



**Cusrow Wadia Institute of Technology,
Pune - 411001**

**Electronics & Telecommunication
Engineering Department**

Multi Point Entry and Credit System 2014

CURRICULUM

[W. E. F. June 2014]

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

A note on CURRICULUM REVISION (2014)

1. Preamble :

- Cusrow Wadia Institute of Technology, Pune was granted Academic Autonomy in the year 1985 by Government of Maharashtra vide letter No. PTI 2483/119915(234)/TE-I (B) dated 27/2/1985.
- Initially the Institute adopted the Model Curriculum prepared by then TTTI, Western Region, Bhopal. Subsequently, the revisions in the curriculum were made as per the needs of the Society.
- The Institute adopted Multi Point Entry and Credit System w.e.f. June 1998.
- The present curriculum has come into force w.e.f. June 2010 .
- The feedback was taken from various stake holders and it was strongly felt that with the rapid strides in the field of Information Technology, Computers and Manufacturing Processes , a dynamic curriculum need to adopt the benefits of the fast changing expectations in the contents as well as the Teaching Learning Methodology. As such, the present curriculum is being reviewed since 2012-2013. The observations are being noted down.
- The Institute has strengthened the hardware and software which is constantly consolidated and upgraded to match the needs of the society in general and the Industries in particular.
- Students should be proficient in the use of computers and related software irrespective of the branch of Engineering they are studying. The students shall be made to make maximum use of software packages and use Internet to derive and update their knowledge.
- The contemporary needs of the user system, more thrust on Learning Management System , Skill development and overall development of the students is the governing factor in the revision of 2014 curriculum.

2. Approach for Curriculum Revision:

- Scientific system approach will be adopted in the revision of curriculum .
- A curriculum revision model showing various steps, will be presented.
- Analysis of the existing curriculum is being done by taking feedback from the faculty implementing the curriculum, Alumni, Industry / Field Personnel, Courses Committee Members and the Experts in the field of Education.
- Entry behaviour of the students be assessed. Basic entry qualification for Diploma is SSC or equivalent .However, higher entry qualification like 12th Science, 12th MCVC, ITI etc. be also considered.
- Curriculum documents of MSBTE, other Boards and other Autonomous Institutions will be

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studied for inclusion of new courses and analysis of contents of existing and newly inducted courses and also the implementation strategy will be decided.

- The curriculum is to be rationalised as per the AICTE and MSBTE norms and guidelines. Recently, AICTE has designed a model curriculum and MSBTE also has revised its curriculum. However, these curriculums are designed by considering the needs at national / State level. As an Autonomous Polytechnic , our curriculum may be governed by local factors / needs.
- The team members will be identified for conducting Search Conference, collecting feedback from stake holders and interviews with Experts for noting the suggestions about the courses and necessary modifications. The Interactive Sessions are proposed to be arranged through Search Conference in which the Experts from Industry and Academia will be invited.

3. ROLES TO BE PLAYED AND FUNCTIONS TO BE PERFORMED BY A DIPLOMA HOLDER:

- A Diploma holder may be employed in the Industry as a Technician or Supervisor for Production, Installation, Repairs and Maintenance. He also may be employed in drawing, estimation or as an Assistant in IT related activities. He may be an Entrepreneur, be assigned a job of Purchase/ Marketing Department. Diploma holder should have basic knowledge of the various subjects of his branch in Engineering and also the related Inter-disciplinary subjects. He should be aware of the present technologies and be able to adopt the changes in future. He shall acquire the necessary skill sets in the Engineering subjects.
- His role in the Society is that of a responsible individual and should conduct himself as regards the values and cultures. He should acquire the necessary professional, presentation and managerial Skills.

4. ANALYSING JOB FUNCTIONS AND DERIVING CURRICULUM OBJECTIVES:

- The role of a Diploma holder, as a Technician on the job, is analysed in four domains of Professional Skills, Life Long Learning, Personal Development and Social Development.
- The curriculum should help the students to acquire professional skills and inculcate attitudes in order that the student will be able to discharge the role and functions effectively on the societal and employment front.
- Goals and objectives of each program are already framed in previous curriculum revision. The courses common to several programmes and the courses relevant to particular programmes were classified under various categories. Same categories may be considered in this revision.
- The overall course structure and Teaching Examination Scheme was prepared in last

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revision in 2010. Various administrative issues like the total workload of the department, balancing of the load in both the terms, the existing staff / faculty position as approved by the Government were also considered in the last revision. As majority of the administrative issues have been sorted out in the existing structure, it is proposed to retain similar structure.

- The contents of various courses will be finalised by considering the feedback from stake holders through interviews, Search Conference and discussions.
- The course structure and the contents will be validated by the Courses Committees(PBOS).
- Study of the Diploma programmes offered by MSBTE, other State Boards and other Autonomous Institutions is being done to widen the perspective.

5. CURRICULUM REVISION PROCESS:

- The curriculum revision process was initiated in the academic year 2012-2013.
- The comments / observations on the existing curriculum of the faculty in the department are being invited. Also the feedback / observations of the Alumni, Faculty in other Institutes, Examiners and the persons from Industry will be noted. The concerned departments will also interview persons from Industry to obtain comments on their expectations from Diploma holders.
- MSBTE had issued guidelines to all Autonomous Polytechnics in the State about the Teaching Examination Scheme. As several Autonomous Polytechnics are spread in various regions, there is no uniformity in their Teaching and Examination Scheme. As such the MSBTE guidelines will be useful in maintaining the uniformity in the Examination Scheme at various polytechnics.
- The guidelines were as under:-

- a) Internal (sessional) and External (Term End) Examination theory marks: 20:80
- b) No. of courses for award of Diploma including Project: 10 – 12. (CWIT11)
- c) No. of courses in the programme : Minimum – 30 (CWIT 36-39)
- d) Formula for credit – 1 Lecture / Practical hour = 1 credit. (CWIT same)
- e) Minimum credits for award of Diploma – 180. (CWIT 185)
- f) Marks for Project and Seminar – 100. (CWIT 150)
- g) Proportion of theory / practical marks for the courses considered for award of class- 60:40 (CWIT approx. 54:46)
- h) Percentage of passing for individual course – 40% (CWIT same)
- i) Percentage of grace marks for meeting the deficiency in award of class – 0.5% (CWIT same)
- j) Percentage marks for award of class :



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Pass class > 40% to 45%

Second Class > 45% to 60%

First Class > 60% to 75%

First Class with Distinction >75%

In July 2012, Director , MSBTE, Mumbai convened the meeting of all 15 Autonomous Polytechnics in the State so as to give guidelines in respect of curriculum, its implementation , programme structure, examination scheme, rules of examination etc. in detail. More than 120 aspects were considered for the discussion. We have already modified the number of courses for award of class from 9 to 10 as per these guidelines. However, it was decided that more thrust be given on skill development and its testing by introducing more practical examinations. Also, minimum 04 Practical examinations be kept for the courses considered for award of class. This can be done by replacing the Oral examinations by Practical examinations wherever possible and applicable. Another aspect of the personality development and inculcation of soft skills will be considered in this revision.

AICTE has also developed a model curriculum. However, the Teaching and Examination schemes have a large variation eg. Theory Credits are @ 45% and the weightage of Marks for Theory is @60%. . Also, the Internal marks weightage for Theory is 10% for Teachers assessment , 20% for Tests and 70% for End Theory Exam. . As such , this curriculum will be considered for comparison of contents and addition of Soft Skills.

A) Norms for the Structure (By AICTE):-

Sr.No.	Component/Category	Time Allocation	Course/s
01	General Studies and Applied Sciences	15 – 25%	Mathematics/Physics/Chemistry /Entrepreneurial development/ Energy Conservation/ Communication Skills/Technical English/Computer Awareness etc.
02	Basic Engineering	20 – 30%	Basic Courses related to Programme/Electronic Lab Practice/ Workshop Practice/Semiconductor theory/Digital Electronics/ Communication systems
03	Applied Engineering	40 – 55%	Courses which develop Competencies required for the Profession.
04	Specialised Courses	5 – 10%	Courses which cover new and Emerging areas of Technology.

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B) Norms for Schedule of the Term (By AICTE):-

Sr.No.	Instructions (hr/day)	Total Instruction (days/term)	Total Instruction (hr/term)	Total Contact hrs. for Diploma
1	05	90	450	450 X 6 = 2700
2	06	75	450	450 X 6 = 2700

C) SCHEDULE OF THE TERM

Sr.No.	Description	AICTE Norm	CWIT
01	Instructions(hr/day)	05/06	07
02	Total Instructions(days/term)	90/75	80
03	Total Instructions(hr/term)	450/450	560
04	Total Contact hrs for Diploma	450 X 6 = 2700	560 X 6 = 3360

1. TEACHING LEARNING PROCESS:

- No. of weeks – 16 (Actually provided= 17-19/ term ,@36weeks)
(2x4= 08 weeks for Exam.)
- Average days per week- 5.5 (Including Saturdays)
- No. of contact hours per day – 7
- No. of hours per week for instruction and pre-decided Co-curricular activities – 38.
- Each course shall be taught for sixteen weeks and two weeks shall be utilised for revision in that term.

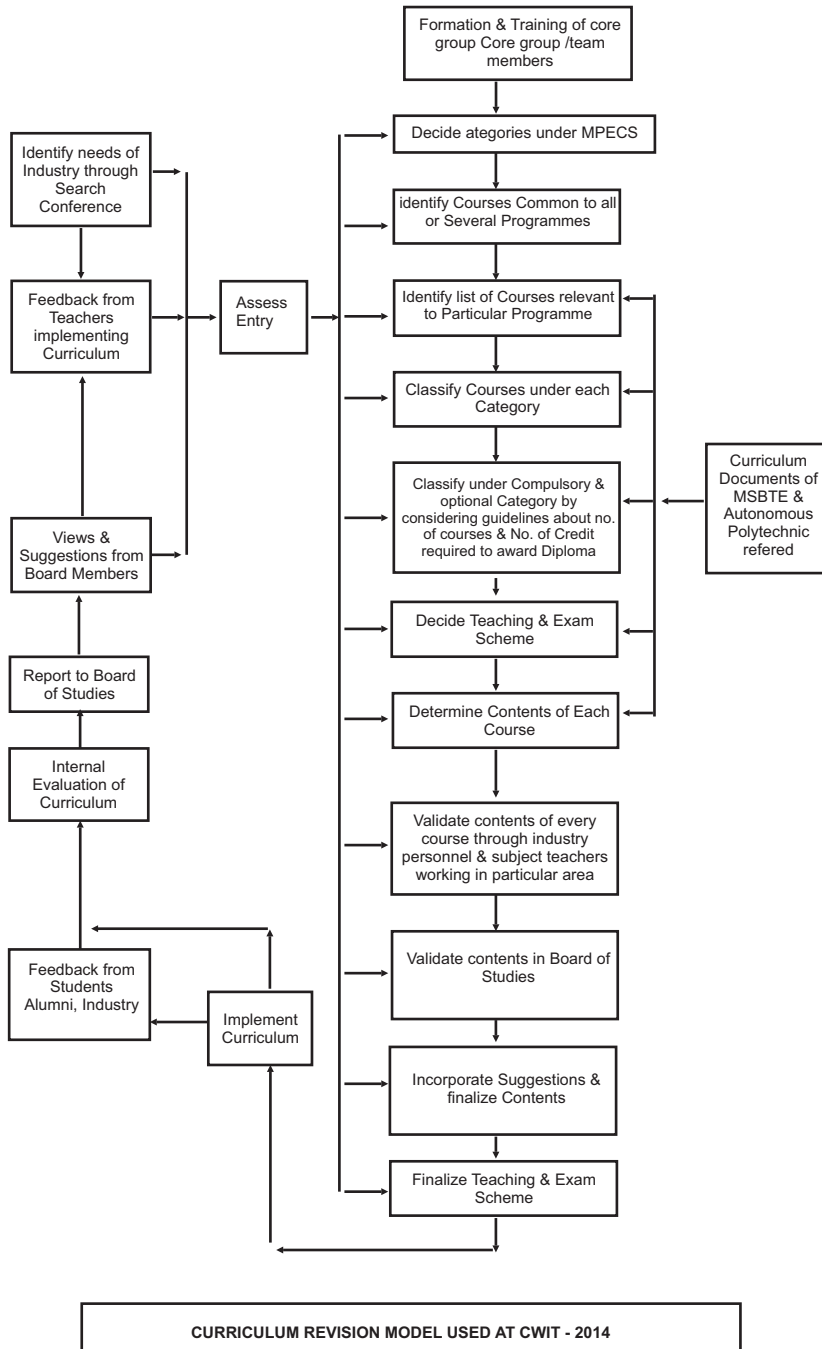
Course Categories: (Existing and proposed to be continued)

- Foundation(1)
- Core(2)
- Allied(3)
- Applied(4)
- Specialised(5)
- Number of courses for a programme – 35 – 39.
- Number of courses for award of class – 11
- Number of Elective Courses - 3
- Number of credits to be earned for obtaining Diploma – 185.
- One credit is = one hour of lecture / practical per week for a course.
- Ratio of theory to practical hours per week : Approx. 50:50

EXAMINATION SCHEME: (PROPOSED)

- Theory paper – 80 marks
- Tests – 20 marks
- Term Work – 25-50 marks
- Practicals -25 – 50 marks
- Viva voce- 25 – 50 marks
- Project Work -100 + 50 marks
- Grand total – 4700 marks , Grand total of marks for award of class – 1600.

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What is Electronics & Telecommunication Engineering?

The Electronics & Telecommunication Engineering is a balanced program of Electronic, Electrical, Digital, Microprocessors, Power, Automatic Control, Instrumentation and Telecommunications supported by basic units in analysis, Software, Engineering science, and opens doors to a wide range of employment opportunities.

Importance of Electronics & Telecommunication

The program is well equipped with a good understanding of Electronics Systems design techniques and their applications in area such as Control, Telecommunication and Consumer Products. The program emphasizes analytical methods to plan and design networks to meet the goals of quality, reliability and cost. The students will also developed skills enabling to exercise independent, critical and creative thought also self confidence and maturity to be successful in their later career.

The diploma programmed in Electronics & Telecommunication Engineering provides students with a strong theoretical & practical background in both Hardware & Software aspects of Digital Communication Systems, Mechatronics, Microprocessors Based System and Computer Based Systems along with the engineering analysis, design and implementation skills necessary to work in team. The curriculum is based on an engineering philosophy.

Objectives of Electronics & Telecommunication Engineering:

The objectives of Electronics & Telecommunication Engineering is achieved through a balance of required courses and judicious choices of technical electives and broad coverage of topics in Electronics and Telecommunication to give excellent foundation for career growth and also gives opportunity of putting the learning into practice.

The main objectives of Electronics & Telecommunication Engineering are :

- * The students will learn the professional studies in all years to develop practical and career skills such as teamwork, communication, presentation and project management.
- * The student acquire in depth knowledge of the components and systems that make the global telecommunications network, starting with basics in Electronics and Computing.
- * The students will learn about the media and devices that transport & direct Communication signals through the network.
- * The students will become familiar with current technology and develop the tools. Also they will gain knowledge of advanced technology.
- * The students will also learn about the policies and regulations that have shaped the industry around the world.
- * The students will use the workstations for designing and testing electronic Circuits and for creating modern programmable intelligent electronic system applications.

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Electronics & Telecommunication Engineering Department:

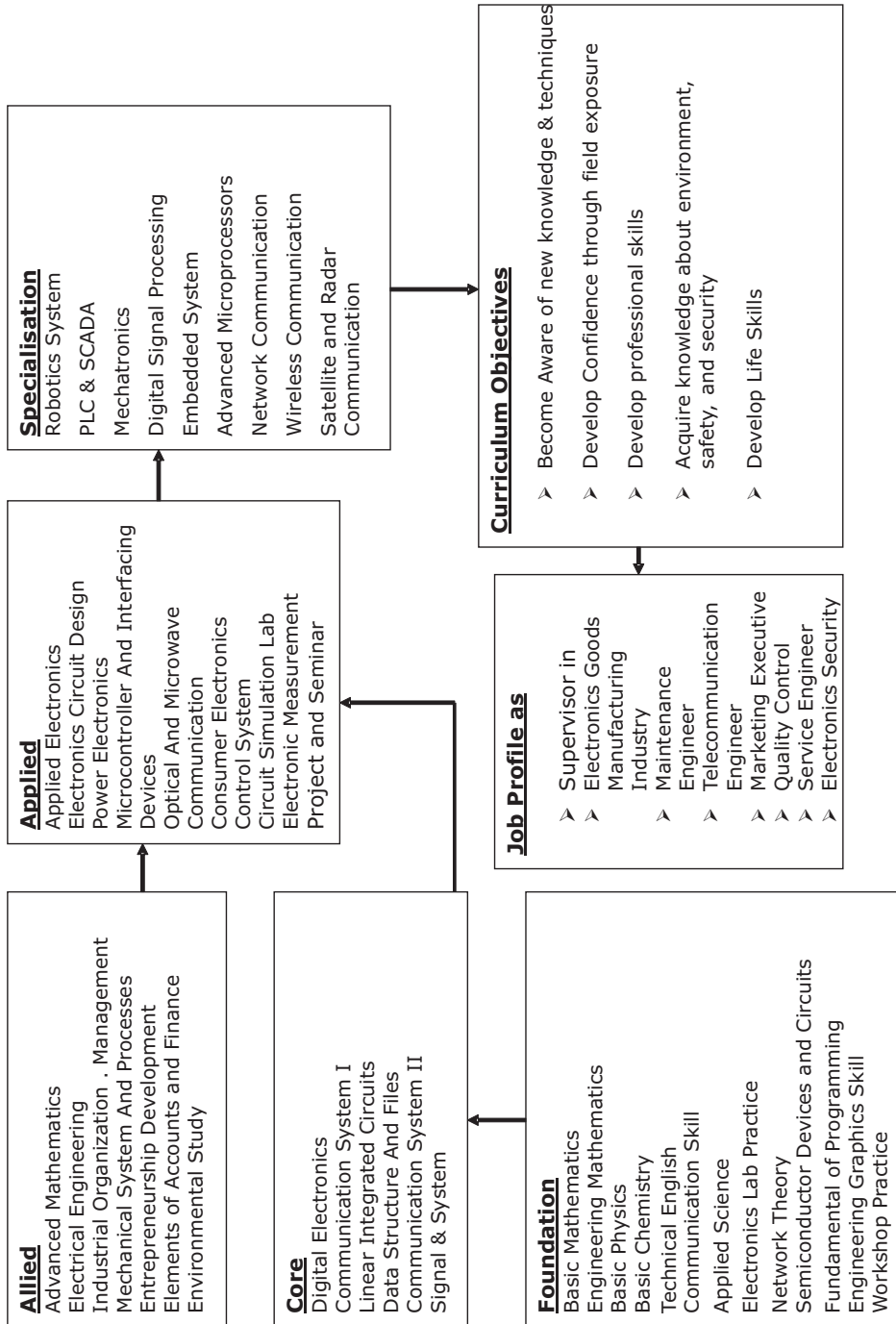
The department was established and started functioning in the year 1951. In the recent era of globalization Electronic Communication is playing a vital role and undoubtedly playing a major source of development. There is vast scope for jobs for the students of Electronics and Telecommunication Engineering in reputed industries in India and abroad, especially in communication field.

