Processing Technology: Fundamentals, Etching, Deposition, Stephen M. Rossnagel, J. J. Cuomo, William Dickson Westwood

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-477 CYBER SECURITY

L T P Total Credits: 4
4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT-1 Introduction to information systems. Types of information Systems. Development of Information Systems. Introduction to information security. Need for Information security. Threats to Information Systems. Information Assurance. Cyber Security. and Security Risk Analysis.

UNIT-2 Application security (Database. E-mail and Internet). Data Security Considerations-Backups. Archival Storage and Disposal of Data. Security Technology-Firewall and VPNs. Intrusion Detection. Access Control. Security Threats -Viruses. Worms. Trojan Horse. Bombs. Trapdoors. Spoofs. E-mail viruses. Macro viruses. Malicious Software. Network and Denial of Services Attack. Security Threats to E-Commerce- Electronic Payment System. e-Cash. Credit/Debit Cards. Digital Signature. public Key Cryptography.

UNIT-3 Developing Secure Information Systems. Application Development Security. Information Security Governance & Risk Management. Security Architecture & Design Security Issues in Hardware. Data Storage & Downloadable Devices. Physical Security of IT Assets. Access Control. CCTV and intrusion Detection Systems. Backup Security Measures.

UNIT-4 Security Policies. Why Policies should be developed. WWW policies. Email Security policies. Policy Review Process-Corporate policies-Sample Security Policies. Publishing and Notification Requirement of the Policies. Information Security Standards-ISO. IT Act. Copyright Act. Patent Law. IPR. Cyber Laws in India; IT Act 2000 Provisions. Intellectual Property Law: Copy Right Law.

References :

1. Charles P. Pfleeger. Shari Lawerance Pfleeger. Analysing Computer Security. Pearson Education India.

2. V.K. Pachghare. Cryptography and Information Security. PHI Learning Private Limited. Delhi India.

3.Dr. Surya Prakash Tripathi. Ritendra Goyal. Praveen Kumar Shukla .Introduction to Information Security and Cyber Law. Willey Dreamtech Press.

4. Schou. Shoemaker. Information Assurance for the Enterprise. Tata McGraw Hill.

5. CHANDER. HARISH," Cyber Laws and It Protection. PHI Learning Private Limited. Delhi India

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-451 **Computer Hardware Technologies**

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

1. **Memory**

Memory, memory chips & modules, memory types, advanced memory technologies, troubleshooting memory.

2. **Motherboard**

PC family tree, motherboard controllers and system resources, input-output ports, IRQ, I/O bus system: ISA, MCA, EISA, VESA local bus, PCI, AGP, PCIX; on board I/O devices, ROMBIOS, ROM POST, CMOS setup.

3. **Power Supply**

Power supply function and operation, power supply quality and specification, power protection and back-up, backup power system; UPS; troubleshooting power supply.

4. **Interfaces and I/O Ports**

Floppy disk interface, IDE interface; ATA standards, master-slave configuration, data transfer mode; SCSI interface; SCSI bus, SCSI standards; which is better SCSI or IDE; serial ports, parallel ports, USB, Video adapters, troubleshooting Video adapters.

5. **Device drives and peripherals**

Floppy disk drive, hard disk drive, CD ROM drive, DVD ROM drive, record able drives, keyboards, mice, printers and monitor, trouble shooting drives and peripherals.

Note:- At least one question must be set from each unit.

BOOKS

1. Craig Zacker & John Rourtre: PC Hardware- The complete reference, TMH.
2. Mark Minosi: The complete PC Upgrade & Maintenance Guide 4/e, BPB publications.
3. S.K. Chauhan: PC Upgrading, maintenance and troubleshooting guide.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-403 NETWORK MANAGEMENT AND SECURITY

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT I

Introduction to network management, network management standards, OSI management framework, simple network management protocol, telecommunication management networks, application level gateways, features of proxies, integrated security management architecture, TCP/IP, v1, v2, v3, RMON, Security in Ipv6-design goals, authentication header, encapsulating security payload.

UNIT-II

Network security requirements, threats, security plan (RFC 2196) security mechanisms, common system problems, Network security mechanism layers, Firewalls-sniffing, spoofing, TCP session, denial of service, anatomy, dual homed gateway configuration, type of firewalls, single choke configuration Packet filtering network address transactions.

UNIT-III

Secure web transactions, Data encryption techniques, Decryption, Symmetric/Private key, DES, IDEA, Public key encryption, One way functions, Trapdoor one way functions, RSA encryption, message integrity, MDs utility, Digital signature, Pretty Good Privacy, Signed and secret message, digital certificates, certification authority.

UNIT-IV

Electronic commerce, electronic payment systems, Secure socket layer, SSL handshake protocol, Secure HTTP, Secure end protocols, credit card based methods, electronic cheques, autonomous payment micro payment, smart cards, m-commerce and security, types of security, acceptable level, Security issues in wirless communications, wireless transport layer security handshake.