The department is having fully equipped laboratories as per MSBTE and AICTE norms, covering total range of sophisticated equipments, machines, instruments, computers and software. The department is involved in students centered activities like Personality Development, Industrial Tours, Guest Lectures and Social Activities.

Department has Laboratories namely Basic Electronics Labs, Digital Electronics and Microprocessors Lab, Software Lab. Mechatronics Lab, Microwave and Communication Lab, Power Electronics Lab, Mobile communication lab and Project Lab.

- * More than 50 dual trace CRO (30MHz)
- * Digital Storage Oscilloscopes
- * More than 60 Branded Computers with higher end specifications.
- * Internet facilities (24*7) - 5 MBPS capacity.
- * Software and Simulation labs, equipped with application softwares.
- * Various projects are undertaken in the department based on Microcontroller, Security Systems, Industrial Automation and Telecommunication
- * Well equipped software laboratory with Core i-III computers with secured network.
- * Devoted and well qualified staff.
- * Departmental Library Facility.

PROGRAMME : DIPLOMA IN E & TC ENGINEERING



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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

Category : FOUNDATION													
Sr. No.	Course Code	Course Title	Preq.	C/O	L	P	CR	TH	TT	PR	OR	TW	TOTAL
1	R14SC1701	Basic Mathematics		C	4	-	4	80	20	-	-	-	100
2	R14SC1702	Engineering Mathematics		C	4	-	4	80	20	-	-	-	100
3	R14SC1703	Basic Physics		C	2	2	4	40	10	-	-	25	75
4	R14SC1704	Basic Chemistry		C	2	2	4	40	10	-	-	25	75
5	R14SC1707	Technical English		C	2	2	4	80	20	-	-	25	125
6	R14SC1708	Communication Skill		C	1	2	3	-	-	-	@25	25	50
7	R14SC1709	Applied Science (E.Phy.+E.Chem.)		C	4	4	8	80	20	-	-	50	150
8	R14EX1501	Electronics Lab Practice		C	2	2	4	-	-	-	@25	50	75
9	R14EX1502	Network Theory		C	4	2	6	80	20	-	-	25	125
10	R14EX1503	Semiconductor Devices and Circuits		C	4	2	6	80	20	@50	-	50	200
11	R14EX1504	Fundamental of Programming		C	3	2	5	80	20	-	-	25	125
12	R14ME1204	Engineering Graphics Skill		C	2	2	4	-	-	-	-	50	50
13	R14ME1205	Workshop Practice		C	-	2	2	-	-	-	-	50	50
		Total			34	24	58	640	160	50	50	400	1300

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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

Category : ALLIED													
Sr. No.	Course Code	Course Title	Preq.	C/O	L	P	CR	TH	TT	PR	OR	TW	TOTAL
1	R14SC2701	Advanced Mathematics		C	3	-	3	80	20	-	-	--	100
2	R14EE2304	Electrical Engineering		C	3	2	5	80	20	-	-	25	125
3	R14ME2203	Industrial Organization . Management		C	3	-	3	80	20	-	-	--	100
4	R14ME2602	Mechanical System And Processes		C	2	2	4	-	-	-	-	50	50
5	R14ME2206	Entrepreneurship Development		O1	2								
	R14EX2208	Elements of Accounts and Finance				1(T)	3	-	-	-	@25	25	50
6	R14EX2207	Environmental Studies		C	2	1	3	-	-	-	@25	25	50
		Total			14	7	21	240	60	-	50	125	475

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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

Category : CORE

Sr. No.	Course Code	Course Title	Preq.	C/O	L	P	CR	TH	TT	PR	OR	TW	TOTAL
1	R14EX3502	Digital Electronics		C	4	2	6	80	20	-	-	50	150
2	R14EX3503	Communication System I		C	4	2	6	80	20	@50	-	50	200
3	R14EX3504	Linear Integrated Circuits		C	4	2	6	80	20	-	-	50	150
4	R14EX3505	Data Structure And Files		C	4	2	6	80	20	-	-	50	150
5	R14EX3506	Communication System II		C	4	2	6	80	20	50	-	50	200
6	R14EX3507	Signal & System		C	2	2	4	-	-	-	@50	50	100
		Total			22	12	34	400	100	100	50	300	950

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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

Category : APPLIED													
Sr. No.	Course Code	Course Title	Prq.	C/O	L	P	CR	TH	TT	PR	OR	TW	TOTAL
1	R14EX4501	Applied Electronics		C	4	2	6	80	20	50	-	50	200
2	R14EX4502	Electronics Circuit Design		C	2	2	4	-	-	-	25	25	50
3	R14EX4503	Power Electronics		C	4	2	6	80	20	-	-	25	125
4	R14EX4504	Microcontroller And Interfacing Devices		C	4	2	6	80	20	50	-	25	175
5	R14EX4505	Optical And Microwave Communication		C	4	2	6	80	20	50	-	25	175
6	R14EX4506	Consumer Electronics		C	4	2	6	80	20	-	-	25	125
7	R14EX4507	Control System		C	4	2	6	80	20	-	-	-	100
8	R14EX4508	Circuit Simulation Lab		C	2	2	4	-	-	@50	-	25	75
9	R14EX4509	Electronic Measurement		C	4	2	6	80	20	50	-	50	200
10	R14EX4510	Project And Seminar		C	-	4	4	-	-	-	50	100	150
		Total			32	22	54	560	140	250	75	350	1375

CWIT - (ELECTRICAL ENGINEERING)

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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

Category : SPECIALISED													
Sr. No.	Course Code	Course Title	Prq.	C/O	L	P	CR	TH	TT	PR	OR	TW	TOTAL
1	R14EX5501	Robotics System	Applied Electronics (R14EX4501)	O	4	2	6	80	20	50	-	50	200
2	R14EX5502	PLC & SCADA											
3	R14EX5503	Mechatronics											
4	R14EX5504	Digital Signal Processing	Microcontroller And Interfacing Devices (R14EX4504)	O	4	2	6	80	20	50	-	50	200
5	R14EX5505	Embedded System											
6	R14EX5506	Advanced Microprocessors											
7	R14EX5507	Network Communication	Communication system-1 (R14EX3503)	O	4	2	6	80	20	50	-	50	200
8	R14EX5508	Wireless Communication											
9	R14EX5509	Satellite and Radar Communication											
		Total			12	06	18	240	60	150	-	150	600

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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

CLASS DECLARATION														
SN	Category	Course Code	Course Title	PREQ	C/O	L	P	CR	TH	TT	PR	OR	TW	TOTAL
1	Allied	R14ME2203	Industrial Org. Management		C	3		03	80	20	-	-	-	100
2		R14EX4502	Electronic Circuit Design		C	2	2	04	-	-	-	25	25	50
3		R14EX4503	Power Electronics		C	4	2	06	80	20	-	-	25	125
4	Applied	R14EX4504	Microcontroller And Interfacing Devices		C	4	2	06	80	20	50	-	25	175
5		R14EX4505	Optical And Microwave Communication		C	4	2	06	80	20	50	-	25	175
6		R14EX4506	Consumer Electronics		C	4	2	06	80	20	-	-	25	125
7		R14EX4507	Control System		C	4	2	06	80	20	-	-	-	100
8		R14EX5501	Robotics System	Applied Electronics (R14EX4501)	O	4	2	06	80	20	50	-	50	200
		R14EX5502	PLC & SCADA											
		R14EX5503	Mechatronics											
9	Specialized	R14EX5504	Digital Signal Processing	Microcontroller And Interfacing Devices (R14EX4504)										
		R14EX5505	Embedded System											
		R14EX5506	Advanced Microprocessors											
10		R14EX5507	Network Communication											
		R14EX5508	Wireless Communication	Communication system-1 (R14EX3503)	O	4	2	06	80	20	50	-	50	200
		R14EX5509	Satellite and Radar Communication											
11	Applied	R14EX4510	Project And Seminar	100CR	C	4	4	04	-	-	-	50	100	150
				TOTAL		37	22	59	720	180	250	75	375	1600

Theory Marks = 900
PR +OR+TW Marks = 700

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Department of Electronics & Telecommunication Engineering Curriculum Revision 2014 (Proposed)

OVERALL SUMMARY											
SR. NO.	CATEGORY	NO. OF COURSES		TEACHING SCHEME			EXAMINATION SCHEME				
		COMP.	OPT.	L	P	CREDITS	TH + TT	PR	OR	TW	TOTAL
1	Foundation	14	-	34	24	58	800	50	50	400	1300
2	Allied	05	01	14	07	21	300	-	50	125	475
3	Core	06	-	20	14	34	500	100	50	300	950
4	Applied	10	-	32	22	54	700	250	75	350	1375
5	Specialized	-	03	12	06	18	300	150	-	150	600
TOTAL		35	04	112	73	185	2600	550	225	1325	4700

Total No. of Courses to be Completed=39; Compulsory Courses= 35 + Optional Courses= 04
 No. of Courses having Theory Exam = 27
 No. of Practical + Oral Examination = 11 + 07 = 18
 Credit Ratio ; Theory : Practical = 62 : 38
 Marks Ratio ; Theory : PR+OR+TW = 54 : 46

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SR. NO.	CATEGORY	COURSE CODE	COURSE TITLE	PAGE NO.
1	FOUNDATION COURSES	R14SC1701	Basic Mathematics	1
2		R14SC1702	Engineering Mathematics	4
3		R14SC1703	Basic Physics	6
4		R14SC1704	Basic Chemistry	9
5		R14SC1707	Technical English	13
6		R14SC1708	Communication Skill	16
7		R14SC1709	Applied Science (E.Phys.+E.Chem.)	19
8		R14EX1501	Electronic Lab Practice	25
9		R14EX1502	Network Theory	28
10		R14EX1503	Semiconductor Devices and Circuits	31
11		R14EX1504	Fundamental of Programming	35
12		R14ME1204	Engineering Graphics Skill	39
13		R14ME1205	Workshop Practice	42
14	ALLIED COURSES	R14SC2701	Advanced Mathematics	44
15		R14EE2304	Electrical Engineering	46
16		R14ME2203	Industrial Organization Management	49
17		R14ME2206	Entrepreneurship Development Program (Optional 1)	51
18		R14ME2602	Mechanical System and Processes	54
19		R14EX2207	Environmental Studies	57
20	R14EX2208	Elements of Accounts and Finance (Optional 1)	61	
21	CORE COURSES	R14EX3502	Digital Electronics	63
22		R14EX3503	Communication System I	67
23		R14EX3504	Linear Integrated Circuits	71
24		R14EX3505	Data Structures And Files	75
25		R14EX3506	Communication System II	79
26		R14EX3507	Signal & System	83
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29		R14EX4503	Power Electronics	94
30		R14EX4504	Microcontroller and Interfacing Devices	98
31		R14EX4505	Optical and Microwave Communication	102
32		R14EX4506	Consumer Electronics	106
33		R14EX4507	Control System	109
34		R14EX4508	Circuit Simulation Lab	112
35		R14EX4509	Electronic Measurement	115
36		R14EX4510	Project and Seminar	118
37	SPECIALISED COURSES	R14EX5501	Robotics System (Elective A Group)	119
38		R14EX5502	PLC & SCADA (Elective A Group)	123
39		R14EX5503	Mechatronics (Elective A Group)	127
40		R14EX5504	Digital Signal Processing (Elective B Group)	131
41		R14EX5505	Embedded System (Elective B Group)	135
42		R14EX5506	Advanced Microprocessors (Elective B Group)	139
43		R14EX5507	Network Communication (Elective C Group)	142
44		R14EX5508	Wireless Communication (Elective C Group)	146
45		R14EX5509	Satellite and Radar Communication (Elective C Group)	150

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DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
COURSE : BASIC MATHEMATICS COURSE CODE: R14SC1701
COURSE CATEGORY: FOUNDATION CREDITS : 4

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	-	3	80	20	-	-	-	100

Rationale:

Mathematics is an important prerequisite for the development and understanding of engineering concepts. The aim of the course is to acquire some essential competencies in Mathematics by the students of diploma in engineering. The course will help the students to think logically and systematically. The students will develop the attitude of problem solving.

Objectives:

The students will be able to

- Understand all the basic concepts of Mathematics used in various fields of engineering.
- Know the methods and procedures of problem solving.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Trigonometry: 1.1 Trigonometric ratios of an angle Definition of positive and negative angles. Unit of measurement of an angle. Signs of trigonometric ratios of an angle in the four quadrants.(ASTC RULE) Trigonometric ratios of negative angles. 1.2 Trigonometric ratios of compound angles. Trigonometric ratios of allied angles. Trigonometric ratios of multiple and sub-multiple angles. Factorization and de-factorization formulae.	15	16
2	Inverse Circular function 2.1 Definition of inverse circular function. Principal value of inverse circular function. Properties of inverse circular function. Simple problems based on properties. 2.2 Solution of triangle. Sine Rule. Cosine Rule. Solution of the triangle using sine and cosine rule. Determinant: 2.3 Definition of determinants. Problems on expansion of determinants of order 2 & 3. Solution of simultaneous equation in two and three unknowns (Cramer's Rule).	10	12

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3	Matrices: 3.1 Definition of a Matrix. Types of Matrices. Algebra of matrices: Addition, subtraction and multiplication of matrices. 3.2 Transpose of a matrix. Cofactor matrix Adjoint of a matrix. 3.3 Inverse of a matrix and to find inverse by adjoint method. Solution of simultaneous equation by matrix method.	10	16
4	Statistics: 4.1 Measures of central tendency. Mean, Median and Mode for grouped and ungrouped data. 4.2 Measures of dispersion: Mean deviation. Standard deviation. Variance and coefficient of variation	10	12
5	Vector Algebra: 5.1 Definition of vector. Addition, subtraction of vectors. Direction cosines, direction ratios of line. 5.2 Product of vectors and its properties: Dot product of vectors Cross product of vectors. Scalar triple product of vectors.	09	12
6	The Straight Line: 6.1 Slope and intercept of a line. Parallel and perpendicular lines. 6.2 Intersection of two lines. Acute angle between two lines Perpendicular distance between a point and a line. Distance between two parallel lines. 6.3 Graphs - Graph of linear function. Graph of quadratic equation. Graph of trigonometric function. Graph of exponential function.	10	12

Teaching Methodology: Chalkboard, Discussion, Assignments, Printed notes

Skills to be developed:

Intellectual Skills:

- Memorizing skill will be developed after studying the formulae of all the topics.
- Selection skill will be developed after studying the methods of solving problems during selection of appropriate formula.
- Calculation skill will be developed after studying the topics Trigonometry ,Determinants and Matrices
- Skill of drawing graphs will be developed after studying the topic graphs.

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Learning Resources:

A) Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Peter V. O'Neil	Advanced Engineering Mathematics	Thomson, Canada.
2	K. A. Stroud, D. J. Booth	Engineering Mathematics	Palgrave, New York, U.S.A.
3	S. L. Loney	Plane Trigonometry	Macmillan Publication

A) Websites for references:

1. www.Wikipedia.com
2. www.Wolfarm.com
3. www.Mathworld.com
4. www.nptel.iitm.ac.in

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DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
COURSE : ENGINEERING MATHEMATICS COURSE CODE: R14SC1702
COURSE CATEGORY: FOUNDATION CREDITS : 4

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	-	3	80	20	-	-	-	100

Rationale:

Mathematics is an important prerequisite for the development and understanding of engineering concepts. The subject intends to teach students basic facts, concepts and principles of Mathematics as a tool to analyze engineering problems. It also aims to teach students to apply the basic facts of Mathematics to solve engineering problem.

Objectives:

The students will be able to:

- Understand the concept and principles of derivatives, functions, limits and integration.
- Use the principles of derivatives for the various applications.
- Understand the principles of complex numbers.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Functions and Limits: 1.1 Definition of functions and Notation. Different types of functions. 1.2 Limits - Concept of limits, Algebra of limits. 1.3 Different methods of finding limits. Limits of algebraic function. Limits of trigonometric function. Limits of exponential functions.	15	16
2	Laws of Derivative: 2.1 Concept and definition of derivative. 2.2 Derivatives of standard functions. 2.3 Laws of derivatives :- Addition law. Subtraction law. Multiplication law. Division law. 2.4 Derivatives of composite functions (Chain rule).	09	12

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3	Methods of Derivatives: 3.1 Derivative of parametric functions. Derivative of implicit functions. Logarithmic differentiation. 3.2 Concept of higher order derivative 3.3 Concept of partial derivative.	10	12
4	Application of Derivatives: 4.1 Geometrical meaning of derivative.(slope of tangent and normal to the given curve) 4.2 Radius of curvature. 4.3 Physical application of derivative. 4.4 Maxima and minima using derivative.	9	12
5	Integration: 5.1 Definition of integration as anti-derivative. 5.2 Integration of algebraic functions. 5.3 Integration of trigonometric functions. 5.4 Integration by substitution.	9	12
6	Complex Number: 6.1 Definition of complex number. Algebra of complex number i.e. addition, subtraction, multiplication and division of complex numbers. To express given complex number in $x + iy$ form . 6.2 Representation of complex number in a plane (Argand's diagram). Modulus and amplitude of complex number. Polar form of a complex number. Exponential form of a complex number. 6.3 Powers of a complex number - De - Moivre's theorem. Euler's theorem.	12	16

Teaching Methodology: Chalkboard, Discussion, Assignments, handouts

Skills to be developed:

Intellectual Skills:

- Memorizing skill will be developed after studying the formulae of all the topics.
- Selection skill will be developed after studying the methods of solving problems during selection of appropriate formula.
- Application skill will be developed after studying the topic Application of derivatives.
- Comprehension skill will be developed after studying each and every topic.

Learning Resources: A)Books :

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	K. A. Stroud, D. J. Booth	Engineering Mathematics	Palgrave, New York, U.S.A.
3	Peter V. O'Neil	Advanced Engineering Mathematics	Thomson, Canada.
4	Shanti Narayan	Engineering Mathematics Vol. I & II	S.Chand & Company, New Delhi.

A) Websites for references:

1. www.wikipedia.com
2. www.wolfarm.com
3. www.mathworld.com
4. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING

COURSE NAME : BASICS PHYSICS

COURSE CODE: R14SC1703

COURSE CATEGORY: FOUNDATION

CREDITS : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Rationale:

The development of various engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the branches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can pursue his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field.

Objectives:

The student will be able to

- Use different types of systems of units.
- Identify and minimize the errors, Understand significant figures.
- Study different types of motion and their applications in engineering field.
- Study molecular forces, explain surface tension and viscosity with applications.
- Understand different concepts of sound with application.
- Differentiate between conduction convection and radiation.
- Use different types of thermometers.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	<p>1.1 Units and measurements: Unit, fundamental units & examples, derived units & examples, system of Fundamental units (C.G.S., M.K.S., S.I. system of units) Rules and Conventions for the use of spacing of symbols in SI system. Table of derived S.I. units. Multiples and sub multiples of units. Significant figures, rules for significant figures.</p> <p>1.2 Errors. – Types of errors, Minimization of errors, Percentage error, Propagation of errors, Numericals.</p> <p>1.3 Surface Tension: Molecular forces and their nature, cohesive forces, adhesive forces, sphere of influence, definition of surface tension, factors affecting surface tension (Temperature, impurity, nature of the liquid), concave and convex meniscus of liquid surfaces and their explanation on the basis of molecular forces, angle of contact, capillary action and its explanation, applications of surface tension. Numericals</p> <p>1.4 Viscosity: Streamline and turbulent flow of fluids, critical velocity, viscous force in fluid, significance of Reynolds's number, velocity gradient, Newton's law, Stoke's law expression , terminal velocity, Numericals.</p>	14	16

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2	<p>2.1 Circular Motion: Circular motion, uniform circular motion, tangential velocity, angular velocity, periodic time, frequency, relation between 1) Angular velocity and frequency, 2) angular velocity and periodic time, 3) linear velocity and angular velocity, radial acceleration expression, centripetal force, centrifugal force ,Numericals.</p> <p>2.2 Applications of Circular Motion: Motion of a vehicle round a horizontal curve, banking of roads and tracks, expression for angle of banking and super elevation, centrifuge. Numericals</p> <p>2.3 Simple Harmonic Motion: Periodic motion, simple harmonic motion, S.H.M. as a projection of uniform circular motion, equation of S.H.M. graphical representation of S.H.M. concepts of oscillation, periodic time, frequency, amplitude, phase, phase difference. Numericals.</p>	9	12
3	<p>3.1 Modes of Heat Transfer, Temperature Measurement : Difference between heat and temperature , definition of calorie , absolute zero , units of temperature $^{\circ}\text{C}$, $^{\circ}\text{F}$, $^{\circ}\text{K}$ with their conversion a) Conduction – Flow of heat along a bar, steady state and variable state temp. Coefficient of thermal conductivity by Searle’s method. (For good conductor) and Lee’s method (for bad conductor). b) Convection, c) Radiation - Emissive power, absorptive power, black body , numerical Comparison between conduction, convection and radiation.</p> <p>3.2 Temperature Measurement: Bimetallic thermometer, resistance thermometer, thermocouple & thermopile, Pyrometers – i) Ferry’s total radiation, ii) Optical Pyrometer.</p> <p>3.3 Sound: Sound waves, propagation of sound, reflection of sound waves, echo, absorption of sound, co efficient of absorption, reverberation, reverberation time, formula for reverberation time (No derivation), methods for controlling reverberation time. Numericals.</p>	9	12

Teaching methodology: Chalk board, Group Discussions, Handouts, Question Bank, PPT, Transparency, Seminar, and Guest Lecture.

Term work:

Skills to be developed:

i)Intellectual Skills:

- Identifying skill will be developed after studying topics of Temperature measurement.
- Discriminating skill will be developed after studying topics on motion.
- Comprehension skill will be developed after studying concept ,principles laws and rules given in the syllabus.

•ii)Motor Skills:

- Measuring skill will be developed after completing practicals.
- Graph Drawing skill will be developed after studying practicals.
- Observing the result and comparison skill will be developed after competing practicals.

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List of Experiments:

- 1.Measurement of (i) length, breadth and height of a block ,(ii) internal, external diameter and height of a hollow cylinder using vernier calipers of different least counts and digital vernier.
- 2.Measurement of diameter of sphere, wire and measurement of thickness of a plate by using micrometer screw gauge.
- 3.Measurement of radii of concave and convex surfaces and thickness of plate using spherometer.
- 4.To find viscosity of water by Poiseuille's method.
- 5.To find viscosity of oil by Stoke's method.
- 6.Calibration of thermocouple and to find unknown temperature.
- 7.Comparison of different thermometers with respect to mercury Thermometer.
- 8.To study the effect of length and mass of the bob on periodic time of a simple pendulum.
- 9.To investigate relation between radius and height of liquid in the capillary tube. (surface tension)
- 10.Determination of co-efficient of thermal conductivity of a good conductor by Searle's method.
- 11.Determination of co-efficient of thermal conductivity of a bad conductor by Lee's disc method.

Learning Resources:

A)Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	R.K.Gaur, S.L.Gupta	Engineering Physics	Dhanpat Rai and sons
2	Prof. M. P. Kurian, Prof. R. B. Birhade, Prof.A.A.Mokashi	Applied Physics	Reliable Publications.
3	Dr.A.P.Saxena & Others	Principles of Physics	J.K.Jain Brothers TTTI, Bhopal.
4	Kamat & Rao	Applied Physics	Jeevan Deep Prakashan.
5	Mrs.V.C.Chinchwadkar	Text Book in Physics	Somaiya Publications, Bombay.
6	Umrani, Joshi	Applied Physics	Nirali Prakashan.

A)Web sites for references:

- 1.www.physicsclassroom.com
- 2.www.hyperphysics.com
- 3.www.physicsinfo.com

B)Video

www.Youtube.com (surface tension, viscosity, sound, ultrasound)

C)PPT

- 1.www.khanaacademy.com
- 2.www.slideshare.net

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DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./E&TC. ENGINEERING

COURSE : BASIC CHEMISTRY

COURSE CODE: R14SC1704

COURSE CATEGORY : FOUNDATION

CREDITS 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Rationale:

Basic sciences like Chemistry are the foundation pillar of engineering and technology. It is most essential to learn the basic science to understand the fundamental concepts of engineering and technology.

The topic of Atomic structure and Chemical bonding is helpful to study properties of elements which are required in the engineering field.

In Electrochemistry electrical energy is obtained from the different chemical reactions which are used in different types of batteries. These batteries are widely used in automobiles and in day to day life.

Metallurgy and alloys have importance in various Industries, because metals are the backbone of the Industry. Study of properties of Metals and Alloys is essential.

Non-metallic materials such as plastic and rubber have great importance and application in technology.

Objectives:

The student will be able to

- After studying the atomic structure and chemical bonding student will be able to draw the electronic configuration of various elements with the formation of various types of molecules.
- With the study of electrochemistry student will be able to know electrolysis, Faraday's laws and working of different batteries.
- After study of Metals and alloys student will be able to understand properties and applications of various Metals and alloys used in engineering industries.
- After studying the non-metallic material student will be able to know the different properties and current applications of plastic and rubber in the engineering field.

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UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	<p>Atomic Structure and Chemical Bonding:</p> <p>1.1 Atom , Bohr's atomic model (postulates) Fundamental particle of atom, their Mass, Charge, Locations,</p> <p>1.2 Atomic number, Mass number, Isotopes and Isobars,</p> <p>1.3 Hund's rule of maximum Multiplicity, Pauli's Exclusion Principle ,Aufbau principle,</p> <p>1.4 Electronic configuration, Octet rule & Duplet rule. (Electronic configuration upto Atomic number 30) .</p> <p>1.5 Types of Chemical bond, Electrovalent, Covalent, Formation and structure of Electrovalent molecules such as NaCl, CaCl₂, AlCl₃ etc</p> <p>1.6 Covalent compounds such as H₂O, Cl₂, O₂, NH₃, N₂ etc</p> <p>1.7 Distinction between Electrovalent and Covalent compounds.</p>	09	12
2	<p>Electrochemistry</p> <p>2.1 Definitions of basic terms involved in Electrolysis: Conductors, Non conductors, Electrolytes: Strong and Weak Electrolyte, Difference between strong and weak electrolyte, Non electrolytes, Electrolysis, Electrolytic cell, Current density.</p> <p>2.2 Ionization, Electrolytic Dissociation, Arrhenius theory of degree of Ionization /Dissociation and Factors affecting the Degree of Ionization. Definition of electrolytic cell, Electrodes -Cathode and Anode , Electrode potential – Oxidation potential and Reduction potential</p> <p>2.3 Mechanism of Electrolysis, Electrolysis, Electrochemical series for Cations and Anions , Electrolysis of CuSO₄ solution using Platinum electrodes & Copper electrodes</p> <p>2.4 Applications of Electrolysis: Electroplating of Silver, Electro refining of blister Copper , Electrometallurgy</p> <p>2.5 Electrochemical Processes: Faradays laws of Electrolysis (1st and 2nd law), Relation between ECE and CE. Numerical problems ,</p> <p>2.6 Electric Cells and Battery , Types of Cells : Primary and Secondary cells, Construction & Working of dry cell.</p>	10	12

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3	<p>A) METALS & ALLOYS</p> <p>Metals</p> <p>3.1 Introduction , Characteristics of Metals, Definitions – Mineral , ore, Gangue, flux and Slag, Metallurgy</p> <p>3.2 Metallurgy- flow chart for extraction of metal</p> <p>3.3 Important Extraction Process- Concentration- Gravity Separation, Electromagnetic separation , Froth flotation Process, Calcinations and Roasting. Reduction – Smelting , Aluminothermic Process ,Electrolytic reduction. Refining-Polishing, Liquation, Electrolytic refining .</p> <p>3.4 Mechanical Properties of Metals: Hardness , Ductility, Malleability, Tensile strength, Toughness ,Machinability , Weldability, Forging, Soldering, Brazing , Castability.</p> <p>Alloys</p> <p>3.5 Definition, Purposes of Making Alloy with examples.</p> <p>Preparation Method – Fusion and Compression</p> <p>Classification of Alloys – Ferrous and Non Ferrous alloys with examples.</p> <p>3.6 Composition , Properties and Applications of Duralumin , Wood metal, Babbit metal, Monel metal ,Brass</p> <p>B) NON METALLIC ENGINEERING MATERIALS</p> <p>3. 7 Polymers, Definition of polymer (plastic) Polymerization , Types of polymerization with examples.</p> <p>3.8 Types of Plastic – Thermo-softening and Thermo- setting plastic and their differences , Properties and Applications of plastic.</p> <p>3.9 Rubber: Definition ,Types of rubber, Drawbacks of natural rubber, Vulcanization of rubber with chemical reaction , Synthetic rubber- Definition , differences between Natural and synthetic rubber, Examples of synthetic rubber, Properties of synthetic rubber like Elasticity, Tack and Abrasion resistance, Their definition and applications</p>	9	10
		04	06

Teaching Methodology: Chalk board, Discussion, Assignments, Handouts and Question Bank, moodle.

Term work

Skills to be developed:

i) Intellectual Skills:

- Understand the concept of Construction & working of different batteries.
- Calculation of C.E. and E.C.E

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List of Practical's/Experiments

- 1) Know your Chemistry laboratory and prepare sample solutions of different concentrations.
- 2) Drawing of Electronic configuration of atoms from atomic number 1 to 30 & Draw the molecular structure of various electrovalent and covalent compounds.
- 3) To determine Alkalinity of a given Water sample.
- 4) To determine the Neutralization point of weak acid and weak base using Conductivity Meter.
- 5) To determine the ECE of copper by Electrolysis of CuSO_4 solution.
- 6) Determination of percentage purity of Iron from stainless steel alloy
- 7) To determine percentage of Copper from the brass.
- 8) To determine percentage of Nickel from given Monel metal alloy.
- 9) To determine phosphate in a given water sample by using spectrophotometer.
- 10) To draw the Flow sheet of extraction of Metal from its ore.
- 11) Precipitation titration of BaCl_2 with H_2SO_4 using Conductivity meter.
- 12) Prepare Phenol formaldehyde resin used in manufacturing of Bakelite plastic

Learning Resources

A) Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	V.P .Mehta	Polytechnic Chemistry	Jain brothers , New Delhi
2	Sharma B.K. & Kaur H.	Industrial Chemistry	Goel Publishing House, Meerut.
3	Jain P.C. & Jain Monika	Engineering Chemistry	Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
4	S.S. Dara	Engineering Chemistry	S. Chand Publication

B) Web site for references:

1. www.in.wikipedia.org
2. www.nptel.iitm.ac.in
3. [www.youtube.com, watch v= KjoQHqzda8](http://www.youtube.com/watch?v=KjoQHqzda8) (related to Chemical bonding)

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
COURSE : TECHNICAL ENGLISH COURSE CODE: R14SC1707
COURSE CATEGORY: FOUNDATION CREDITS : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	3	80	20	-	-	25	125

Rationale: Students need effective writing skills in their academic and professional life. This syllabus is need based and special efforts are taken to improve the writing skills of students. Students admitted to polytechnic come from rural and urban areas. They are from different mediums and backgrounds. As the students are weak in writing correct English, more stress is given on improving their basic concepts of written communication.

Objectives:

The students will be able to

- Learn the basic concepts of grammar and sentence formation.
- Express their ideas logically and correctly.
- Comprehend the given passage and arrange their ideas in sequential order.
- Improve their presentation skills in oral and written communication.
- Interact effectively from the industry point of view.
- Use the various formats of business correspondence.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Grammar: 1.1 Parts of Speech. 1.2 Transformation of sentences. [tenses, prepositions, conjunctions, punctuation, direct-indirect speech, active & passive voice] 1.3 Features of technical writing.	8	16
2	Communication: 2.1 Written and oral communication. 2.2 Barriers in communication. 2.3 Principles of communication	4	12
3	Applied Writing: 3.1 Dialogue writing 3.2 Comprehension. 3.3 Speech writing on : - Farewell speech - Introducing a guest -Vote of thanks	4	12

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4	Office Drafting: 4.1 Notice and Circular. 4.2 Memo. 4.3 Email writing.	4	12
5	Business Correspondence: 5.1 Letter of Enquiry, Order and job application. 5.2 Letter of Complaint, resignation, reminder. 5.3 Joining letter, appreciation letter.	8	16
6	Report writing: 6.1 Visit report. 6.2 Accident report. 6.3 Progress report, Investigation report.	4	12

Teaching Methodology: Chalkboard, whiteboard, improved lecture method, discussion method, power point Presentations, case study.

Term work: Skills to be developed:

i) Intellectual Skills :

- Speaking and listening skills will be developed on completion of the assignment nos.7-12 of term work.
- Presentation skills will be developed on performance of assignment nos.1-6 of term work.
- Writing skills will be developed by studying topics of applied writing, Office drafting, Business correspondence and Report writing.
- Reading and comprehension skills will be developed by studying the topic of Comprehension.

ii) Skills to be developed in Professional practices are included in these assignments.

List of Practical/Assignment/Experiment:

1. Self introduction. (Professional Practices)
2. Technical presentation. (Professional Practices)
3. Elocution. (Professional Practices)
4. Power Point presentation. (Professional Practices)
5. Email Writing.
6. News Presentation. (Professional Practices)
7. Introduction of Basic English words and their pronunciation.
8. Introduction of friends, guests, visitors.
9. Meeting and greeting people.
10. Talking about the family.
11. Giving directions about places in town.
12. Describing your home, neighbourhood and region.

(Note: Practical no.7 to 12 will be covered by using Linguaphone Language lab machine. In every practical student will solve the assignment based on that unit. Student will learn basic English words, their pronunciation, introducing new situations and rules to keep the conversation going)

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Learning Resources:

A)Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Locker,Stephen Kyo Kaczmarek	Business Communication : Building Critical Skills	Published by McGraw Hill Professionals.
2	Alok Pandey & Deepak Pandey	Advanced English Grammar & Composition	Published by Sahni Publication, Delhi-7.
3	Raymond Murphy	Intermediate English Grammar	Published by Foundation Book 2003 (Second Edition), New Delhi.
4	Raymond Murphy	Essential English Grammar	Published by Foundation Book Pvt. Ltd., 2004 (Second Edition), New Delhi.
5	M.P. Bhatia	Applied Grammar & Composition	Published by M.I. Publications (Eighth Revised Edition), Agra.

A)Web sites for references :

1. www.learn4good.com
2. www.fluentzy.com
3. www.edufind.com
4. www.khake.com
5. www.learnenglish.org.uk
6. www.english4engineer.com
7. www.owl.english.purdue.edu

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DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./COMP./E&TC. ENGINEERING
 COURSE : COMMUNICATION SKILLS COURSE CODE: R14SC1708
 COURSE CATEGORY: FOUNDATION CREDITS : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
1	2	-	-	-		@25	25	50

@ Internal Exam

Rationale:

The old course materials comprising anthologies of prose selections and the old methodology based mainly on the classroom lecture are not conducive to the development of study skills and communicative competence in the students. Therefore, a need to develop an appropriate course in English for students of engineering and technology and to adopt an innovative approach to English language teaching and learning is essential. The aim of this course is to impart to the students the necessary communication skills that they need in their academic and professional life.

This course demands an actual use of the English language by students in the classroom and encourages interaction among them. It is designed to develop the linguistic skills and not to test their memory skills. In this new approach, all the four skills involved in learning a language, namely- 1) Listening 2) Reading 3) Writing 4) Speaking are developed.

Objectives:

The students will be able to

- Practice the basic skills of speaking, reading, listening and writing.
- Express their ideas correctly and fluently in English.
- Interact with others in English and gain confidence in the use of the English language.
- Realise the importance of effective presentation skills.
- Improve their communication skills that will lead to their overall personality development

Course Details:

UNIT	NAME OF THE TOPIC	HOURS
1	Presentation Skills: 1.1 Personal grooming. 1.2 Matter of presentation. 1.3 Manner of presentation.	3
2	Interview Techniques: 2.1 Communication skills. 2.2 Stress management. 2.3 Presence of mind.	3

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3	Group Discussion Techniques: 3.1 Manners and etiquettes. 3.2 Discussion rules. 3.3 Effective presentation of views.	3
4	Body Language: 4.1 Facial expressions. 4.2 Posture and gesture. 4.3 Eye movements.	3
5	Resume Writing: 5.1 Correct language. 5.2 Strengths and achievements. 5.3 Format of biodata.	2
6	Vocabulary: 6.1 Synonyms. 6.2 Antonyms. 6.3 Homonyms.	2

Teaching Methodology: Chalkboard, Whiteboard, Discussion Method, Power Point Presentation, Case study, Improved Lecture Method etc.

Term work:

Skills to be developed:

i) Intellectual Skills :

- Listening and speaking skills will be developed on completion of assignments of Term work & the topic of group discussion techniques.
- Presentation skills will be developed by studying the topic of Presentation skills and after performing the assignments based on it.
- Writing skills will be developed by studying topic of resume writing.

ii) Skills to be developed in Professional practices are included in these assignments as presentation and guest lectures.

List of Practical/ Assignment/Experiment

1. Interview of the candidates. (Professional Practices)
2. Debate on different topics. (Professional Practices)
3. Poster Presentation. (Professional Practices)
4. Group discussion. (Professional Practices)
5. Role Play. (Professional Practices)
6. Power Point Presentation. (Professional Practices)
7. Talking about different jobs and types of work.
8. Talking about your hobbies and enquiring about those of other people.
9. Enquire about people's programmes, plans and booking facilities.
10. Telephone etiquettes and information about the postal service.
11. Talking about the public transport system.
12. Talking about accommodation facilities in a hotel & shopping.

(Note: Practical no.7 to 12 will be covered by using Linguaphone Language lab machine. In every practical student will solve the assignment based on that unit. Student will learn the conversation techniques, pronunciation, etiquettes, manners and he will develop the ability to speak in different situations).