REFERENCE BOOKS:

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-401 SOFTWARE ENGINEERING

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1 INTRODUCTION

Introduction to Software crisis & Software processes: Software life cycle models-Build & fix, waterfall prototype evolutionary, spiral model.

UNIT 2 REQUIREMENT ANALYSIS & SPECIFICATIONS

Problem Analysis – DFD, Data dictionaries, ER diagrams, object diagrams: approaches to problems analysis: SRS: specifying behavioral & non-behavioral requirements.

UNIT 3 SOFTWARE DESIGN

What is design? Modularity, Strategy of design, information flow metrics, entropy-based measures, metric analysis. Software Reliability:Importance, Software reliability & Hardware reliability, failures & faults, reliability concepts, reliability models- macro, basic, logarithmic Poisson, calendar time component, micro models; estimating number of residual errors; reliability allocation.

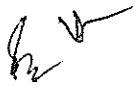
UNIT 4 SOFTWARE TESTING & MAINTENANCE

Introduction, Functional testing, activities during testing, debugging, testing tools. Software Maintenance: Introduction, type of maintenance process, maintenance models, reverse engineering, re-engineering.

REFERENCES BOOKS:

1. R.S.Pressman, Software Engineering-A Practitioner's Approach, 5th Ed. TMH, 2000.
2. Ian sommerville, Software Engineering, 4thEd. Addison Wesley.
3. Pankaj Jalote, An Integrated Approach to Software Engineering 2nd Ed. Narosa Publishing.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.



ECL-477 Renewable Energy Sources

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

Course Objective

To familiarize the students about the fundamental concepts, advantages of using renewable energy sources, various renewable energy technologies, general power scenario and some recent technological development.

UNIT I

Introduction: Basics of energy, conventional energy sources, fossil fuels limitations, renewable energy sources, advantages and limitations, global energy scenario, energy scenario of India, Recent technological development.

UNIT II

Solar Energy: Theory of solar cells, solar cell materials, I-V characteristics of solar cell, PV module and PV array, MPPT, PV systems, Stand alone and grid connected PV systems, applications, solar radiation, flat plate collectors and their materials, applications and performance, solar thermal power plants.

UNIT III

Wind Energy: Wind power and its sources, Types of wind power plants, Types of wind turbine generator units, Site selection, Merits and demerits of wind power generation.

Biomass Energy: Availability of bio-mass and its conversion theory.

Thermo-electrical and thermionic Conversions: Working, Performance and limitations.

UNIT-IV

Various types of energy sources: Overview and application of hydro, geothermal energy, Ocean Wave and Tidal Wave energy

Energy Management system: Energy Management system, Energy Audit, Energy crises, Energy planning, Energy exploited and energy demand, Energy demand management.

Text/Referenees Books:

1. Raja et al, "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. B.H Khan, "Non-Conventional Energy Resources" Tata McGraw-Hill Education.
3. H.P. Garg & Jai Prakash "Solar Energy: Fundamentals and Applications" , Tata McGraw Hill
4. D.S. Chauhan, "Non-Conventional Energy Resources", New Age International.
5. S.Hasan Saeed and D.K.Sharma, "Non- Conventional Energy Resources" S.K.Kataria & Sons.
6. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
7. Peter Auer, "Advances in Energy System and Technology", Vol. I & II Edited by Academic Press.
8. G. D. Rai, Non Conventional Energy Resources, Dhanpat Rai, India, 2006

9. D. P. Kothari. Rakesh Ranjan. Renewable Energy Sources and Emerging Technologies. PHI. India.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-478 Solar Photovoltaic System and Technology

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

Course Objective

To learn the fundamentals, design and application of solar photovoltaic systems for power generation on small and large scale electrification.

UNIT I - Solar Cell Fundamentals

Photovoltaic effect-Principle of direct solar energy conversion into electricity in a solar cell. Semiconductor properties, energy levels, basic equations. Solar cell, p-n junction, structure. PV Module, PV Array.

PV module performance – Equivalent Circuit model of Solar cell, Modeling and Simulation of solar cell, module and array, I-V characteristics of a PV module, maximum power point, cell efficiency, fill factor, effect of irradiation and temperature.

UNIT II - Manufacturing of PV Cells & Design of PV Systems

Commercial solar cells - Production process of single crystalline silicon cells, multi crystalline silicon cells, amorphous silicon, cadmium telluride, copper indium gallium di selenide cells. Design of solar PV systems and cost estimation. Case study of design of solar PV lantern, stand alone PV system - Home lighting and other appliances, solar water pumping systems

UNIT III - Classification of PV Systems And Components

Classification - Central Power Station System, Distributed PV System, Stand alone PV system, grid Interactive PV System, small system for consumer applications, hybrid solar PV system, concentrator solar photovoltaic. System components - PV arrays, inverters, batteries, charge controls, net power meters, PV array installation, operation, costs, reliability.

UNIT IV- Pv System Applications

Building-integrated photovoltaic units, grid-interacting central power stations, stand-alone devices for distributed power supply in remote and rural areas, solar cars, aircraft, space solar power satellites, Socio-economic and environmental merits of photovoltaic systems. Technological Barriers in implementing Solar PV system. Application of Solar Photovoltaic system in digital India. Government Initiatives and polices.