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Learning Resources:

A) Books

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Dr.B.R.Kishore , D.S.Paul	Kumar's Group Discussions and Interviews	Vee Kumar Publications Private Limited, New Delhi-110008.
2	Adam B. Cooper	PowerPoint Presentations that Sell	McGraw Hill Professionals.
3	R.C.Bhatia	Business Communication	Ane Books India, New Delhi.
4	Krishna Mohan, Meera Banerji	Developing Communication Skills	Published by Rajiv Beri for Macmillan India Ltd., New Delhi.

B) Web sites for references:

1. www.skillstudio.co.uk
2. www.khake.com
3. www.search4excellence.com
4. www.selfgrowth.com
5. www.mindtools.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECH./ELECT./E&TC. ENGINEERING

COURSE : APPLIED SCIENCE (E.PHY.+E.CHEM.) COURSE CODE: R14SC1709

COURSE CATEGORY : FOUNDATION CREDITS : 8

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	4	*4	80	20	-	-	50	150

* Note:

Applied Science contains Section I –Engg. Physics & Section II- Engg. Chemistry. Both the sections will have separate papers of two hours duration each.

Rationale:

Applied Science includes applied Chemistry as well as applied Physics. The Development of various engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the branches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can pursue his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field.

Applied chemistry involves science and chemical principle that have resulted into development of new materials used in modern age. The topic water has wide application in all branches of engineering & technology. In the curriculum topic like Corrosion & its protection is needed for every engineering field. Whereas the study of the Lubricants is needed to know how various types of machines work smoothly and efficiently in various conditions. Students must know the efficiency of various types of fuels, its calorific value and the importance of chemical analysis of the fuel in engineering field.

Objectives :

The student will be able to

1. State the principle and measure the EMF by potentiometer.
2. Understand the concept of resistance and capacitance.
3. Study magnetic effect of electric current and apply right hand thumb rule.
4. Study effect of magnetic field on current carrying conductor and apply Fleming's left hand rule.
5. Differentiate magnetic materials and study their applications in engineering field.
6. Explain different terms related to lasers, its properties and application in engineering field.

7. After studying the topic Water student will be able to understand the types of impurities present in water, as well as its removal i.e purification processes such as ion exchange method, permutit method and important analytical tests of drinking water.
8. Student will be able to understand definition of Corrosion, its mechanism and different factors affecting the Corrosion. Protection methods like Cathodic protection and Application of different metal coating.
9. By studying Lubricant student will be able to select proper lubricant for different conditions in various Machines.
10. After studying the topic Fuel, student will be able to understand how conventional as well as non conventional energy is used for mankind.

Section-I (Engg.Physics)

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Section-II (Engg. Chemistry)

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	2	2	40	10	-	-	25	75

Section-I (Engg.Physics)

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 Measurement of Resistance and EMF : Definition of charge, current, Potential difference ,specific resistance, color code for resistance, types of resistance, resistance in series & parallel combinations (numerical), concept of temperature dependence of resistance, thermister, principle of potentiometer and balancing condition of potentiometer, potential gradient, measurement of EMF by potentiometer (numerical) 1.2 Measurement of Capacitance : Capacitor & capacitance, units, capacitor in series and parallel combinations (numerical), applications of capacitor (air, solid dielectric, electrolytic)	9	12

2	<p>2.1 Magnetic Effect of Electric Current: Magnetic effect of electric current, lines of induction due to a straight conductor; right-hand thumb rule, magnetic induction (direction and magnitude), concept of uniform field</p> <p>2.2 Effect of Magnetic Field on Current Carrying Conductor: Force of a magnetic field on current carrying conductor, (No derivation) Fleming's left hand rule, couple acting on a rectangular coil placed in the uniform magnetic field, numericals</p> <p>2.3 Magnetism: Magnetic materials, permeability, susceptibility, relation between relative permeability and susceptibility, properties of diamagnetic, paramagnetic and ferromagnetic substances, ferrites and their application-antenna cores, television picture tube.</p> <p>2.4 Electromagnetic Spectrum: Definition, range, applications</p> <p>2.5 Ultrasonic Waves: Ultrasonic waves, production of ultrasonic waves by magnetostriction transducer, Application – Flaw detection, drilling, welding, cleaning.</p> <p>2.6 Nanotechnology: Introduction to nanotechnology, principle and applications.</p>	14	16
3	<p>3.1 Lasers: Excitation of particle, optical pumping, types of transitions – non radiative and radiative, spontaneous and stimulated emission, population inversion, resonance cavity, active system, Principle of laser, types of lasers, - ruby laser, Helium-Neon laser, comparison between ruby and He-Ne lasers, Uses of lasers – as carrier waves, metal cutting communication, Computers, drilling, radars, depth sounding etc.</p> <p>3.2 Fiber Optics: Principle, types of optical fibers properties & applications.</p>	9	12

Teaching methodology : Chalk board, Group Discussions, handouts, Question Bank, PPT, Transparency, Seminar, and Guest Lecture.

A) Term work :

Skills to be developed :

i) Intellectual Skills:

- Discrimination skill will be developed after studying topics : types of resistor and capacitors, types of lasers
- Comprehension skill will be developed after studying concept ,principles laws and rules given in the syllabus

ii) Motor Skills:

- Drawing and connecting circuit skill will be developed after completing practicals.
- Measurement skill will be developed after completing practicals.
- Observing the result and comparing skill will be developed after completing practicals.

List of Practical's /Assignments/Experiments :

- 1) Specific resistance by voltmeter ammeter method.
- 2) Measurement of EMF by potentiometer.
- 3) Measurement of resistance in series and parallel
- 4) To study the effect of temperature on the resistance of – thermister.
- 5) To study the effect of temperature on the resistance of - copper coil.
- 6) Measurement of resistance by using color code and digital multimeter.
- 7) Measurement of divergence of light beam by laser

● Term work includes any six practicals (six weeks)& one mini project/seminar(six weeks)

Learning Resources :**A) Books :**

Sr. No.	AUTHOR	TITLE	PUBLISHER
1	R.K.Gaur, S.L.Gupta	Engineering. Physics	Dhanput Raj Publication.
2	Prof.M.P.Kurian Prof.R.B.Birhade Prof.A.A.Mokashi	Applied Physics	Reliable Publications.
3	Dr.A.P.Saxena & Others	Principles of Physics	J.K.Jain Brothers TTTI, Bhopal.
4	Mrs.V.C.Chinchwadkar	Text Book in Physics	Somaiya Publications, Bombay.
5	David Halliday Robert Resnik	Physics	Wiley Eastern Limited.

A) Web sites for references .:

www.physicsclassroom.com

www.hyperphysics.com

www.physicsinfo.com

B) Video**C) PPT**

www.khanaacademy.com

www.slidehare.net

Section-II (Engg. Chemistry)

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
I	<p style="text-align: center;">WATER</p> <p>1.1 Types of impurities in the natural water.</p> <p>1.2 Definition : Soft water, Hard water, Types of hardness of the Water,</p> <p>1.3 Degree of Hardness of the Water in terms of equivalent amount of CaCO_3, Numerical based on degree of hardness of water</p> <p>1.4 Bad Effects of hard water in Domestic purposes, In Industries like Textile , Paper , Sugar, Dye industry and in Steam generating boiler</p> <p>1.5 Water treatment for Industrial applications :Principle , Diagram, Working, Chemical reactions , Regeneration ,Advantages – Permutit/zeolite process and Ion Exchange process</p> <p>1.6 For Domestic Applications : Water quality param eters for potable water , Treatment of water for domestic application by Screening, Sedimentation , Coagulation , Filtration , Sterilization.</p> <p>Chlorination – using chlorine gas , bleaching powder & chloramines</p> <p>1.7 Desalination of Sea water (brackish) by Reverse Osmosis</p> <p>1.8 Definition of pH, pH scale, Numerical problem on pH . Industrial application of the pH</p>	10	12
II	<p style="text-align: center;">CORROSION</p> <p>2.1 Definition of Corrosion, Types of corrosion,</p> <p>2.2 Atmospheric Corrosion-definition, mechanism of oxidation corrosion, Types of oxide films and their significance, factors affecting atmospheric corrosion</p> <p>2.3 Immersed corrosion- definition, mechanism of immersed corrosion by galvanic cell action-with evolution of hydrogen gas and absorption of oxygen gas, factors affecting immersed corrosion</p> <p>Protection of Metals by :</p> <p>2.4 Modification of environment , Modification of properties of metal , Electrochemical protection by sacrificial anodic protection and impressed current cathodic protection , use of protective coatings</p> <p>2.5 Applications of metallic coatings by Galvanizing, Tinning, Metal spraying , Electroplating , Metal cladding , Cementation.</p>	10	12
	<p style="text-align: center;">A:-LUBRICANTS</p> <p>3.1 Lubricant-Definition, Characteristic of a good lubricant.</p> <p>3.2 Classification of lubricants-Solid lubricants-characteristics and applications Graphite and Molybdenum disulphide. Liquid lubricants – characteristics and applications synthetic fluid (silicon oil) , Water as a lubricant(coolant), Semisolid lubricants- Characteristics and applications of Grease .</p> <p>3.3 Mechanism of Lubrication – definition of lubrication , Types of mechanism of lubrication : Fluid film lubrication, boundary lubrication & extreme pressure lubrication,</p> <p>3.4 Physical characteristics of lubricants- viscosity, viscosity index , oiliness, volatility, flash and fire point, cloud and pour point, chemical characteristics of lubricants – acid value or neutralization number, emulsification ,saponification value</p> <p>3.5 Selection of lubricants for Road rollers , Steam engine, Sewing Machine , Concrete mixer, IC engine, Cutting tools and Gears.</p>	06	8
	<p style="text-align: center;">B:- FUELS</p> <p>3.6 Fuels- Definition, calorific value and ignition temperature, characteristics of good fuels with suitable example, advantages and disadvantages of solid , liquid and gases fuels ,</p> <p>3.7 Classification of fuels , Solid fuels-analysis of solid fuel, proximate analysis of Coal for determination of moisture , volatile matter , ash and fixed carbon, Significance of proximate analysis.</p> <p>3.8 Liquid fuels – origin , fractional distillation of crude petroleum, boiling range, carbon composition and applications of petroleum fractions obtained . Composition , properties and applications of Bio- diesel</p> <p>3.9 Gaseous fuels – composition, properties , applications of Biogas, LPG & CNG</p>	06	8

Teaching methodology : Chalk board, Group Discussions, handouts, Question Bank, PPT, Transparency, Moodle.

Term work :

Skills to be developed :

i) Intellectual Skills:

- Comprehension skill will be developed after studying concept, principles laws and rules given in the syllabus
- Comprehension skill will be developed after studying topics: Corrosion and water.
- Selection skill will be developed after studying topics: Lubricants and Fuels.

ii) Motor Skills :

- Measurement skill will be developed after completing practicals.
- Observing the result and comparing skill will be developed after completing practicals.

Term work includes six experiments (six weeks) and mini projects or seminar (six weeks)

List of Practical's/Experiments :

- 1) Determination of Total hardness of water by using EDTA method.
- 2) To determine Moisture contents in a given coal sample by proximate analysis.
- 3) To determine Ash contents in a given coal sample by proximate analysis.
- 4) To determine viscosity of liquid by using Ostwald viscometer.
- 5) To determine Dissolved Oxygen in a given water sample by Winkler's Method.
- 6) To determine pH of different solutions by using pH meter.
- 7) To determine the Acid value of a given oil.(lubricant)

Learning Resources:

A) Books:

Sr. No.	AUTHOR	TITLE	PUBLISHER
1	Jain P.C. & Jain Monika	Engineering Chemistry	Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2	Ved Prakash Mehta	Polytechnic Chemistry	Jain brothers, New delhi.
3	C. V. Agarwal	Chemistry of Engg. Materials	Tara Publucations Waranasi
4	B.K. Sharma	Industrial chemistry	Goel publication
5	S.S.Dara	Engineering Chemistry	S. Chand publication

B) Web sites for references:

1. www.in.wikipedia.org
2. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE NAME: ELECTRONICS LAB PRACTICE COURSE CODE: R14EX1501
 COURSE CATEGORY: FOUNDATION CREDIT: 04

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
02	02	-	-	-	-	@25	50	75

@ Internal Exam

Rationale:

Electronics Lab Practice is the introduction to the world of electronics. It includes the study of basic components, its various types and applications. It is foundation for all Electronics Engineering courses.

Objectives: The students will be able to understand

- Recognize the component and its type.
- Understand the specifications (ratings) of the component
- Identify the device from its symbolic representation

UNIT	NAME OF THE TOPIC	HOURS	MARKS
01	Study of Passive components- Resistor: 1.1 Classification of resistors, materials used 1.2 General specification of resistors, power rating, Ohms Law 1.3 Colour coding for three, four, five bands 1.4 Potentiometer its types 1.5 LDR-construction and principle	06	-
02	Capacitor: 2.1 Classification of capacitors, Dielectric materials used 2.2 Specifications-working voltage, capacitance, equations of capacitance 2.3 Coding using numbers, colour code 2.4 Capacitance series, parallel 2.5 Applications	05	-
03	Inductors: 3.1 Concept of permeability, Faradays Law of electromagnetic induction 3.2 Equations for Self inductance and Mutual inductance 3.3 Applications of inductors in Transformers 3.4 Colour codes of inductors	05	-

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04	Displays: 4.1 Light Emitting Displays ,Structure of(LED) 4.2 Seven, Fourteen, Sixteen segment display 4.3 Cathode Ray Tube (CRT)display 4.4 Liquid Crystal Displays (LCD)	05	-
05	Common Measuring Instruments 5.1 Multimeter: -Analog Multi-meters & Digital Multi-Meter Its Features Limitations. -Measurement of Resistance.-Measurement of Voltage.- Measurement of Current. -Continuity Testing.-Diode and Transistor Terminal Identification. 5.2 Regulated Power Supply: Front panel controls and their details 5.3 Function Generator : Front panel controls and their details Application of function generator 5.4 CRO Front panel controls and their details .Use of CRO For viewing Wave-forms. Measurement of Amplitude & Calculating Frequency with CRO	06	-
06	Time Constant Concept: 6.1 AC analysis of the RC, RL and RLC circuits. 6.2 DC analysis of the RC, RL and RLC circuits. 6.3 Time constant concept with equations and waveforms.	05	-

Teaching Methodology:

- 1)Group discussion
- 2)Guest lectures
- 3)Power Point Presentations
- 4)Chalk board

Term work:

Skills to be developed:

i) Intellectual Skills:

- Understanding the functioning of various instruments.
- Identify different components and their terminals.

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ii) Motor Skills:

- To measure the parameters of signal on measuring instruments..
- To test the electronics components. Find out the values from color bands.

List of Experiments:

- 1) To calculate and measure values of various types of resistors from Colour Coding and by Multimeter.
- 2) To determine values of Capacitance using Colour code and from written values on them.
- 3) To identify inductors.
- 4) To identify different type of Displays.
- 5) To identify different switches and relays.
- 6) Identification of active devices.
- 7) To observe different types of PCB and understand the manufacturing process.
- 8) To identify different types of Cables and Connectors.
- 9) Observation and measurement of a signal from function generator on CRO.
- 10) To handle and understand different Tools in the Lab.
- 11) To draw various symbols used in Electronics.
- 12) To understand the different safety precautions in tool handling in the Lab.

Learning Resources:

A) Books:

SR. No.	TITLE	AUTHOR	PUBLISHER
1	Printed Circuit Board, Design & Technology	Walter Bosshart	Tata McGraw Hill
2	Basic Electronics and Linear Circuits	N N Bhargava S C Gupta	Tata McGraw – Hill
3	Electrical Technology	B.L. Thereja	S. Chand
4	www.youtube.com/watch?v=CiduYvjVq70	Video Clip for PCB Manufacturing	freeware

B) Web sites for references:

- www.nptel.com
- www.electronic-lab.com

D) Magazines:

- Electronics for you

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DIPLOMA PROGRAMME : ELECTRONICS & TELECOMMUNICATION ENGINEERING
 COURSE : NETWORK THEORY COURSE CODE : R14EX1502
 COURSE CATEGORY : FOUNDATION CREDITS : 6

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme					
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	-	-	25	125

Rationale:

It is the foundation subject which will prepare students to do voltage and current analysis for the various electrical circuits. This will make a proper base for designing various electronic circuits. It will also develop logical and analytical skills.

Objectives:

The students will be able to-

- Understand the principle & operation of different networks.
- Understand network theorems.
- Understand working of two port network.
- Understand basic concept of resonant circuit.
- Understand basic concept of filter.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Network Theory: 1.1 Basic components R, L, C, series combination, Examples 1.2 Parallel combination , Ohm's Law, Examples 1.3 Sources AC, DC-voltage and current 1.4 Kirchoff's voltage law, Examples 1.5 Kirchoff's current law, Examples 1.6 DC analysis of RC circuit - voltage and current Relations 1.7 DC analysis of RL circuit – voltage and current Relations 1.8 AC analysis of RC circuit – current and voltage relations 1.9 AC analysis of RL circuit – current and voltage relations 1.10 Energy stored in L, C, Time constant concept	10	12
2	Network Theorems: 2.1 Mesh analysis, Examples 2.2 Nodal analysis, Examples 2.3 Superposition theorem, Examples 2.4 Thevenin's theorem, Examples 2.5 Norton's theorem, Examples 2.6 Maximum Power Transfer theorem, Examples 2.7 Principle of duality 2.8 Circuit reduction and conversion	10	12

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3	Two Port Networks: 3.1 Symmetrical networks-characteristics impedance, propagation constant, Attenuation constant . 3.2 Asymmetrical network –iterative impedance, image impedance. 3.3 Resistive networks T, π , Conversion of T to π (Star to Delta) 3.4 Conversion of π to T (Delta to Star) 3.5 Attenuator: Definition, Application, units 3.6 Symmetrical, Asymmetrical- T type, π type, 3.7 Lattice, Bridged T,L type 3.8 Numericals. 3.9 Z parameters, condition for symmetry and Reciprocity 3.10 Y parameters, condition for symmetry and Reciprocity 3.11 h parameters, condition for symmetry and Reciprocity 3.12 Transmission parameters, condition for symmetry and Reciprocity	12	16
4	Resonance Circuits : 4.1 Introduction to Resonance - series and parallel, selectivity, Q factor 4.2 Calculations for resonant frequency & bandwidth for series resonant circuit 4.3 Calculations for resonant frequency & bandwidth for parallel resonant circuit. 4.4 Comparison of series and parallel resonance circuits. 4.5 Coupled circuits & it's analysis. 4.6 Untuned, Tuned, doubled tuned – coupled circuits, effect of K.	10	12
5	Filters: 5.1 Pole & Zero concept for network 5.2 Simple circuits & calculation for RC type 5.3 Filter fundamentals:- pass band, stop band. 5.4 Concept of cut off frequency, phase, attenuation 5.5 Design of constant k low pass filter . 5.6 Design of constant k high pass filter . 5.7 Design of constant k band pass filter . 5.8 Design of constant k band stop filter .	12	16
6	Transmission line theory: 6.1 Transmission line –Introduction, equivalent circuit, primary and secondary constants 6.2 Equation of transmission line, V, I relation, characteristic Impedance, relation between primary and secondary constants 6.3 Concept of VSWR, standing waves. 6.4 Numericals. 6.5 Various types of Transmission lines . 6.6 Application of transmission lines	10	12

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Teaching Methodology : Chalk-Board

Term Work: Skills to be developed :

i) **Intellectual Skills :**

students will be able to

- Understand the principle of any circuit.
- Compare different circuits.
- Conclude output results.

ii) **Motor Skills :**

students will be able to

- Operate measuring instruments
- Connect various circuits
- Observe output results

List of Practicals:-

- 1.R-series & parallel combination circuits , V & I Analysis on DC circuit.
- 2.Verification of Kirchoff's voltage law and Kirchoff's current law.
- 3.Verification of Superposition theorem.
- 4.Verification of Thevenin's theorem.
5. Norton's theorem, Maximum power transfer theorem.
- 6.Two port network parameters Z, Y, h measurements.
- 7.To perform measurement of resonance frequency, bandwidth & Q factor for Series resonance circuit.
- 8.To perform measurement of resonance frequency, bandwidth & Q factor for Parallel resonance circuit.
- 9.To built and test Low Pass & High Pass Filter.
- 10.To built and test Band pass & Band stop Filter.
- 11.T & π Network conversions.
- 12.To plot pole, zero for given network.

Learning Resources: A) Books:

SR. No.	TITLE	AUTHOR	PUBLISHER
1	A Text Book of Electrical Technology	B.L. Thareja	Nirja Publication.
2	Network Lines & Fields	J. D. Rayder	Prentice Hall Publication.
3	Networks and Systems	D Roy Choudhary	New age international Publication.
4	Network Analysis & Synthesis	M E Van Valkenburg	Prentice Hall Publication.

B)Magazines:

- Electronics for you.
- Electronics bazaar
- Digit.

C) Web sites for references:

- www.alldatasheet.com
- www.electronics-tutorials.com
- www.knovel.com.
- ieee-ies.org.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : SEMICONDUCTOR DEVICES & CIRCUITS **COURSE CODE: R14EX1503**
COURSE CATEGORY: FOUNDATION **CREDITS : 6**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	@50	-	50	200

Rationale: Electronics is the major part of our day to day life. In each and every field electronic systems are used. The Electronic Devices & Circuits is one of the subject which is the base of all advance electronics. It starts with PN - junction Diode, BJTs, which makes the student to follow the functioning of electronic devices & Circuits.

It intends to teach the operating principle and application of electronic circuits like amplifiers, regulators.

Objectives:

The students will be able to

- Identify various electronic devices and state their specifications.
- Describe the formation of PN junction.
- Draw the characteristics of basic devices Diode, BJT.
- Explain Voltage regulator and voltage amplifier.
- Distinguish Linear and Nonlinear wave shaping circuit.
- List and draw symbols of Photo devices.

Course Details:

UNIT	NAME OF THE REVISED TOPIC	HOURS	MARKS
1	Semiconductor Diodes 1.1 P.N. Junction Diodes Working principle- Forward bias and Reverse bias. & circuit diagram of characteristic of PN junction diode, Static & dynamic resistance, specification, forward voltage drop, maximum forward current power dissipation. 1.2 Zener diode Constructional diagram, symbol, circuit diagram and characteristics of Zener diode diode Specification: Zener voltage, power dissipation, dynamic resistance 1.3 Special Diodes Construction, symbol & applications of PIN diode, Schottky diode, Tunnel diode	08	12

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2	<p>Uncontrolled Rectifiers and Filters:</p> <p>2.1 Rectifiers Need of rectifiers. Types of rectifiers: HWR, FWR (bridge and centre tap) circuit operation I/O waveforms for voltage & current Parameters of rectifier Average DC value of current & voltage, ripple factor, ripple frequency, PIV of diode, TUF, efficiency of rectifier. Comparison of three types of rectifiers</p> <p>2.2 Filters Need of filters Circuit diagrams, operation and input-output waveforms of following types of filters</p> <ul style="list-style-type: none"> • Shunt capacitor • Series inductor • LC filter • π filter <p>2.3 Numerical examples based on parameters of rectifiers</p> <p>2.4 Regulators Need of Regulators Circuit diagram of Zener Diode as Regulator operation.</p>	12	16
3	<p>Wave shaping Circuit</p> <p>3.1 Linear wave shaping circuit Need of wave shaping circuits, comparison between linear and non-linear wave shaping circuits Operations of wave shaping circuits Linear circuits: RC Integrator & differentiator</p> <p>3.2 Non linear wave shaping circuits Circuit diagram, operation, waveforms of different types of clippers using diodes: series, shunt, (biased and unbiased) Circuit diagram, operation, waveforms of different types of clampers: positive and negative</p> <p>3.3 Voltage multiplier voltage doubler, tripler and quadrupler.</p>	12	12
UNIT 4	<p>Bi-polar Junction Transistors:</p> <p>4.1 Introduction: Basic concept, Types of transistors, operation, 4.2 Configuration (CB, CC & CE) & its input -output characteristics, Comparison between CB, CC & CE 4.3 Need for biasing, Concept of DC load line, Operating point (Q), stabilization, thermal runaway, Types of biasing 4.4 Transistor as switch</p>	10	12
UNIT 5	<p>Voltage Amplifier and Power Amplifier:</p> <p>5.1 Characteristics of an ideal Voltage Amplifier with specifications, voltage and current gain. 5.2 Amplifiers- CE, CB, CC Circuits. 5.3 Single stage AF amplifier, A_v, A_i, Z_{in}, Z_o. 5.4 H-Parameters of amplifier. 5.5 Multistage amplifier - Types, RC coupled amplifier circuit diagram, Working. 5.6 Power Amplifier- Types, Comparison between Class A, B, C and D Power Amplifier.</p>	14	16

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UNIT 6	Photo Devices: 6.1 Construction, symbol, operating principle, characteristic & applications LED IRLED Photodiode Laser diode Photo transistor LASCR 6.2 Opto-couplers : Construction, symbol, operating principle & applications.	08	12
	Total	64	80

Teaching Methodology: Chalk-Board, Group Discussions and Power Point Presentation.
Term Work:

Skills to be developed:

i)Intellectual Skills:

Students will be able to

- Identify the device and device terminals
- List the devices and components for amplifier circuits
- State the parameters given in the data sheets

ii)Motor Skills:

Students will be able to

- Assemble the circuit as per the circuit diagram
- Measure parameters of amplifier circuit
- Sketch input and output waveforms of wave shaping circuit
- Draw amplifier response graphically

Professional Practices:

- 1.Seminar related to types of Diodes, Transistors and Photo Devices.
- 2.Application based Video related to operation of types of Diodes, Transistors
- 3.Market search for types of Diodes, Transistors and Photo Devices and technical specifications.
- 4.Datasheets search through manufacturers, catalogue, internet, magazines, books etc. and submit a report on it.

List of Practical:

- 1.To perform characteristics of the PN Junction Diodes.
- 2.To perform characteristics of the Zener Diodes.
- 3.To perform half wave, Full wave, Bridge rectifier circuits & their regulation characteristics.
- 4.To perform Capacitor input filter for half wave, Full wave, Bridge rectifier circuits & their regulation characteristics.
- 5.To perform Voltage multiplier circuits using diode and observe waveforms.
- 6.To perform Clipper & Clamper circuits using diode and observe waveforms

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7. To plot Input and Output Characteristics of BJT CE configuration. Find R_i and R_o .
8. To plot Input and Output Characteristics of BJT CB and CC configuration.
9. To perform transistor biasing circuits. Find stability factor.
10. To perform transistor single stage AF amplifier (CE configuration). Calculate Bandwidth.
11. To Plot Characteristics of Photo-Transistor.
12. To perform characteristics of Opto-coupler.

Learning Resources: A)Books:

SR. NO.	TITLE	AUTHOR	PUBLISHER
1	Electronic Devices & Circuits	Allen Mottershead.	Prentice Hall of India New Delhi.
2	Electronic Devices and circuits	David A Bell.	Prentice Hall of India New Delhi.
3	Power Supply (Monographs on Solid State Electronic Instrumentation	B.S. Sonde.	TataMcGraw Hill
4	Modern Electronic Instrumentation & Measurement Technique	Albert D. Helfrick, William D Cooper.	Prentice Hall of India New Delhi.
5	Basic Electronics & Linear Circuit	N.N.Bhargava S.C. Gupta	Tata McGraw Hill

B)Magazines:

- Electronics for you.
- Electronics bazaar.
- Digit.

C) Web sites for references:

- www.alldatasheet.com
- www.electronics-tutorials.com
- www.indianscientificinstrument.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : FUNDAMENTAL OF PROGRAMMING COURSE CODE: R14EX1504
COURSE CATEGORY : FOUNDATION CREDIT : 5

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	02	03	80	20	-	-	25	125

Rationale:

Fundamentals of programming are necessary for developing the programming skills. It helps to the students for program planning concepts, selection of programming language and testing, debugging of a program.

C language is a general purpose structured programming language. It was designed with system's programming applications in mind and as such, provides the user with an enormous amount of power and flexibility. This course enables the student to logically analyze a problem and to write, debug and modify the program. C has a unique way of doing things and is even understandable to a student who has no previous exposure to any programming language. It provides a base for advanced programming languages. It can also be used as a back end tool for various projects.

Objectives:

The students will be able to-

- To learn and acquire art of computer programming
- To develop the logic for solving a problem using a computer
- List the keywords, operators of C language.
- Write, debug, edit and execute the program.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Program Planning Concepts 1.1 To develop logic by designing an Algorithm 1.2 Representation of an Algorithm as a Flowchart Programming Languages 1.3 What is a Programming Language? 1.4 Types of Programming Languages – Machine-level, Assembly-level and High-level Languages. 1.5 High-level Programming Language Tools – Compiler, Linker, Interpreter, 1.6 Intermediate Language Compiler and Interpreter, Editor, GUI Program Testing and Debugging 1.7 Definition of Debugging, editing 1.8 Types of Program Errors 1.9 Debugging a Program for Syntax Errors 1.10 Debugging a Program for Logic Errors	07	12

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2	<p>Introduction to 'C'</p> <p>2.1 History of C, Features of 'C', advantages of 'C', structure of 'C' Program</p> <p>2.2 Character set, keywords, constants, variables, rules of variables, Data type:</p> <p>2.3 Declarations, initializations, assignments, memory sizes, formatting characters and minimum/maximum values for each data types</p> <p>2.4 Type modifiers, type conversion</p> <p>Operators:</p> <p>2.5 Arithmetic, Logical, assignment, relational, increment and decrement</p> <p>2.6 Conditional, bit wise, special operators</p> <p>2.7 Precedence, expressions,</p> <p>2.8 Formatted input and output statements.</p>	07	12
3	<p>Decision and Loop Control</p> <p>3.1 Decision making and branching: if statement (if, if-else, if-else-if, ladder, nested if- else)</p> <p>3.2 Switch statement.</p> <p>Loop Control:</p> <p>3.3 What is loop, why to use loops, pre test and post test loops</p> <p>3.4 while, do-while</p> <p>3.5 for loops</p> <p>3.6 Nested loops</p> <p>3.7 break and continue statement</p>	10	16
4	<p>Arrays and Strings</p> <p>Arrays:</p> <p>4.1 Declaration, initialization of one dimensional, two dimensional arrays</p> <p>4.2 size of array, memory allocation of array</p> <p>4.3 Accessing array elements using index</p> <p>4.4 Operations such as searching and sorting of array</p> <p>Strings:</p> <p>4.5 Declaration and initialization of string variables</p> <p>4.6 String handling functions from standard library (strlen (), strcpy (), strcat (), strcmp()).</p>	07	12
5	<p>Functions</p> <p>5.1 Basics of a function, Need of functions</p> <p>5.2 How function works, Function definition, internal and external variables, scope and lifetime of variables</p> <p>5.3 Function call, passing arguments to functions (call by value, call by reference),</p> <p>5.4 return values, storage classes</p> <p>5.5 category of function , Library functions</p> <p>Structures</p> <p>5.6 Defining structure</p> <p>5.7 Declaring and accessing structure members</p> <p>5.8 Initialization of structure</p> <p>5.9 Arrays of structure.</p>	10	16
6	<p>Pointers</p> <p>6.1 Concept of pointer</p> <p>6.2 Declaration and initialization of pointer variable</p> <p>6.3 Pointer to array</p> <p>6.4 Pointer to string</p>	07	12

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Teaching Methodology: Chalk- Board

TERM WORK:

Skills to be developed

i)Intellectual Skills:

- ability to develop logic for given program
- ability to design algorithm, flowchart for given program
- Study different types of errors as syntax semantic, fatal, linker & logical
- Debugging of programs
- Understanding different steps to develop program such as
 - Problem definition
 - Analysis
 - Design of logic
 - Coding
 - Testing
 - Maintenance (Modifications, error corrections, making changes etc.)

ii) Motor Skills:

- Proper handling of Computer System.
- Typing skill

List of Practicals:

1. Simple programs involving arithmetic and logical expressions.
2. Program using if-else control statement.
3. Program using Switch case.
4. Program using for loop.
5. Program using do- while loop
6. Program on manipulation of single dimensional array.
7. Program using 2-dimensional array.
8. Program involving manipulation of string
9. Program using string related library functions
10. Program using user defined function.
11. Program using pointer to array.
12. Program using call by reference

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Learning Resources:

A)Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	The C Programming Language	Kernighan, Ritchie	Prentice Hall of India
2	Programming Language Concepts	Carlo Ghezzi, Mehdi Jazayeri	John Wiley and Sons
3	Programming in ANSIC C	E. Balagurusamy	Tata McGraw Hill
4	Let Us C	Yashavant Kanetkar	BPB Publications
5	Computer Fundamentals	Pradeep K. Sinha and Priti Sinha	BPB Publications

B) Software:

- Turbo C
- Borland C

C) Web sites for references:

- <http://cplus.about.com/od/beginnerctutoriali/a/blctut.htm>
- <http://computer.howstuffworks.com/c.htm>
- <http://www.indiastudycenter.com/studyguides/sc/objtest/default.asp>
- <http://www.cprogramming.com>
- <http://www.imada.sdu.dk>
- <http://www.eskimo.com>
- <http://www.geocities.com>

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS & TELECOMMUNICATION ENGINEERING

COURSE : ENGINEERING GRAPHICS SKILL COURSE CODE: R14ME1204

COURSE CATEGORY: FOUNDATION CREDITS : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	2	-	-	-	-	-	50	50

Rationale:

Drawing which is known as the language of engineers is widely used means of communication among the designers, engineers, technicians & craftsmen in an industry. The translation of ideas into practice without the use of this graphic language is really beyond imagination. Thus for the effective & efficient communication among all those involved in an industrial system, it becomes necessary for a diploma engineer to acquire the appropriate skills in the use of graphic language. This preliminary course aims at building a foundation for the further courses in drawing and other allied subjects.

Objectives:

The students will be able to

- Understand basic principles of engineering drawing.
- Draw orthographic projection of different objects.
- Draw isometric view from given two orthographic views.
- Understand and Draw various engineering curves and know their applications

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction to subject : Use of instruments, types of lines, types lettering, full, enlarging and reducing scales, dimensioning techniques. Geometrical constructions: To construct a regular polygon of given side. To construct a regular polygon in a given circle. To inscribe a circle in a given circle. To inscribe a circle in a given polygon. To circumscribe a circle around a given polygon. To draw circles touching each other and the sides of given polygon internally and externally. Tangent exercises : To bisect a given straight line/arc/angle. To divide given straight line into given number of equal parts. To draw a normal to a given straight line/arc/from a given point within or outside it. To draw a straight line parallel to a given straight line/arc through a given point / at a given distance. To draw an arc touching to two straight lines / two arcs (internally/externally)/one line and one arc. To draw an internal/external tangent to two given arcs apart from each other.	10	-

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2	<p>Redraw figures : To redraw the given figure (using the knowledge of geometrical constructions and tangent exercises).</p> <p>Constructions of curves : To study the construction of following curves using the method mentioned against them. Ellipse Directrix focus method, arcs of circle method and concentric circle method. Parabola directrix focus method and rectangle method. Involute of a polygon, of a circle and of combination of a polygon and circle.</p>	6	-
3	<p>Orthographic projection : Conversion of simple pictorial views into orthographic projections using first angle and third angle method of projections. Dimensioning the views.</p>	4	-
4	<p>Sectional views : Conversion of simple pictorial views into sectional orthographic projections using first angle and third angle method of projection. Dimensioning the views.</p>	4	-
5	<p>Isometric projections and views : Construction and use of isometric scale, Conversion of simple orthographic views into isometric projections/views.</p>	6	-
6	<p>Freehand sketches : The ends and thread profiles, Conventional representation of threads, Types of nuts, bolts, washers, set screws. Types of rivet heads and riveted joints. Types of sections full, half, revolved, removed offset. Conventional breaks for circle and rectangular sections.</p>	2	-

Teaching Methodology:

Discussions, Chalk-Board, Charts, Models, Transparencies

A)Term work :

Skills to be developed :

i)Intellectual Skills :

- i) Conversion of given orthographic views into Isometric and vice-versa.
- ii) Visualisation of an object
- iii) Drawing of sectional views.

ii)Motor Skills :

- i) Use of various drawing instruments.
- ii) Drawing of various engineering curves.
- iii) Redrawing the given figures.
- iv) Free hand sketching of machine components.

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Sr.No.	Topic Name	No. of Sheets
1	Geometrical constructions & tangent exercise	1
2	Redraw and Engineering Curves	1
3	Orthographic views	1
4	Sectional views	1
5	Isometric views	1
6	Freehand sketches	1

Learning Resources:

A)Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1.	N.D. Bhatt	Engineering Drawing	Charotar Publication, Anand.
2.	Mali and Chaudhary	Engineering Drawing	Vrinda Publication, Jalgaon
3.	Kamat & Rao	Engineering Drawing	Jeevandeep Publication, Mumbai
4.	N.Y. Prabhu	Geometrical Engineering Drawing	Pune Vidyarthi Griha, Publication Pune.
5.	Ozarkar & Utturkar	Engineering Drawing	Maharashtra Publishing house
6.	K. Venugopal	Engineering Drawing	New Age International Ltd. Delhi.

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DIPLOMA PROGRAMME: ELECTRONICS & TELECOMMUNICATION ENGINEERING
COURSE : WORKSHOP PRACTICE (E&TC) COURSE CODE: R14ME1205
COURSE CATEGORY: FOUNDATION CREDITS : 2

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
-	2	-	-	-	-	-	50	50

Rationale:

The students will know the various tools & machinery used in the workshop, Various fitting, welding techniques & tin smithy work. To develop practical skills in handling various tools, accessories & equipments in designing/testing.