REFERENCE BOOKS

1. Chetan Singh Solanki., Solar Photovoltaic: Fundamentals, Technologies and Application, PHI Learning Pvt., Ltd., 2009.
2. Jha A.R., Solar Cell Technology and Applications, CRC Press, 2010.
3. John R. Balfour, Michael L. Shaw, Sharlave Jarosek., Introduction to Photovoltaics, Jones & Bartlett Publishers, Burlington, 2011.
4. Luque A. L. and Andreev V.M., Concentrator Photovoltaic, Springer, 2007.
5. Partain L.D., Fraas L.M., Solar Cells and Their Applications, 2nd edition, Wiley, 2010.
6. S.P. Sukhatme, J.K.Nayak., Solar Energy, Tata McGraw Hill, New Delhi, 2010.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-444 RELIABILITY OF ELECTRONICS & COMMUNICATION SYSTEMS

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Concept of Reliability: Failures of systems and its modes. Measure of Reliability, Reliability function, Hazard rate MTBF and their interrelations.

Reliability Data and Analysis: Data sources. Data collection, use of Reliability Data, Reliability Analysis, Performance Parameters, calculation of failure rate, Application of Weibill distribution.

UNIT 2

System Reliability and Modeling: Series systems, Parallel system, series parallel systems. Time dependence, Reliability Determination, Stand by systems, r out of n, Configurations, Methods of tie set and cut sets of Or reliability evaluation, simulation and Reliability prediction. Monte Carlo method, concepts of network topology. Overall reliability evolution.

UNIT 3

Maintainability and Availability

Maintainability and its equation. Factors Affecting maintainability. Measures of Maintainability, Mean Down Time, Availability Intrinsic availability equipment availability & Mission availability. Replacement processes and Policies.

UNIT 4

Life Testing of Equipments

Non-destructive tests, destruction tests and their Mathematic modeling. Quality and Reliability, Measurement & prediction of Human Reliability, Reliability and safety, Safety margins in critical Devices, case studies.

Value Engineering

Techniques in value Engg; Structure of value Engg. Reliability Management.

Books Recommended:

1. Govil, Reliability Engineering, 1992.
2. Dr.A.K.Aggarwal, Reliability Engineering, 1992.
3. Related IEEE/IEE publications.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

01/03/19

ECL-436 NANO TECHNOLOGY AND APPLICATIONS

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

UNIT 1

Introduction to Nanotechnology: Overview of current research in nano-scale electronics and devices, characteristic scale for quantum phenomena, nanoparticles, nano-clusters, nanotubes, nanowires and nanodots; Quantum well structures, quantum dots, quantum wires; Current and future nanotechnology applications in engineering and materials, electronics and computing, energy and medicine: Carbon Nanotube: Electronic structure, Transport, optical, thermal and mechanical properties of nano tubes and its Application.

UNIT 2

Quantum Device: Length Scales/Transport, Ballistic Electron Transport, Coulomb Blockade, RTD, Electron-Wave Coupling Devices; Spintronic

UNIT 3

Molecular Electronics: Organic semiconductors, Organic molecules as switches, motor-molecules and biomimetic components, conducting polymers, light emitting polymers, Molecular Semiconductors and Metals, Logic Gates.

UNIT 4

Processing and Nano-Fabrication: Synthesis of nanomaterials, Application of Nano Materials, Micro & Nano electromechanical systems, Fabrication techniques of Nano devices; Photolithography: E-beam lithography, Advanced Nano-lithography; Thin Film Technology: MBE, CVD, PECVD, LB and Self Assembly, Spu n-Coating.

Nano-Characterization: Scanning Probe Microscopy, Electron Microscopy (TEM, SEM) Photon Spectroscopy, Electron Spectroscopy, Nanomanipulator.

Reference Books:

1. Nano-the next revolution: Mohan Sunder Rajan (NBTI)
2. Introduction to Nano Technology: charles p. Pode (Springer).
3. Nano Electronics and Information Technology: Rainer Waser
4. Handbook of Nanotechnology: Bhushan

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-462 GENETIC ALGORITHMS & APPLICATIONS

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

Unit 1

Introduction: Overview, History of evolutionary computation: Search spaces & fitness landscapes, elements of genetic algorithms, comparison of Gas and tradition search methods.

Unit 2

Fundamental Concepts of Gas: Typical examples to illustrate how Gas work. Simple computer exercises.

Unit 3

Problem Solving Using Gas: Evolving computer programs, data analysis & prediction, evolving neural networks, simple computer exercises.

Unit 4

Implementation of Gas: Suitability of GA for typical problems, encoding a problem for a GA, adapting the encoding, selection methods, Genetic operators, Parameters for Gas.