Objectives:

The students will be able to

- Use tools & their applications in various shops.
- Know about the material used for pattern making & various types of pattern.
- Know about the types of furnaces used in casting, black smithy shops.
- Understand the various types of welding processes.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Demonstration of : - All Basic tools as spanners, pliers, screw drivers etc. - Their size specification & application Fitting : - Introduction to various fitting tools - One job involving drilling, bending process – (Soldering iron stand) Welding : - Introduction to various welding equipments - One job as (pot stand)	-	-
2	Tin Smithy : - Introduction to various tools & operations - One job as per given (Panel/chassis design) Turning : - Introduction to turning, CNC machine operation - One job on turning with given size and shape for a probe.	-	-

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Teaching Methodology: Discussions, Models, Charts

A)Term work :

All jobs be of practical use, the quality of the finish should be good and job should be saleable in market. Each job will carry equal marks, 10 marks for timely submission.

B)Term work :

Skills to be developed:

i)Intellectual Skills :

- ability to read job drawings.
- ability to identify and select proper material, tools and machines.

ii)Motor Skills :

- ability to set tools, work piece and machines for desired operations.
- ability to complete job as per job drawing in allotted time.
- ability to use safety equipment and follow safety procedures during operations.
- ability to inspect the job for confirming desired dimensions and shape

Learning Resources:

A)Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1.	S.K. Hazara & A.K.Chaudhari	Workshop technology Vol.1	Media promoters & Publishers

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: CIVIL/MECHANICAL/ELECT./COMP./E&TC. ENGINEERING
COURSE : ADVANCED MATHEMATICS COURSE CODE: R14SC2701
COURSE CATEGORY: ALLIED CREDITS : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
3	-	3	80	20	-	-	-	100

Rationale:

Mathematics is the backbone of all technical courses. Understanding the engineering concepts requires logical approach and thinking. The course aims to give the diploma students a perfect knowledge of Mathematics which can be used in the engineering field. They will be able to apply the advanced concepts of Mathematics in solving the varied kinds of engineering problems.

Objectives:

The students will be able to

1. Learn the new concepts of Laplace transform, Probability and Differential equations.
2. Solve the given mathematical problem with intelligent combination of techniques.
3. Apply the laws and principles of Mathematics to practical situation.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Integration: 1.1 Different methods of integration. Integration by different types. Some general integral. Integration by parts. Integration by partial fraction. 1.2 Definite integral. Properties of definite integral.	12	16
2	Application of Integration: 2.1 Area under the curve. Area between two curves. 2.2 Mean value. 2.3 Root mean square value.	8	12
3	Introduction to Laplace Transform: 3.1 Definition of Laplace transform. First shifting theorem. 3.2 Inverse Laplace transform. Properties of inverse Laplace transform.	6	12

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4	Differential Equation: 4.1 Definition of differential equation. Order and degree of differential equation. Formation of differential equation. 4.2 Solution of differential equation of 1 st order and 1 st degree. Variable separable differential equation. Homogenous differential equation. Linear differential equation.	8	16
5	Probability: 5.1 Definition: Event, sample space and probability. 5.2 Introduction to permutation and combination. Factorial notation. Meaning of ${}^n P_r$ and ${}^n C_r$. 5.3 Addition theorem for probability. Simple examples on probability. 5.4 Conditional probability.	8	12
6	Probability Distribution: 6.1 Binomial distribution. 6.2 Poisson distribution. 6.3 Normal distribution.	6	12

Teaching Methodology: Chalkboard, Discussion, Assignments, printed notes.

Skills to be developed:

i) Intellectual Skills:

- Memorizing skill will be developed after studying the formulae of all the topics.
- Selection skill will be developed after studying the methods of solving problems during selection of appropriate formula.
- Logical thinking will be developed after studying the topic Probability.
- Application skill will be developed after studying the topic Application of Integration

Learning Resources:

A) Books:

SR. NO.	AUTHOR	TITLE	PUBLISHER
1	Peter V. O'Neil	Advanced Engineering Mathematics	Thomson, Canada.
2	Joel L. Schiff	The Laplace Transform	Springer Verlag, New York.
3	Shanti Narayan	Engineering Mathematics Vol. I & II	S. Chand & Company, New Delhi.

B) Web sites for references:

1. www.wikipedia.com
2. www.wolfarm.com
3. www.mathworld.com
4. www.nptel.iitm.ac.in

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS & TELECOMMUNICATION ENGINEERING
COURSE : ELECTRICAL ENGINEERING COURSE CODE: R14EE2304
COURSE CATEGORY : ALLIED CREDITS : 5

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	2	3	80	20	-	-	25	125

Rationale:

Diploma engineers come across machines and equipments involving components and devices based on principles of Electrical Engineering. The course envisages study of principles of DC and AC circuits, construction, working and selection of different types of DC and AC motors and transformers.

Objectives:

The students will be able to:

1. Understand facts, concepts & principles of electrical engineering.
2. Fundamentals of DC & AC circuits.
3. Fundamentals of DC machines & motors.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	<p>A) D.C. CIRCUITS AND BASIC TERMS : Revision of basic terms series and parallel circuits, resistance, specific resistance and temperature co-efficient of resistance. (No numerical).</p> <p>B) A.C.FUNDAMENTALS : Generation of alternating voltage and current i.e. principle and description of elementary alternator. Graphical representation of e.m.f. and current. Equation of A.C., E.M.F. Definitions of instantaneous value, cycle, period, peak value, average value, r.m.s. value. Definition of peak factor and form factor. (No derivation) Phasor representation of an alternating quantity. Concept of phase, phase difference, in phase, out of phase quantities. Phasor diagram of a sine wave of same frequency, meaning of lagging and leading. P.F. Waveforms and phasor diagram for a</p> <ol style="list-style-type: none"> a) Purely resistive circuits. b) Purely inductive a.c. circuits. c) Purely capacitive circuits. Inductive reactance & Capacitive reactance.	10	16
2	<p>A.C. SERIES CIRCUITS : R.L. circuit (circuit, phasor diagram.) Impedance. Impedance triangle, Power relations for above circuits. R.C. circuits (circuit, phasor diagram). Impedance. Impedance triangle, Power. R.L.C. series circuit (Phasor diagram), series resonance. Phase relationship between voltage and current. Impedance triangle. Series resonance. Definition of Apparent Power, Reactive Power, True Power, Power Factor.</p> <p>B) THREE PHASE CIRCUIT : Introduction – 1 phase, 2 phase and 3 phase. Advantages of polyphase circuits over 1 phase. Generation of three phase voltage, Voltage-current & power relations of star and delta connected balanced system and numerical. Introduction to 3 phase supply systems i.e. star and delta connection and application.</p>	07	12

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3	SINGLE PHASE TRANSFORMER : Definition of transformers. Principle of operation. Constructional details. Types of transformers. E.M.F. equation. Concept of ideal transformer. Voltage, Current ratio of a transformer. Concept of practical transformer on load. Phasor diagram of transformer at No load and On load at various P.F. Regulation of a transformer. Transformer Losses. Efficiency of transformer. KVA rating of a transformer. Method of finding efficiency and regulation of a transformer, O.C&S. C Test, direct loading.	07	12
4	IV-D.C. MACHINES : Introduction, Constructional features and working of d.c. generator E.M.F. equation of a d.c. generator & numerical. Types of motor. Working principle & torque equation d.c. motor (Numerical). Characteristics and application of d.c. motors, reversal of direction of rotation of motor. Necessity of a starter, construction and working of a d.c. shunt motor starters. Speed control of D.C. series & shunt motors (No numerical on speed control, numerical on E.M.F & Torque).	07	12
5	MOTORS: Induction motors – Types, Constructional details, working, comparison between squirrel cage & slip ring induction motor. Working of 3 phase induction motor. Method to change the direction of rotation of three phase induction motor. Starters. Application of induction motor. General load characteristic of 3 phase induction motor. Advantages of 3 phase induction motor w.r.t. 1 phase induction motor applications and characteristics of – a) Resistance split phase motor b) Capacitor split phase motor. c) Shaded pole type motor. Application of following special motor. a) Universal motor/A.C. series motor. b) Linear induction motor. Servo Motor. Stepper motor : Construction of variable reluctance. Permanent magnet and hybrid type of stepper motor. Characteristics of stepper motor, Application stepper motors. Speed control of stepper motors – various methods.	10	16
6	A) Control characteristics of the motor for Torque & Speed based control of following motors a) Universal motor b) A.C. series motor c) Linear induction motor. d) DC Servo motor. e) AC servo motor F) Stepper motor.	07	12

Teaching Methodology: Chalk-Board, Discussions, charts, transparencies.

A) Practical's :

Skills to be developed:

i) Intellectual Skills :

- Identifying the various types of motors and Transformers used in Industries for various applications.
- Selecting proper type of Motor, Transformer, and other electrical Equipments.
- Interpret the results obtained during the practical.
- Writing the report after performing the practical by comparing the obtained data with standard data.

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i) Motor Skills :

- Proper connection of appliances for a particular circuit diagram.
- Measurement of indicated values by various indicating instruments.
- Observe & control the readings shown by various instruments.

List of Practicals :

1. V, I, Power calculations with lamp load for series & parallel circuit combination on DC & AC
2. V, I PF & Power calculation of R, L, C circuit combination.
3. Line & phase relationship of voltage & current for 3 phase star & delta connection.
4. To determine efficiency & relation of 1 phase transformer by O.C. & S.C test
5. To determine efficiency and regulation of a single phase transformer by direct loading.
6. Speed control of d.c. shunt motor by :
 - a) Armature control method.
 - b) Excitation control method.
7. Study of D.C. shunt motor starter & starting & reversing of a D.C. shunt motor.
8. Study of a 1 phase induction motor (No load test and starting & reversing)
9. Study of stepper motor.
10. Induction motor speed control.
11. Study of AC, DC servo motor
12. Induction motor speed control.
13. Study of control characteristics of AC & DC servo motor.
14. Study of Three Phase Transformer.
15. Measurement of voltage ratios of Three phase transformer for various types of connections.

Learning Resources:

A) Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1.	Electrical Technology Vo. -I S	B.L.Theraja	Chand Publishing
2.	Electrical Technology Vo. -II S	B.L.Theraja	Chand Publishing
3.	Electrical Engineering	B.H.Deshmuth	Nirali Prakashan

B) Web Sites for references:

1. www.wikipedia.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: MECHANICAL/ELECT./COMP./E&TC. ENGINEERING
COURSE : INDUSTRIAL ORGANISATION & MANAGEMENT
COURSE CODE: R14ME2203 **CREDITS :3**
COURSE CATEGORY : ALLIED

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
3	-	3	80	20	-	-	-	100

Rationale:

This course is classified under human sciences and is intended to teach students about structure of organization, types of organization, principles of management, functioning of personnel department, industrial laws, and inventory control methods. It also envisages giving exposure to accountancy principles and various networking methods.

Objectives:

The students will be able to

- Understand the concept of different business organization.
- Know activities in the various departments like purchase, marketing, personnel, material etc.
- Know different acts for execution of factory work.
- Understand principles of Bookkeeping& accountancy.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Business Organizations : 1.1 Types & their foundations, proprietary, partnership, private and public limited companies, co-operative and public sector organizations. Role of public and private sector in the country and their social obligations towards society. 1.2 Principles of organizations, delegation of authority and responsibility decentralization, committee. Types of organizations such as line/military, staff, line & staff. 1.3 Marketing Management : Definition, Selling V/s Marketing concept, Functions of Marketing management, Market Research, Definition, functions & agencies of advertising, Types of market.	9	12
2	Human Resource Management : 2.1 Personnel management: Duties and responsibilities of personnel management, Manpower planning, Sources of employment, recruitment, selection. Various methods of testing, training and development of workers and supervisors, duties and authorities of supervisors, morale maintenance, motivation. 2.2 Wages and Incentives: Definition of wages, wage payment plans, Concept of incentive. 2.3 Safety management: Causes and effects of accident, Safety programmes. 2.4 Labour Laws: Factory act, Employee's State Insurance act, Workmen's Compensation act, Dispute act.	9	16

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3	Material and Stores Management : 3.1 Introduction to the functions of material management, material flow in an industry, purchase functions and systems, purchase procedure. Receipt and Issue of material, Types of stores, centralized & decentralized purchase. 3.2 Inventory Control: Objectives of inventory control, inventory and its classification, EOQ (Economic Order Quantity) its derivation (no numericals), ABC analysis, Material Requirement Planning (MRP).	7	12
4	Management Process: 1.1 Management and its various definitions, Importance of management, Difference between management, organisation and administration, Evolution and development of management, Levels of management scientific management. 1.2 Principles of management (14 principles of Henry Fayol). Functions of management such as planning, organising, directing, controlling etc.	6	12
5	Financial Management: 5.1 Objectives & Functions of Financial management. 5.2 Capital Generation & its Types, Finance (methods of raising capital), Finance from Bank, Capital market, Financial institutions, Shares & its types, Debentures, Loans, Financial Ratios. 5.3 Book Keeping & Accountancy, its objectives, principles of double entry book keeping, Accounting Terminology (Numericals only on Journal & Ledger Account). 5.4 Introduction to Trading account, profit and loss account & Balance Sheet (No Numericals).	9	16
6	Project Management and Quality Management: 5.1 CPM/PERT Technique: CPM terminologies, Definitions in PERT, Comparison of CPM & PERT (No Numericals). 6.2 Quality management, Quality Policy, Quality control, Inspection, Concept of Quality circle, TQM, Quality Audit.	8	12
Total		48	80

Teaching Methodology: Chalk-Board, Discussions, Transparencies.

Skills to be developed:

i) Intellectual Skills :

- Understand functions and managerial skills required for various departments.
 - Understand the principles of double entry book keeping system.
 - Interpret transactions in journal, ledger and balance sheet.
- Learning Resources:**

Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	Dr. O.P. Khanna	Industrial Engineering & Management	Dhanpat Rai & Sons.
2	J. R. Batliboi	First Steps in Book Keeping	
3	Dr. B. C. Punmia and K. K. Khandelwal	Project Planning and Control with CPM and PERT	Laxmi Publication.

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DIPLOMA PROGRAMME: CIVIL/MECH./ELECT./COMP./ E&TC ENGINEERING

COURSE : ENTREPRENEURSHIP DEVELOPMENT COURSE CODE: R14ME2206

COURSE CATEGORY: ALLIED

CREDITS : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	1 (T)	-	-	-	-	@25	25	50

Rationale:

This course consists of topics related to the development of entrepreneurial skills and other details such as selection of product lines, site selection, financial aspects, personnel management, quality control and creative thinking. The course includes case studies in the related field. The course emphasizes the development of enterprising qualities among young engineers.

Objectives:

Students will be able to

- Identify entrepreneurship opportunity.
- Acquire entrepreneurial values and attitude.
- Use the information to prepare project report for business venture.
- Develop awareness about enterprise management.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	<p>1.1 Introduction : Definition of entrepreneur, concept of entrepreneur and entrepreneurship, importance of entrepreneur. Types of entrepreneur: Innovating entrepreneur, imitative entrepreneur, fabian entrepreneur, drone entrepreneur and according to type of business. Difference between Entrepreneur and Intrapreneur.</p> <p>1.2 Entrepreneurial Competencies : - Characteristics of an entrepreneur, qualities of an entrepreneur, competencies of entrepreneur.</p> <p>1.3 Women Entrepreneur: Definition, characteristics of women entrepreneur. Causes of limited growth in India, remedies for limited women entrepreneurship development.</p>	6	
2	<p>Motivation : Definition and concept of motivation, types of motivation: affiliation, power, and achievement motivation. Need and importance of achievement motivation, challenges of motivation, Motivating factors. Theories of motivation: a) Maslow Hierarchy theory ,b)Mc Gregor X-Y theory, c)</p>	4	

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3	Creativity and Innovation : Definition and concept of Innovation, definition and concept of Creativity. Characteristics of creative people. Discussion of various examples with respect to creativity and innovation.	5	
4	4.1 Business Opportunity Search and Scanning : Opportunities available in different sectors such as manufacturing, services and trading. Classification of opportunities on the following : - Natural resource based, Demand based, Local industrial based, Service sector based, Export based, Skill based, Off-farm based. 4.2 Business Idea : Search for business idea, sources of business idea, ways of generating ideas, ideas processing & selection (factors affecting product idea). SWOT Analysis. 4.3 Sources of Business Idea : Market survey & techniques, prospective consumers, development in other nation, study of project profile, government organization, trade fair and exhibitions. Checklists for information collection.	6	
5	Government and Non Government Agencies for Promotion and Development : Importance of funds, Types of funds. Various schemes of assistance of government, Government policies and incentives. Registration with various government agencies, definition of SSI and Ancillary.	5	
6	Business Plan Preparation : Project identification, project formulation, feasibility analysis, Estimation of cost of production, Cost volume profit relationship at different levels, Interpretation of financial statements, Institutionalized and Non - institutionalized sources of working capital, Funds flow statements, Loan application form for appraisal. Project report preparation.	6	

Teaching Methodology: Group Discussion, visits, guest lectures.

Term Work: Skills to be developed:

i) Intellectual Skills :

- Identify various opportunities in market.
- Identify individual's entrepreneurial competencies.
- Interpret risk to be taken during a task.
- Interpret SWOT of individual.
- Prepare a report of business plan.
- Enhance/Improve presentation and writing skills.

Professional Practices:-

1. Walking through Market.
2. Business plan preparation.
3. Interview of a successful entrepreneur.
4. Interview / Biography of a successful women entrepreneur.

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List of Experiments / Practicals / Assignments:

1. Biography of any entrepreneur.
2. Self Disclosure Exercise (Who am I?).
3. Self rating questionnaire.
4. Thematic Appreciation Test (TAT).
5. Ring Toss Exercise.
6. Tower Building Exercise.
7. Convince and Crown.
8. Creativity and Problem solving.

Learning Resources:

A)Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Dynamics Of Entrepreneurial Development And Management.	Vasant Desai	Himalaya Publishing House, 1997, Reprint-1999.
2	Entrepreneurial Development Concept and Practices.	Dilip M. Sarwate	Everest Publishing House, 1996.
3	Entrepreneurial Development.	Gupta Srinivasan	Sultan Chand & Sons, 1993.
4	Training of Entrepreneurship and Self Employment.	D. D. Mali	Mittal Publications, 1999.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : MECHANICAL SYSTEM AND PROCESSES COURSE CODE: R14ME2602
COURSE CATEGORY : ALLIED CREDIT : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	Paper Hrs	TH	TEST	PR	OR	TW	TOTAL
2	2	-	-	-	-	-	50	50

Rationale: It is expected that the Diploma holder in Electrical Engineering have to deal with number of mechanical equipments in industry from the various aspects like operation, maintenance etc. Though their branch being Electrical, they must have adequate knowledge of Mechanical Engineering. In this course he will learn about the basics of I C Engines, Heat treatments, forces, hydraulics, pneumatics

Objectives : The students should able -

- To understand the concepts of shear forces , bending moment torsion.
- To know about various mechanical properties of materials.
- To know about composition & properties of commonly used metals & alloys.
- To know about testing methods of to determine the mechanical properties.
- To know about the basic principles of hydraulics, hydrostatics, fluid flow.
- To understand the construction & working of water turbines, venturimeter.
- To understand the concept of pressure.
- To understand the principle of heat transfer, powder metallurgy & power transmission.
- To know about the construction & working of I C Engine& its characteristics.
- To know about the various welding methods in industries.

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 Shear Force & Bending Moment - Shear force calculation, cantilever, simply supported beam, concentrated load & uniform load, bending moment, maximum bending moment 1.2 Torsion: Twisting of solid & hollow shafts, tensional rigidity power, and torque.	06	-
2	2.1 Mechanical Properties of Materials – Elasticity, ductility, malleability, brittleness, toughness, hardness, formability & weld ability. 2.2 Testing of materials -Destructive, non-destructive testing, tensile, compressive, fatigue, impact & hardness test, magnetic crack detection, ultrasonic, radiographic tests. Stress-strain curve, elastic limit, Hook’s law, Young’s modulus, thermal stress. 2.3 Materials - Classification of plain carbon steel, nickel chrome, tungsten & silicon steel. Copper- properties & applications fabrication. Brass properties, Mu-metal, naval & silicon brass. Bronze properties. Al- alloys.	05	-

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3	<p>3.1 Hydrostatics: Properties of gases & liquids, related terms, calculation of pressure head, its conversion to height of water column.</p> <p>3.2 Pressure – vacuum & absolute pressure. Bernoulli's theorem, its application in the venturimeter. Calculation of cc, cv, cd flow through notches, water turbine.</p> <p>3.3 Fundamentals of fluid flow, discharge, types of flow</p>	05	-
4	<p>4.1 Heat treatment: Electrical conductors, annealing of steels, its effect on mechanical & electrical properties, comparison between annealing, normalizing, hardening, tempering.</p> <p>4.2 Powder metallurgy: Importance & limitations, processes, electrical applications</p> <p>4.3 Power transmission & safety: Belt, rope, chain gear drives, tools, safety of personnel in the workshop.</p>	06	-
5	<p>5.1 Internal Combustion Engines & Turbines: Air standard efficiency of diesel & Otto cycle. Calculation of IHP & BHP, heat balance sheet, use of I C Engines for power generation.</p> <p>5.2 I C Engines: Construction & classification of I C Engines. Difference between two stroke & four stroke, petrol & diesel Engine. Operation of Diesel Engines, maintenance & faults.</p>	05	-
6	<p>6.1 Introduction to Industrial Hydraulics & pneumatic systems: Various components used, their functions, simple pneumatic & hydraulic circuits.</p> <p>6.2 Types of welding: fusion & pressure welding: electric resistance welding, Arc welding, gas welding.</p>	05	-

Teaching Methodology : Chalk-Board, Group Discussion, Power Point Presentation, Expert Lectures.

Term Work :

Skills to be developed :

i)Intellectual Skills:

- Identify
- Discrimination
- Selection
- Interpretation
- Understanding
- Reading
- Design Approach
- Report Writing

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ii) Motor Skills:

- Proper connection
- Measurement
- Troubleshooting
- Testing
- Draw graph paper
- Observe the result and compare

List of Practical: (any Eight):

A) The term work shall consist of any ten experiments from the following

1. Study of diesel engine
2. Study of petrol engine
3. Study of Venturimeter
4. Study of Orifice
5. Study of Industrial Pneumatic components
6. Study of Industrial Hydraulics components.
7. Simple Hydraulic & Pneumatic circuit
8. Hardness testing of materials.
9. Study of pressure measuring devices.
10. Study of Pelton Wheel

B) Field Work:

Learning Resources:

A) Books :

SR. NO.	TITLE	AUTHOR	PUBLISHER
01	Material science & Metallurgy	O.P. Khanna	Dhanapat & Co., New Delhi
02	Material science & Metallurgy	V.D. Kodgire	Everest Publications, Pune
03	Fluid Mechanics	R. K. Bansal	Khanna Publications, New Delhi
04	Strength of Materials	Ramamrthumm	New Delhi Dhanapat & Co

B) Web sites for references :

1. www.howstuffworks.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : ENVIRONMENTAL STUDIES COURSE CODE: 14EX2207
COURSE CATEGORY : ALLIED CREDIT : 3

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	1	-	-	-	-	@25	25	50

Rationale:

Environment essentially comprises of our living ambience, which gives us the zest and verve in all our activities. The turn of the twentieth century saw the gradual onset of its degradation by our callous deeds without any concern for the well being of our surrounding we are today facing a grave environmental crisis. The unceasing industrial growth and economic development of the last 300 years or so have resulted in huge ecological problems such as overexploitation of natural resources, degraded land, disappearing forests, endangered species, dangerous toxins, global warming etc.

It is therefore necessary to study environmental issues to realize how human activities affect the environment and what could be possible remedies or precautions which need to be taken to protect the environment.

The curriculum covers the aspects about environment such as Environment and Ecology, Environmental impacts on human activities, Water resources and water quality, Mineral resources and mining, Forests, etc.

Objectives:

The student will be able to,

- Understand importance of environment
- Understand key issues about environment
- Understands the reasons for environment degradation
- Understand aspects about improvement methods
- Study initiatives taken by the world bodies to restrict and reduce degradation

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Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Nature of Environmental Studies</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> Define the terms related to Environmental Studies State importance of awareness about environment in general public <p>Contents:</p> <ul style="list-style-type: none"> Definition, Scope and Importance of the environmental studies Importance of the studies irrespective of course Need for creating public awareness about environmental issues 	01	04
<p>Topic 2: Natural Resources and Associated Problems</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> Define natural resources and identify problems associated with them Identify uses and their overexploitation Identify alternate resources and their importance for environment <p>Contents:</p> <p>2.1 Renewable and Non renewable resources</p> <ul style="list-style-type: none"> Definition Associated problems <p>2.2 Forest Resources</p> <ul style="list-style-type: none"> General description of forest resources Functions and benefits of forest resources Effects on environment due to deforestation, <ul style="list-style-type: none"> Timber extraction, Building of dams, waterways etc. <p>2.3 Water Resources</p> <ul style="list-style-type: none"> Hydrosphere: Different sources of water Use and overexploitation of surface and ground water Effect of floods, draught, dams etc. on water resources and community <p>2.4 Mineral Resources:</p> <ul style="list-style-type: none"> Categories of mineral resources Basics of mining activities Mine safety Effect of mining on environment <p>2.5 Food Resources:</p> <ul style="list-style-type: none"> Food for all Effects of modern agriculture World food problem 	04	10
<p>Topic 3. Ecosystems</p> <ul style="list-style-type: none"> Concept of Ecosystem Structure and functions of ecosystem Energy flow in ecosystem Major ecosystems in the world 	01	04
Topic 4. Biodiversity and Its		

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<p>Topic 4. Biodiversity and Its Conservation</p> <ul style="list-style-type: none"> • Definition of Biodiversity • Levels of biodiversity • Value of biodiversity • Threats to biodiversity • Conservation of biodiversity 	02	06
<p>Topic 5. Environmental Pollution</p> <ul style="list-style-type: none"> • Definition • Air pollution: Definition, Classification, sources, effects, prevention • Water Pollution: Definition, Classification, sources, effects, prevention • Soil Pollution: Definition, sources, effects, prevention • Noise Pollution: Definition, sources, effects, prevention 	03	08
<p>Topic 6. Social Issues and Environment</p> <ul style="list-style-type: none"> • Concept of development, sustainable development • Water conservation, Watershed management, Rain water harvesting: Definition, Methods and Benefits • Climate Change, Global warming, Acid rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust: Basic concepts and their effect on climate • Concept of Carbon Credits and its advantages 	03	10
<p>Topic 7. Environmental Protection</p> <ul style="list-style-type: none"> • Brief description of the following acts and their provisions: • Environmental Protection Act • Air (Prevention and Control of Pollution) Act • Water (Prevention and Control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Population Growth: Aspects, importance and effect on environment • Human Health and Human Rights 	02	08

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Practical:

Skills to be developed:

Intellectual Skills:

1. Collection of information, data
2. Analysis of data
3. Report writing

Motor Skills:

1. Presentation Skills
2. Use of multi media

List of Projects:

1. Visit to a local area to document environmental assets such as river / forest / grassland / hill/ mountain.
2. Visit to a local polluted site: Urban/Rural/Industrial/Agricultural
3. Study of common plants, insects, bird
4. Study of simple ecosystems of ponds, river, hill slopes etc

Prepare a project report on the findings of the visit illustrating environment related facts, analysis and conclusion. Also suggest remedies to improve environment.

Learning sources: A) Books:

SR. NO.	TITLE	AUTHOR	PUBLISHER
01	Environmental Studies	Anindita Basak	Pearson Education
02	Environmental Studies from Crises to Cure	R. Rajgopalan	Oxford University Press
03	Environmental Studies	Dr. R. J. Ranjit Daniels, Dr. Jagdish Krishnaswamy	Wiley India

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: CIVIL/ MECH./ELECT./COMP/ ELEX. ENGINEERING
COURSE : ELEMENTS OF ACCOUNTS AND FINANCE COURSE CODE: R14EX2208
COURSE CATEGORY: ALLIED CREDITS : 3

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
2	1 (T)	-	-	-	--	@25	25	50

Rationale :

The aim of this course is to provide with the basic level skills and knowledge required by engineers in the accounting and finance. The curriculum envisages the elementary theory and practice of financial accounting. This involves understanding of the concepts and choices that underline measurement and disclosure in financial statements.

Objectives:

The students will be able to

- Acquire knowledge of basic concepts of accounting
- Acquire basic accounting knowledge
- Interpret the financial statements

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction to Book-keeping and Accountancy Meaning & definition, objectives, importance and utility, Difference between Book-keeping and Accountancy. Basis of accounting: Cash basis and accrual basis Branches of accounting: Financial , Cost, management Accounting terminology: Business transactions- Cash, Credit, Non-monetary transactions Types of assets- Fixed, Current, Fictitious Types of liabilities: Fixed, Current, Contingent Net worth, Capital, Debtor, Creditor, Expenditure, Types of Expenditure: Capital, Revenue, Deferred revenue Solvent- insolvent	5	
2	Fundamentals of double entry book-keeping: Principles, Comparison between conventional and double entry system, Classification of accounts: Personal, Real, Nominal Meaning of debit and Credit Basic rules for debit and credit for different accounts	6	
3	Journal: Definitions, Importance and utility of journal, Specimen of a journal, Journalizing and steps for journalizing Ledger: Meaning, need and contents of ledger, specimen of ledger account, posting of entries in ledger Balancing of ledger accounts	8	

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4	Trial Balance: Meaning and purpose Specimen of trial balance, preparation of trial balance from given balances of accounts, introduction to errors and their rectification methods Depreciation: causes and need, methods of computing depreciation Provisions and reserves: Meaning and objectives	3	
5	Final Accounts: Financial statements, preparation of profit and loss account, trading account, Valuation of stock, provisions for bad debts, Balance sheet: Arrangements of assets and liabilities Accounting standards:	5	
6	Cash flow and fund flow statements Difference between cash flow and fund flow statement, advantages and limitations Ratio analysis: current ratio, return on equity, the debt-equity ratio, the dividend payout ratio and the price/earnings (P/E) ratio	5	

Teaching Methodology: Discussions, Chalk-Board, Charts.

Term Work :

List of Assignments :

1. Minimum Two exercises on Journalising
2. At least two assignment on posting entries into Ledger
3. Preparation of Trial Balance,
4. Interpreting a Profit and Loss Account / Income and Expenditure statement
5. Reading a Balance Sheet
6. Exercise on Cash flow statement
7. Finding financial ratios from Balance sheet and interpreting them
8. Reading and interpreting financial Statement of a Private/Public Limited Company

Learning Resources:

Books:

SR.NO.	AUTHOR	TITLE	PUBLISHER
1	T.S. Grewal S.C. Gupta	Introduction to accountancy	S. Chand Publications, New Delhi
2	-	Book-keeping and Accountancy For Std XI And XII	Maharashtra State Board Of Secondary And Higher Secondary Education

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE : DIGITAL ELECTRONICS COURSE CODE: R14EX3502
 COURSE CATEGORY : CORE CREDIT : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	-	-	50	150

Rationale:

The tremendous power and usefulness of digital electronics can be seen from the wide variety of industrial and consumer applications. The areas of applications of digital electronics have been increasing every day. This unpredicted growth of digital electronics is the advent of Integrated circuits It is essential to know these fundamentals to understand the concept of microprocessors & its applications.

Objectives:

The students will be able to

- Know the concepts of digital electronics.
- Simplify logic circuit using Boolean algebra.
- Construct simple logic circuits.
- Know the functions of various digital ICs.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	A) Number Systems. 1.1 Decimal, Binary, Octal, Hexadecimal number systems, 1.2 Conversion from one system to another, signed number representation using 1's and 2's complement, Binary addition, subtraction using 1's and 2's complement 1.3 BCD, Gray, Excess 3, 8-4-2-1 code, Advantages and Disadvantages of these codes. B) Logic Gates. 1.4 AND, OR, NOT, EX-OR, Universal gates – NAND, NOR, symbol, truth table. 1.5 Boolean expression, building basic gates using universal gates. C) Boolean Algebra. 1.6 Fundamentals of Boolean algebra, basic laws, commutative, associative, distributive laws, duality principle, De-Morgan's theorems.	12	16

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2	<p>A) Combinational Logic Circuits. 2.1 Introduction to logic design, Sum of products (SOP), Product of sum (POS), Don't care conditions 2.2 Karnaugh map representation of logic functions, simplification of logical functions using K-map, (2,3 and 4 variables) 2.3 Design example – Half adder, Full adder, Half subtractor, Full subtractor. B) Encoders and Decoders. 2.4 Multiplexer – concept, 4:1, 8:1, 16:1 2.5 Demultiplexer – concept, 1:4, 1:8 2.6 Digital circuit design using MUX & DEMUX- one example each. 2.7 Decoder – 3:8, 4:16 line decoder 2.8 Decimal to BCD Encoder, BCD to 7 segment decoder</p>	10	12
3	<p>A) Sequential Logic Circuits. 3.1 Concept of Flip-Flop, Flip-Flops: S-R, Clocked RS, T, D, J-K. 3.2 Master slave JK, triggering of Flip-Flops, symbols and truth tables, race around condition. B) Shift Registers. 3.3 Concept of register, shift registers – SISO, SIPO, PISO, PIPO, left and right shift 3.4 Timing diagrams ring counter. C) Counters 3.5 Concept of counters, synchronous and asynchronous counters 3.6 Up/Down counters, timing diagrams, decade and binary counter</p>	10	12
4	<p>Logic Families. 4.1 Introduction to logic families, TTL, ECL, CMOS logic families. 4.2 Implementation of logic gates using TTL logic family. 4.3 Implementation of logic gates using ECL logic family . 4.4 Implementation of logic gates using CMOS logic family. 4.5 Characteristics – fan in, fan out, speed, noise immunity, propagation delay, power dissipation. 4.6 Comparison of TTL, ECL, CMOS logic families with reference to above characteristics, tri-state logic. 4.7 Specifications of IC 74XX.</p>	10	12
5	<p>ADC and DAC. 5.1 A to D and D to A conversion concepts. 5.2 DAC – weighted register type and R-2R ladder type 5.3 Specifications of D/A Converters. 5.4 ADC – Ramp, Successive approximation, Flash method 5.5 Specifications of A/D Converters.</p>	10	12
6	<p>CMOS Processing Technology. 6.1 Basic CMOS technology. 6.2 CMOS process enhancement. 6.3 BiCMOS Technology. 6.4 Static CMOS Design. 6.5 Dynamic CMOS Design. Introduction to the VHDL 6.6 VHDL design units: VHDL Model Components: a) Entity Declarations, b) Architecture Descriptions, c) Timing Model 6.7 Basic VHDL Constructs: a) Data Types, b) Objects, c) Sequential and Concurrent statements, d) Entity and Architecture Declarations. 6.8 VHDL Programming on Logic gates.</p>	12	16

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Teaching Methodology: Chalk-Board, Group Discussion, Power Point Presentation, Expert Lectures.

Term Work:

Skills to be developed:

i) Intellectual Skills:

- Ability to interpret the different specifications of digital ICs from data sheets.
- Ability to design the various digital circuits.

ii) Motor Skills:

- Ability to make proper connection of digital circuits on bread board.
- Ability to troubleshoot the digital circuits and verify the results.

List of Practicals:

1. Verify the truth tables of logic gates. (IC74XX)
2. Construction of basic gates using universal gates. (IC7400 and IC7402)
3. Construction of half adder and full adder.
4. Code conversion using logic gates: BCD to Binary, BCD to Gray, Gray to BCD. (3/4 - bit)
5. Design and implement combinational function using MUX IC74151. (3/4 - bit)
6. Verification of truth tables of flip-flops using ICs 7474, 7476.
7. Functional verification of universal shift register using IC 7495. (Shift left and shift right)
8. Implement decade counter using IC 7490.
9. Implement synchronous counter using IC 74192.
10. Implement up-down ripple counter using JK-flip flop. (3-bit)
11. Implement R-2R ladder DAC. (3/4 - bit)
12. Write a code for basic logic gates using VHDL and simulate the code.
(At list for 3 logic gates)

Professional Practice:

1. Information Search:

Search of data sheets of digital IC through internet, magazine, data manuals and submit a brief report as a part of term work.

2. Market Survey:

A group of students is expected to undergo market survey regarding specifications and cost of Digital ICs and IC Testers. Submit the report.

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Learning Resources:

A)Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Digital Principles	Malvino and Leach	Tata McGraw Hill Pub. New Delhi
2	Modern digital electronics	R. P. Jain	Tata McGraw Hill Pub. New Delhi
3	Digital Design	M. Morris Mano	Printice Hall India
4	Digital Electronics	Gothman	Printice Hall India
5	Principals of CMOS VLSI Design	Neil H. E. Weste & Kamran Eshraghian	Addison-Wesley
6	VHDL Programming	Dougious L. Perry	Tata McGraw Hill Pub. New Delhi
7	Digital Logic Design with VHDL	Stephen Brown & Zvonko Vranesic	McGraw-Hill

B) Magazines:

- Electronics for you.
- Electronics Bazaar
- Digit.

C) Software:

- Xilinx ISE 9.2i

C) Web sites for References:

- www.alldatasheet.com
- www.electronics-tutorials.com
- www.indianscientificinstrument.com.
- <http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/esc102/node28.html>
- <http://neovlsi.wordpress.com/2009/03/06/what-is-a-universal-gate-and-why-nand-is-called-a-universal-gate/>

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE NAME: COMMUNICATION SYSTEM I COURSE CODE: R14EX3503
 COURSE CATEGORY: CORE CREDIT : 06

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	@50	-	50	200

@ Internal Exam

Rationale:

It is the foundation course which will be helpful for understanding higher technologies. It presents information about the basic philosophies, processes, circuits and other building blocks of communication systems. It forms the platform for studying emerging technologies in communication.