TEXT BOOKS:

1. Davis L, Handbook of Genetic Algorithms.
2. Goldberg D.E., Genetic Algorithms in Search optimization & Machine Learning.
3. Michalewiez, Z., Genetic Algorithms & Data Structures - Evolution Programs

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECE-454 RADAR AND SONAR ENGINEERING

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1.

INTRODUCTION TO RADAR: Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar.

RADAR EQUATION: Simple form of Radar Equation, Prediction of Range performance, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

UNIT 2.

CW & FREQUENCY MODULATED RADAR:

The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar

MTI & PULSE DOPPLER RADAR: Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Digital Signal Processing, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler Radar, MTI from a moving platform.

UNIT 3.

TRACKING RADAR: Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

UNIT4.

RECEIVERS, DISPLAYS & DUPLEXERS: Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

INTRODUCTION TO SONAR

TEXT BOOK:

1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

REFERENCE BOOK:

1. Electronic Communication Systems: Kennedy; TMH

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

Digital Image Processing

ECL-414
L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1

Introduction and Fundamental to digital Image Processing: What is Digital Image Processing, Origin of Digital Image Processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing system, Image sensing and acquisition, image sampling, quantization and representation, Basic relationship between pixels.

UNIT 2

Image Enhancement in the Spatial Domain & Frequency Domain: Background basic gray level transformation, Histogram processing, Basic of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and sharpening frequency – domain filters.

Image Restoration: Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, inverse filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric Transformations.

UNIT 3

Color Image Processing: Color Fundamentals, Color models, Basic of full color image processing, Color transformations.

Image compression: Fundamentals, Image compression models, Error Free compression, Lossy compression.

Image segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented Segmentation.

Unit -4:

Representation, Description and Recognition: Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors-simple, topological descriptors, pattern and pattern classes-Recognition based on matching techniques.

Recognition: Pattern and pattern Classes, Decision-Theoretic Methods.

TEXT BOOK:

- Digital Image Processing by Rafael C. Gonzalez & Richard E Woods-2002, Pearson Education.

REFERENCE BOOK:

- Digital Image Processing by A.K Jain, 1995,- PHI

NOTE: Eight questions will be set in all by the examination taking two questions from each unit. Students will be required to attempt to attempt five questions in all selecting at least one question from each unit.

ECL-408 DIGITAL DESIGN THROUGH VERILOG

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

UNIT I

Introduction to Verilog: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks, Exercises.

UNIT II

Gate Level Modeling: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip-flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic, Circuits, Exercises.

Behavioral Modeling: Introduction, Operations and Assignments, Functional Bifurcation, *Initial* Construct, *Always* Construct, Examples, Assignments with Delays, *Wait* construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The *case* statement, , Simulation Flow, *if* and *if-else* constructs, *assign-deassign* construct, *repeat* construct, *for* loop, the *disable* construct, *while* loop, *forever* loop, parallel blocks, *force-release*.

UNIT III

Modeling at Data Flow Level: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

Switch level Modeling: Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets, Exercises.

System Tasks, Functions, And Compiler Directives: Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises,

UNIT IV

Digital Design with SM Charts: State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

Designing with programmable gate arrays and complex programmable logic devices: Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

Verilog Models: Static RAM Memory, A simplified 486 Bus Model, Interfacing Memory to a Microprocessor Bus, UART Design, Design of Microcontroller CPU.

TEST BOOKS:

1. Design through Verilog HDL–TR. Padmanabhan and B. B Tripura Sundari, WSE, IEEE Press.
2. Fundamentals of Logic Design with Verilog – S. Brown and Zvonko Vranesic, TMH, 2005.
3. Digital Systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.
4. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.

NOTE: There will be nine questions in total from all four units. First question is compulsory *and* set from all four units. Students will have to attempt any five questions in all selecting *at least* one question from each unit.

ECL- 412 **DSP PROCESSORS AND ARCHITECTURES**

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

UNIT I

Introduction to DSP: Introduction, A Digital signal-processing system, The sampling process Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) Linear time-invariant systems, Digital filters, Decimation and interpolation, Analysis and Design tool for DSP Systems MATLAB, DSP using MATLAB.

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

UNIT 2

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

Execution Control and Pipelining: Hardware looping, Interrupts, Stacks, Relative Branch support Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT 3

Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors Pipeline Operation of TMS320C54XX Processors.

Implementations of Basic DSP Algorithms: The Q-notation, FIR Filters, IIR Filters Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing

UNIT IV

Implementation of FFT Algorithms: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

Interfacing memory and I/O peripherals to programmable DSP devices: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface Programmed I/O, Interrupts and I/O, Direct memory access (DMA).Multichannel buffered serial port, McBSP Programming, a CODEC interface circuit, CODEC Programming, A CODEC-DSP interface example.

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand,2000.

REFERENCES:

1. Digital Signal Processing–Jonatham Stein, John Wiley, 2005.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECE-434 ASIC DESIGN

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

UNIT 1: **Introduction to ASICs**: Types of ASICs-Design flow - CMOS logic: CMOS transistors CMOS Design rules - Combinational Logic Cell -Sequential logic cell - Data path logic cell - I/O cells - ASIC library design: Transistors as Resistors - Transistor Parasitic Capacitance-Logical effort.

UNIT II **Programmable ASICs**:- Anti fuse - static RAM - EPROM and EEPROM technology - practical issues - Programmable ASIC logic cells: Actel ACT - Xilinx LCA - Altera FLEX - Altera MAX. Programmable ASIC I/O cells: DC & AC inputs and outputs - Clock & Power inputs - Xilinx I/O blocks.

UNIT III **Programmable ASIC interconnects:** Actel ACT -Xilinx LCA - Xilinx EPLD - Altera MAX 5000 and 7000 - Altera MAX 9000 - Altera FLEX. Programmable ASIC design software : Design systems - Logic Synthesis - Half gate ASIC. Low level design entry : Schematic entry - Low level design language - PLA tools - EDIF- CFI design representation.

UNIT 4

Logic synthesis: Verilog and logic synthesis -VHDL and logic synthesis. Simulation: types of simulation. : Testing: boundary scan test – fault simulation - automatic test pattern generation.

ASIC Construction: System partition - FPGA partitioning - partitioning methods -' Floor planning and placement: floor planning - placement - physical design flow. Routing : global routing - detailed routing - special routing - circuit extraction - DRC.

References: 1) Andrew Brown, - VLSI Circuits and Systems in Silicon -, McGraw Hill, 1991. 2) S.D. Brown, R.J. Francis, J. Rox, Z.G. Uranesic, "Field Programmable Gate Arrays"- Kluever Academic Publishers, 1992.

4) S. Y. Kung, H. J. Whilo House, T. Kailath, " VLSI and Modern Signa l Processing ", Prentice Hall, 1985.

5) Jose E. France, Yannis Tsividis, " Design of Analog - Digital VLSI Circuits for Telecommunication and Signal Processing", Prentice Hall, 1994.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-452 **HIGH SPEED DIGITAL DESIGN**

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 10

UNIT 1

Introduction to High-Speed Digital Design

Frequency, time and distance-capacitance and inductance effects-high speed properties of logi gates-speed and power– measurement techniques-rise time and bandwidth of oscilloscop probes- self inductance, signal pickup and loading effects of probes-observing crosstalk

UNIT 2

Transmission Line Effects and Crosstalk

Transmission lines-point to point wiring–infinite uniform transmission lines-effects of source an load impedance-special transmission line cases-line impedance and propagation delay-groun planes and layer stacking-crosstalk in solid ground planes, slotted ground planes and cross hatched ground planes- near and far end crosstalk

UNIT 3

Terminations and Vias

Terminations- end, source and middle terminations-AC biasing for end terminations-resisto selection-crosstalk in terminators-properties of vias– mechanical properties of vias-capacitance o vias-inductance of vias-return current and its relation to vias

UNIT 4

Stable Reference Voltage and Clock Distribution:

Stable voltage reference - distribution of uniform voltage - choosing a bypass capacitor - cloc distribution - clock skew and methods to reduce skew - controlling crosstalk on clock lines delay adjustments - clock oscillators and clock jitter

Text Books

1. Howard Johnson & Martin Graham, "High Speed Digital Design: A Handbook of Blac Magic", Prentice Hall PTR

2. Dally W.S. & Poulton J.W., "Digital Systems Engineering", Cambridge University Press

3. Masakazu Shoji, "High Speed Digital Circuits", Addison Wesley Publishing Company

NOTE: There will be nine questions in total from all four units. First question is compulsory an set from all four units. Students will have to attempt any five questions in all selecting at lea one question from each unit.

ECL-454 SPEECH SIGNAL PROCESSING

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT 1

Digital models for the speech signal - mechanism of speech production-acoustic theory -lossless tube models-digital models - linear predictive coding of speech - auto correlation - formulation of LPC equation - solution of LPC equations-levinson durbin algorithm-levinson recursion-schur algorithm-lattice formulations and solutions–PARCOR coefficients

UNIT 2

Spectral analysis of speech-short time fourier analysis-filter bank design-speech coding- subband coding of speech-transform coding-channel vocoder-formant vocoder – cepstral vocoder-vector quantizer coder

UNIT 3

Speech synthesis-pitch extraction algorithms-gold rabiner pitch trackers – autocorrelation pitch trackers-voice/unvoiced detection-homomorphic speech processing-homomorphic systems for convolution-complex cepstrums-pitch extraction using homomorphic speech processing

UNIT 4

Automatic speech recognition systems - isolated word recognition - connected word recognition-large vocabulary word recognition systems - pattern classification - DTW, HMM- speaker recognition systems - speaker verification systems-speaker identification systems

Text Books

1. Rabiner L.R. & Schafer R.W., "Digital Processing of Speech Signals", PHI.
2. Thomas Parsons, "Voice and Speech Processing", McGraw Hill Series
3. Saito S. & Nakata K., Fundamentals of Speech Signal Processing, Academic Press.

Reference Books

1. Owens F.J., "Signal Processing of Speech", Macmillan New Electronics
2. Papamichalis P.E., "Practical Approaches to Speech Coding", Texas Instruments, Prentice Hall
3. Rabiner L.R. & Gold, "Theory and Applications of Digital Signal Processing", Prentice Hall of India

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-456 **SIGNAL COMPRESSION TECHNIQUE**

L T P

4 - -

Total Credits:

External Marks: 80

Internal Marks: 20

Total Marks: 1

UNIT 1

Review of Information Theory: Discrete memoryless information source - Redundar Discrete information source with memory–Markov process, The information of a discrete sou with memory, Amount of information of _rst order and higher order Markov chains. The disc memoryless information source - Kraft inequality; Optimal codes; Bounds on the optimal c length; Kraft's inequality foruniquely decodable codes; Source coding theorem; Cod strategies; Shannon-McMillan theorem; Shannon's _rst coding theorem; The discrete informat source with memory – Coding aspects; Most probable message; Source coding theorem.

UNIT 2

Rate Distortion Theory: Motivation; The discrete rate distortion function R(D); Properties R(D): Calculation of R(D); R(D) for the binary source, and the Gaussian source, Source cod theorem(Rate distortion theorem); Converse source coding theorem (Converse of the R distortion theorem); Information transmission theorem; The continuous Rate distortion functio

UNIT 3

Signal Compression: Vector quantization-Code book generation–LBG algorithm; application speech and image compression. Parametric coding of of speech - Linear predictive codi Levinson recursion–Schur algorithm-Lattice structure implementation; Code excited lin prediction.

UNIT 4

Transform Coding: Theory and construction of transforms; Karhunen Loeve transfo Discrete Cosine Transform; Wavelet transform; Application to speech and image compressi Subband coding: speech, audio and image coding.

Text books:

1.Thomas M. Cover, Joy A. Thomas, \Elements of Information Theory," John Wiley & So Inc., 1991.

2.David Salomon, \Data Compression," 2nd Edn., Springer, 2000.

3.Khalid Sayood, \Introduction to Data Compression," 2nd Edn.,Addison Wesley, 2000.

Reference books:

1. Toby Berger, \Rate Distortion Theory: A Mathematical Basis for Data Compression," Prentice Hall, Inc., 1971.

2. K. R. Rao, P. C. Yip, \The Transform and Data Compression Handbook," CRC Press, 2001.

3. R. G. Gallager, \Information Theory and Reliable Communication," John Wiley & Sons, I 1968.

4. Ali N. Akansu, Richard A. Haddad, \Multiresolution signal decomposition: Transfor subbands and wavelets," Academic Press, 1992.

5. Martin Vetterli, Jelena Kovacevic, \Wavelets and subband coding," Prentice Hall Inc., 1995

NOTE : There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

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ECL-458
L T P
4 - -
External Marks: 80
Internal Marks: 20

DIGITAL MOS CIRCUITS

Total Credits: 4

Total Marks: 100

UNIT 1

Review of the basics physics and characteristics of MOS transistors–I-V & C-V Characteristics-Short channel and narrow channel effects in MOSFETs–subthrehold Conduction-channel length modulation-drain induced barrier lowering-hot carrier effects -velocity saturation of charge carriers etc. Scaling in MOSFETs–constant voltage and constant field scaling- digital MOSFET model-series connection of MOSFETs–body effect. Scaling issues in interconnects. Latch up in CMOS and methods for preventing latch up.

UNIT 2

MOS inverters-resistive load-NMOS load-pseudo NMOS and CMOS inverters-calculation of input high and low and output high and low levels-power dissipation-calculation of delay times for CMOS inverter-CMOS ring oscillator-design of super buffer - estimation of interconnect parasitic and calculation of interconnect delay. Static CMOS logic circuits-CMOS NOR, NAND, AOI and OAI gates-full adder-SR and JK latches C^2MOS latch - Pass transistors and Transmission gates-simple circuits using TG – basic principles of pass transistor logic-voltage boot strapping.

UNIT 3

Pseudo NMOS–Tri-state circuits–clocked CMOS–Dynamic CMOS circuits–solutions for charge sharing-DOMINO Logic- NORA–TSPC logic styles–Dual rail logic networks– Implementation of general VLSI system components such as decoders, encoders, Flip Flops and Registers. Method of Logical Effort for high speed CMOS design-BiCMOS logic circuits-BiCMOS inverter with resistive base pull down and active base pull down -BiCMOS switching transients-simple gates using BiCMOS–Advanced CMOS logic styles

UNIT 4

CMOS clocking styles- clock generation and distribution-Arithmetic Circuits in CMOS VLSI-high speed adders, subtractors and multipliers–CMOS Memory structures–SRAM and DRAM design–Sense amplifier design- Low power design techniques–MT CMOS–VTCMOS basic ideas of adiabatic logic. Floor planning and Routing–Input and Output circuits–special CMOS device structures such as SOI, DTMOS, Radiation Hard CMOS, Fin FETs, etc.

Reference Books:

1. S. Mo Kang & Ysuf Leblebici, CMOS Digital Integrated Circuits-Analysis & Design, Second Ed., MGH
2. Jan M Rabaey, Digital Integrated Circuits - A Design Perspective, Prentice Hall
3. Y Taur & T H Ning, Fundamentals of Modern VLSI Devices, Cambridge Univ. Press
4. Ken Martin, Digital Integrated Circuit Design, Oxford Univ. Press
5. Jacob Baker R., Harry W Li & David E Boyce, CMOS - Circuit Design, Layout & Simulation, PHI

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-2607 **PC Interfacing and Data Acquisition**

L T P

4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

Unit 1: PC as a platform for Data Acquisition

Origin of PC, software-operating systems, programming languages, hardware components-mother board-microprocessors, chipsets and support circuits, functions, system control, peripheral control, memory control BIOS and its functions.

Unit 2. Memory and Mass Storage Devices

Memory, logical organization, Technologies, installation, packaging, Mass storage

Devices, data organization, Magnetic storage, Optical storage, interfaces–AT attachments, SCSI parallel interface, Key board, mouse, track ball, scanners, Display systems, Display adapters, Audio Systems, Printers, Ports-USB, Firewire, IrDA, Bluetooth, RS-232C Serial Port, Parallel Ports.

Unit 3. Buses and Communications

History, architecture, bus function, various buses; ISA, PCI, PCI-X, PCI-Express, PCMCIA, Infiniband, hyper transport

Unit 4. Interfacing-

Local area networking-Concepts, topologies, standards, hardware, Telecommunication-analog and digital services, Internet–addressing, Domain name systems, Routing. Design of DAS around PC, different DAQ cards and software, Interfacing of Add-on DAQ cards with PC using various buses

Allocation and technique of data acquisition for agriculture

Books Recommended

1. Hardware Bible – Winn. L. Rosch, Techmedia, New Delhi

2. The Complete PC maintenance and upgrade guide–Mark Minasi, BPB publications.

3. 8086/8088 Programming–John Uffenbeck, PHI.

4. Structured Computer Organisation–Tanenbaum, PHI.

5. Microprocessors–Gilmore, Mc-Graw Hill.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-2609 **Modeling and Simulation of Dynamic System**

L T P

4 - -

Total Credits: 4

External Marks: 80

Internal Marks: 20

Total Marks: 100

Unit 1 – Fundamental to MATLAB

Mathematical Operations with Arrays, Function & Function Files, Nested Loops, 2 Dimensional & 3 Dimensional Plots

MATLAB Cell Arrays & Structures

Strings, Cell Arrays, Nesting of Cell Arrays, Creation of Structure, Structure of Structures, Arrays of Structure, Conversion of Cell Arrays to Structure, Control Statement, elements of MATLAB programming

Functions and GUI

Subfunctions, Function handler, Nested Functions, File Input Output Handling, Graphical User Interface (GUI), Components of GUI, Dialogue Box, File Dialogue Box, Graphics Features

Unit 2 – Communication System Simulation with MATLAB

Communication System Toolbox - Simulation Analysis of Communication Link, Exposure to GUI Feature in Communication Toolbox, Analog Modulation/ Demodulation, Digital Modulation/ Demodulation, Bit Error Rate, Signal To Noise Ratio, Signal Constellation

Unit 3 – Filters using MATLAB

Simulation of IIR, FIR Filters, Simulation of Digital Filters, Adaptive Filter, FDA Tool

Signal Processing Applications with MATLAB

Signal Processing toolbox – Transforms, Least Mean Square (MSE) Algorithm, Minimal Mean Square Error (MMSE) Algorithm, Maximum Likelihood (ML) Algorithm, Kalman Filter

Unit 4: Modeling of Dynamic System

Modeling of Dynamic System using various graphical programming tool, modeling of agricultural system, environmental system, electrical system, various communication system and application related to agricultural and rural development.

References:

1. Contemporary Communication Systems using MATLAB, John G. Prokis, Masoud Salehi, Gerhard Bauch
2. Digital Signal Processing, A Computer Based Approach by Sanjit Mitra, 3rd edition, Mc GrawHill Publication., Brooks/Cole Cengage Learning, SecondEdition
3. MATAB Programming by Y. Kirani Singh, B.B. Choudhary, PHI
4. Using MATLAB (User's Guide), Math Works Inc
5. MATLAB Communication Toolbox User's Guide, Math Works Inc
6. MATLAB Signal Processing Toolbox, User's Guide, Math Works Inc
7. MATLAB Filter Design Toolbox, User's Guide, Math Works Inc

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECL-2629 **Soft Computing Techniques**

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

Unit 1: Artificial Neural Networks

Basic-concepts-single layer perception-Multi layer perception-Supervised and un supervised learning back propagation networks, Application;

Unit 2: Fuzzy Systems

Fuzzy sets and Fuzzy reasoning-Fuzzy matrices-Fuzzy functions-decomposition-Fuzzy automata and languages- Fuzzy control methods-Fuzzy decision making, Adaptive Control, Applications;

Unit 3: Neuro-Fuzzy Modelling

Adaptive networks based Fuzzy interfaces-Classification and Representation trees-algorithms –Rule base structure identification-Neuro-Fuzzy controls;

Unit 4: Genetic Algorithm

Survival of the fittest-pictures computations-cross overmutation-reproduction-rank method-rank space method, Application;

Unit 5: Soft Computing and Conventional AI

AI Search algorithm-Predicate calculus rules of interface-Semantic networks-frames-objects-Hybrid models; Applications;

Suggested Reading

1. Neuro Fuzzy and soft computing- Jang J.S, Sun C.T and Mizutami E, Prentice Hall;
2. Fuzzy Logic Engineering Applications- Timothy J.Ross; McGraw Hill;
3. Neural Networks- Simon Haykin, pearson Education
4. Fuzzy Sets and Fuzzy Logic- George J.Klir and Bo Yuan, Prentice Hall;
5. Artificial Intelligence- Nih.J.Ndssen Harcourt Asia Ltd.,Singapore;

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

ECE-2021 Wireless Sensors Networks

L T P
4 - -

Total Credits: 4

External Marks: 80
Internal Marks: 20

Total Marks: 100

UNIT 1: Introduction to Wireless Sensors, Different wireless topologies and standards and technologies for wireless communications, Examples of wireless sensors, Hardware and software requirements of wireless sensors, Advantages and Disadvantages of wireless sensors, role of wireless sensors in agriculture and agro industry.

UNIT 2: Basic structure of wireless sensor: RF receivers, sensors, microcontrollers, power sources, network issues for wireless sensors, study of Bluetooth technology and ZigBee technology, Difference between these two technologies, mesh networks, 802.11 mesh network architecture, Remote application server(RAS), Wireless medium access control(MAC), MAC's IEEE standards viz 802.11b, 802.15.1, LR-WPANs.

UNIT 3: Smart Transducers, Architecture of smart transducer: smart transducer interface module(STIM), network capable application processor(NCAP),transducer independent interface(TII), IEEE 1451 standard, IEEE 1451.5 standard, smart transducer interface for sensors and actuators-transducers to microprocessor communication protocol.

UNIT 4: M2M technology: a machine and process control, role and applications of M2M in agriculture and agro industry, wireless LAN for farm management, Application of Bluetooth technology in greenhouse environment, monitor and control, RFID: different types of RFID tags, structure of a typical RFID, use of RFID in agriculture and agro industry

Recommended Books/Reading

1. Feng Zhao, Leonidas Guiubas, "Wireless Sensor networks An Information Processing Approach" Morgan Kaufmann Publishers, An Imprint of Elsevier First Indian Reprint 2005.
2. Wireless Sensor Networks, C.S. Raghavendra, Krishna M. Sivalingam and Taieb Znati Kluwer Academic Publishers.
3. Anna Hac, "Wireless Sensor network Designs" John Wiley and Sons, December 2003.
4. Edgar H. Callaway, Jr. and Edgar H. Callaway, "Wireless Sensor Networks: Architectures and Protocols" CRC Press, August 2003, 352 pages.
5. A Baggio. Wireless sensor networks in precision agriculture. In The REALWSN'05 Workshop on Real-World Wireless Sensor Networks, IVA, Stockholm, June 2005.
6. J. Panchard. Survey onWireless Sensor Networks for Agriculture. Technical report, EPFL, Lausanne, 2007.

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.

CSL-414 MULTIMEDIA COMMUNICATION SYSTEMS

L T P Total Credits: 4

4 - -

External Marks: 80 Total Marks: 100

Internal Marks: 20

UNIT 1

Multimedia Communications: Introduction to various multimedia comm. Techniques. Applications. Networks. Protocols and Standards, bandwidth and compression issues.

Digital Communication basics: Source encoding, Channel encoding, Circuit switched Networks: Packet switched networks, ATM, Frame Relay.

UNIT 2

Multimedia Information Representation: Different types of multimedia information, Information representation.

Compression Techniques: Encoding and decoding techniques, Text compression techniques, Image compression techniques, Audio and Video Compression, Standards for Multimedia Compression, Huffman, Run length, Variable length, Lossy/Lossless compression.

UNIT 3

Multimedia File Formats

Various files formats for multimedia and their applications, BMP, PNG, TIFF, JPEG, DEX. AVI, MPEG Audio/ Video Standards, Challenges for encryption and decryption.

UNIT 4

World Wide Web

The Internet, Internet Multimedia Applications, Enterprise networks, Entertainment Networks, High Speed Modems, Application Support Functions, Audio/ Video Streaming, Video Conferencing.

Books Recommended:

1. Multimedia Communications by Fred Halsall, Prentice Hall.
2. Digital Communication by Proakis, Prentice Hall.
3. Internet Resources.
4. Related IEEE/IEE publications

NOTE: There will be nine questions in total from all four units. First question is compulsory and set from all four units. Students will have to attempt any five questions in all selecting at least one question from each unit.