Objectives: The students will be able to

- Understand basics of communication system.
- Learn Basics of Analog Modulation.
- Understand Basics of noise and antenna.
- Study the working principle of Receiver.
- Understand the wave propagation theory.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
01	Linear Modulation: 1.1 Block diagram of communication system 1.2 Need of modulation 1.3 Concept of modes of Communication(Simplex ,half duplex, full duplex) 1.4 Amplitude modulation-definition, frequency spectrum, mathematical representation 1.5 Modulation index, power and current relations Bandwidth requirements 1.6 Numerical 1.7 Concept of sidebands(Mathematical representation of DSB and SSB) 1.8 DSB-SC generation(using FET balanced modulator) 1.9 SSB generation using Filter method 1.10 SSB SC generation using Phase shift method 1.11 Block diagram of AM Transmitter	12	16

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02	Angle modulation: 2.1 Frequency Modulation - Definition, mathematical representation 2.2 Modulation index, frequency spectrum of the FM Wave, Bandwidth requirement 2.3 Numerical 2.4 Concept of Phase modulation 2.5 Pre-emphasis and De- emphasis 2.6 Narrowband FM and Wideband FM 2.7 Adjacent channel interference , co-channel interference 2.8 FM Generation methods 2.8.1 Reactance method 2.8.2 Varactor diode method 2.9 Armstrong method 2.10 FM generation using IC(566,PLL565)	10	12
03	Noise: 3.1 Types of Noise (a) External noise- atmospheric, Extraterrestrial, Industrial 3.2 (b) Internal noise- Thermal agitation, Shot noise 3.3 Transit time noise ,Miscellaneous noise 3.4 Noise calculations in Amplifiers 3.5 Noise parameters-Signal to noise ratio, noise figure, noise resistance 3.6 Noise temperature calculations 3.7 Numerical 3.8 Noise in AM 3.9 Noise in FM-Noise triangle	10	12
04	Antenna and wave propagation: 4.1 Electromagnetic spectrum 4.2 Concept of dipole antenna, resonant antenna, non resonant antenna 4.3 Antenna parameters-Gain, antenna resistance, Bandwidth, Beamwidth, Directivity, Radiation pattern, Polarization, isotropic antenna 4.4 Structure, radiation pattern and application of Yagi – Uda, Horn antenna 4.5 Structure, radiation pattern and application of Loop antenna, Dish antenna 4.6 Ground wave propagation, radio horizon, optical Horizon 4.7 Ionosphere details 4.8 Sky wave propagation 4.9 Space wave propagation 4.10 Virtual height, actual height, critical frequency, critical angle, skip zone, MUF, skip distance 4.11 Duct propagation 4.12 Troposcatter propagation	12	16

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05	Radio Receiver: 5.1 AM superheterodyne Receiver-block diagram and Working with waveforms 5.2 Sensitivity, selectivity, fidelity 5.3 Image Frequency and its rejection, double spotting 5.4 Frequency changing and tracking 5.5 Diode detector-Simple and practical 5.6 Need of AGC simple and delayed 5.7 FM superheterodyne Receiver-block diagram and working with waveforms 5.8 Limiter- circuit diagram and working 5.9 FM detector types-Balanced slope detector 5.10 Phase discriminators	10	12
06	Pulse analog modulation: 6.1 Need of pulse modulation 6.2 Band limited & time limited signals 6.3 Sampling theorem Nyquist criteria 6.4 Sampling methods- Natural, Flat top 6.5 Aperture and aliasing effect 6.6 PAM, PWM & PPM Modulation - block diagram, working and waveforms 6.7 Advantages, disadvantages and their comparison 6.8 Generation of PPM and PWM using IC 555 6.9 Numericals based on sampling theorem	10	12

Teaching Methodology: Chalk board, Group discussion, Guest lectures, Power Point Presentations

Term work: Skills to be developed:

i) Intellectual Skills:

- Ability to understand the various noise sources
- Ability to trace and locate the components in the receiver

ii) Motor Skills:

- Observe and measurement of spectra of various modulation schemes
- Plot the radiation pattern and determination of beamwidth.

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List of Practical's (any Ten)

- 1.AM, Generation, waveform observation & measurements.
- 2.FM Generation, waveform observation & measurements.
- 3.Observation of AM signals and FM signals using Spectrum analyzer.
- 4.Study of sensitivity, selectivity and fidelity of radio receiver.
- 5.Plotting of polar diagram of antenna (Folded Dipole)
- 6.Plotting of polar diagram of antenna (Yagi-Uda antenna)
- 7.Plotting of polar diagram of antenna (HURTZ antenna)
- 8.SSB generation, waveform observation & measurement.
- 9.DSB generation, waveform observation & measurement.
- 10.Observation of sampling signals: Natural Sampling, Flat top Sampling
- 11.Observation of PWM modulation and demodulation
- 12.Observation of PPM modulation and demodulation
- 13.MATLAB SIMULINK designs of AM Transmitter.
- 14.MATLAB SIMULINK designs of FM Transmitter
- 15.MATLAB SIMULINK designs of SSBSC Transmitter

Learning Resources:

A)Books:

NO	TITLE	AUTHOR	PUBLISHER
1	Electronic Communication System	Kenedy, Devis	McGraw Hill
2	Electronic Communication System	Roddy Coolen	PHI
3	Principle of Communication System	Taub shelling	McGraw Hill
4	Principles of electronic communication system	Louis. E.Frenzel	McGraw Hill

B)Web sites for references:

- www.nptel.com
- www.electronics-tutorials.com

C)Magazines:

- Electronics for you

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE: LINEAR INTEGRATED CIRCUITS COURSE CODE: R14EX3504
 COURSE CATEGORY : CORE CREDIT : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	-	-	50	150

Rationale:

The operational Amplifier was one of the first analogue integrated circuits, because of its usefulness as a building block in many circuit designs. This course includes the important practical guidelines about the design of linear and non-linear op-amp circuits.

Today the growth of any industry depends upon electronics to great extent. Contents of this subject are the basic building blocks of different analog circuits.

Prerequisites various devices and circuits studied in Electronic Lab Practices and Semiconductor Devices and Circuits. Prospects- LSI, MSI, VLSI.

Objectives:

The students will be able to

- Compare various Linear ICs
- State the practical applications of linear ICs.
- State advantages & drawbacks these applications.
- Measure the OP Amp parameters.
- Draw and analyze the circuits of operational amplifiers, Oscillator, f/b amplifier and timers.
- Explain the concept of active filter circuit and its application

Course Details:

UNIT	NAME OF THE REVISED TOPIC	HOURS	MARKS
1	Differential Amplifier: 1.1 Differential Amplifier, Circuit Diagram, working, calculation f or gain, CMRR. 1.2 OP-AMP: Concept, fabrication, basic building block of typical - 741. 1.3 Parameters of Op-Amp: Input offset voltage, Input offset current, Input bias current, differential input resistance, Input capacitance, Input voltage range, offset voltage adjustment range, Common Mode Rejection Ratio (CMRR), Supply Voltage Rejection Ratio(SVRR), large signal voltage gain and transfer characteristics supply voltages, supply current, output voltage swing, output resistance, slew rate, gain bandwidth product 1.4 Typical parameter comparisons 741, 351.	08	12

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2	<p>Op-Amp Configuration:</p> <p>2.1 Open loop and closed loop configuration of Op-Amp, its comparison. Virtual ground, virtual short concept. Open loop configuration – Inverting , Non-inverting Close loop configuration – Inverting, non- inverting, Differential amplifier, unity gain amplifier (voltage follower), inverter(sign changer)</p> <p>2.2 Inverting and non-inverting configuration of Adders (summing amplifier, scaling Amplifier, averaging amplifier) Subtractor. Basic Integrator and Basic Differentiator - working, waveforms and practical circuit. Basic concept of frequency compensation of Op-Amp and Offset nulling. Numerical based on designing of above circuit.</p>	12	12
3	<p>Applications of Op-Amp:</p> <p>3.1 Instrumentation Amplifier : Circuit diagram, operation, derivation of output voltage Equation. Advantages and applications of Instrumentation amplifier. Pin diagram pin functions and specifications of IC LM 324 Voltage to current converter (with floating load, with grounded load) Current to voltage converter.</p> <p>3.2 Sample and hold circuit. Logarithmic and antilogarithmic amplifiers (using Diodes) Precision rectifier - half wave and full wave Comparator: Circuit diagrams and operation of</p> <ul style="list-style-type: none"> • Zero crossing detector, • Schmitt trigger, • Window detector, • Peak to peak detector <p>3.3 IC339-Quad voltage comparator, IC710 voltage comparator.</p>	12	16
4	<p>Multivibrators:</p> <p>4.1 IC 555 internal block diagram, Pin Diagram. 4.2 IC 555 operation as Monostable multivibrator circuit diagram, operation and waveforms generation 4.3 IC 555 operation as Astable multivibrator circuit diagram, operation and waveforms generation 4.4 Expression for Time Period, limitations, specifications 4.5 Numerical on astable and monostable multivibrator.</p>	10	12
5	<p>Filters:</p> <p>5.1 Introduction to filters ,Classification of filters, 5.2 Concept of passive and active filters 5.3 Merits and demerits of active filters over passive filters 5.4 Ideal and actual characteristics, terms: - cut off frequency, Pass band, Stop band, center frequency, roll off rate, BW, Q-factor, first order and second order Butterworth filters, order of filter, Low pass filter, high pass filter, band pass filter (wide band pass , narrow band pass filter) Band reject filter(wide band reject, narrow band reject filter), all pass filter. Numerical based on design of different filters.</p>	14	16

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6	Oscillators: 6.1 Concept of oscillators, 6.2 Types of oscillators: Phase shift oscillators, Wien bridge oscillators using IC-741 Types of Multivibrators: Monostable, Astable, Bistable using IC-741. Schmitt trigger, voltage controlled oscillator (VCO) using IC-555.	08	12
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Teaching Methodology:

Chalk-Board, Group discussion, Power Point Presentation, Expert Lectures.

A)TERM WORK :

Skills to be developed:

i) Intellectual Skills:

Students will be able to

- Identify the pin numbers of OPAMP ICs
- List the components for various circuits
- Design various OPAMP and TIMER based circuits

ii) Motor Skills:

Students will be able to

- Assemble various circuit using OPAMP
- Measure various parameters of OPAMP
- Calibrate the response of filter
- Draw graph of OPAMP and TIMER

Professional Practices:

- 1.Seminar related to Applications of OPAMP.
- 2.Videos search related to operation of Oscillators Using IC741.
- 3.Datasheets search through manufacturers, catalogue, internet, magazines, books etc. and submit a report on it.

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List of Practical's:

- 1.Measurement of Op-amp Parameter- Bias current, Input offset V & I, Open loop gain, Slew rate.
Measurement of Op-amp Parameter- CMRR, input, output impedance and frequency response of IC 741.
- 2.INV, NON INV, Summing & Subtraction Amplifier using IC 741.
- 3.Design Integrator & Differentiator Circuits using IC 741.
- 4.Instrumentation Amplifier using IC 741.
- 5.To perform precision Rectifier using IC 741.
- 6.Assemble and perform Comparators- Zero crossing Detector and Peak to Peak Detectors.
- 7.Assemble Schmitt Trigger using IC 555 and plot output waveform & find out UTP & LTP.
- 8.Design Astable Multivibrator using IC 555.
- 9.Design Monostable Multivibrator using IC 555.
- 10.To perform Wein bridge Oscillator using 741.
- 11.To perform RC Phase Shift Oscillator using 741.
- 12.To plot the frequency response of High Pass & Low Pass Filter Circuits using IC 741.

Learning Resources:

A) Books

SR.NO	TITLE	AUTHOR	PUBLISHER
1	Op-amp & Linear Integrated Circuits	Ramakant Gaikwad	Prentice-Hall India
2	Integrated Circuits	K.R. Botkar	S. Chand Publication
3	Op-amp & Linear Integrated Circuits	Loughlin Driscott	Prentice-Hall India
4	Serigo Franco	Design with Operational Amplifier and Analog Integrated Circuit	Tata-McGraw Hill
5	Willam D. Stanley	Operation Amplifier with Linear Integrated Circuit	Person

B)Magazines:

- Electronics for You

C)Software:

- Multisim

D) Web sites for references:

- www.onesmartclick.com/engineering/linear-integrated-circuits
- www.ntteinc.com/linear_web
- www.analog.com/UploadedFiles/Application_Notes
- www.core-ic.com/inventory/simplesearch
- www.ee.latrobe.edu.au/internal/workshop/datasheet

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE: DATA STRUCTURE AND FILES COURSE CODE: R14EX3505
COURSE CATEGORY: CORE CREDITS: 04

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	-	2	3	80	20	-	-	50	150

Rationale :

This course covers the fundamentals of data structures. This includes the study of operations on Arrays, stack, queue, linked list and tree. This course helps to calculate the time complexity and space complexity of algorithms.

Objectives :

Ideally this course should act as a primer/pre-requisite for fundamentals of programming. On completion of this course, students are expected to be capable of understanding the data structures, their advantages, how to implement them in C, how their drawbacks can be overcome and what the applications are and where it can be used.

- Students should be able to learn about the data structures/ methods/algorithms mentioned in the course with a comparative perspective so as to make use of the most appropriate data structure/ method/algorithm in a program to enhance the efficiency .(i.e. reduce the run-time) or for better memory utilization, based on the priority of the implementation. Detailed time analysis of the graph algorithms and sorting methods are expected to be covered but it is expected that the students will be able to understand at least the efficiency aspects of the graph and sorting algorithms covered in this course.
- The students should be able to convert an inefficient program into an efficient one using the knowledge gathered from this course.

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COURSE DETAILS:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	<p>Algorithms : Definition and characteristics, Algorithm Design tools, Pseudo-code, Algorithm efficiency and analysis, time and space analysis of algorithms. Program development steps</p> <p>Sparse matrix – Component of space complexity, its implementation and usage, Operations on Sparse matrix</p> <p>Searching algorithms: Sequential search, binary search and analysis of these algorithms</p> <p>Sorting Algorithms : Bubble sort, insertion sort, selection sort</p>	12	16
2.	<p>Data Structure: Why we need data structure?</p> <p>Concepts of data structures: a) Data and data structure b) Abstract Data Type and Data Type. Ordered list, Polynomial as an ordered list. Structure representation of polynomials, Array representation of polynomials.</p> <p>File Handling- Introduction - File , Opening and closing a file</p>	10	12
3.	<p>Singly Linked Lists: Concept, Linked List as ADT, Representation of Linked list in Memory, Traversing a linked list, Searching a linked list, Memory Allocation; Garbage collection, Insertion into Linked list, Deletion from a linked list, Header Linked List, Representation of polynomial, Circularly Linked list, Doubly Linked List.</p>	10	12
4.	<p>Stacks: Concept, Array representation of stacks, Linked representation of stacks, Stack as ADT, Arithmetic expressions; Polish notation. Application of stacks: Recursion, Implementation of recursive procedures by stacks.</p> <p>Queues: Concept, Array representation of queues, Linked representation of queues, Queue as ADT, Circular queues, Dequeues, Priority queues. Application of queues: Categorizing data, Simulation of queues.</p>	12	16
5.	<p>Nonlinear Data structures – I: Trees Basic terminologies, forest, tree representation (using array, using linked list). Binary trees - binary tree traversal (pre-, in-, post- order), threaded binary tree (left, right, full) - non-recursive traversal algorithms using threaded binary tree, expression tree. Binary search tree- operations (creation, insertion, deletion, searching).</p>	12	12

6.	Nonlinear Data structures – II: Graphs Graph definitions and concepts, Graph representations/storage implementations – adjacency matrix, adjacency list, adjacency multi-list. (directed/undirected graph, weighted/un-weighted edges, sub-graph, degree, cut-vertex/articulation point, pendant node, clique, complete graph, connected components – strongly connected component, weakly connected component, path, shortest path, isomorphism). Graph traversal and connectivity – Depth-first search (DFS), Breadth-first search (BFS) – concepts of edges used in DFS and BFS (tree-edge, back-edge, cross-edge, forward-edge), applications. Minimal spanning tree – Prim’s algorithm (basic idea of greedy methods). AOV network-topology sort, critical path method	8	12
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Teaching Methodology:

- 1) Chalk board , Group discussion , Guest lectures , Power Point Presentations

Term work:

Skills to be developed:

1. Intellectual Skills:

- Able to write a program to implement Stack, queue, array, sorting and searching
- Able to test and debug the programs
- Able to Interpretation of output.
- Understanding the application of data structures.

ii) Motor Skills:

- Ability to draw flowcharts of program.
- Ability to show input-output bindings

Softwares Required : .

TC , TCPP, Dosbox

List of practical's:-

1. Program to implement structure operation
2. Program to implement array operation
3. Program to implement sparse matrix operation
4. Program to implement sequential search
5. Program to implement binary search
6. Program to implement bubble sort
7. Program to implement selection sort
8. Program to implement file handling functions
9. Program to implement of linked lists operations
10. Program to implement Stack and Queue operations
11. Program to implement binary tree
12. Program to implement Graph

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A) Books

SR. NO.	TITLE	AUTHOR	PUBLISHER
1.	Fundamentals of Data Structures of C	Ellis Horowitz, Sartaj Sahni, Susan Anderson-freed	Galgotia Publishing Co., 3 RD New Delhi, Edition, 2008.
2.	Data Structures in C	Aaron M. Tenenbaum.	PHI Publications, 2nd Edition, 2007
3	Data Structures	S. Lipschutz	Schaum's Outline Series, TMH, 2008
4	Data Structures and Files Using C	Abhyankar Abhay. K	C- Aditi Publications, 2 nd Edition.
5	Data structures	Behrouz A. Forouzan	Cengage Learning

B) Web sites for reference :

- 1.[http:// www.academictutorials.com/data-structure/](http://www.academictutorials.com/data-structure/)
- 2.<http://www.datastructures.info>
- 3.<http://academicearth.org/courses/data-structures>
- 4.http://www.algolist.net/Data_structures/
- 5.<http://www.csse.monash.edu.au/~dwa/Animations/index.html>
- 6.<http://www.algoanim.info/Animal2/?q=taxonomy/term/27>

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE NAME: COMMUNICATION SYSTEM-II COURSE CODE: R14EX3506

COURSE CATEGORY: CORE

CREDIT: 06

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	-	50	200

Rationale:

Modern telecommunication systems have growing demands of increasing data rate. This subject enable students to comprehend different digital modulation schemes which have different data rates and bandwidths. This subject gives basic idea about finite set of discrete messages, the key processing steps at the transmitter, channel, receiver and ultimately the information sink. This subject familiarize students with formatting and source coding, band pass signaling, equalization, channel coding, multiplexing and multiple access, spreading and synchronization.

Objectives: The students will be able to understand

- Fundamental principles of pulse code modulation.
- Fundamental principles of Delta Modulation.
- Fundamental principles of Digital CW modulation techniques.
- Basics of coding techniques.
- Basics of multiplexing and multiple access schemes.
- Fundamentals of information theory and probability.
- Spread spectrum modulation and their different methods.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
01	Digital pulse modulation Techniques: - 1.1 PCM- block diagram and working 1.2 Concept of Quantization linear and nonlinear 1.3 Concept of Companding 1.4 Concept of ISI, eye pattern 1.5 Numerical based on nyquist rate & PCM 1.6 DM-transmitter and receiver block diagram and working 1.7 Slope overload and granular noise 1.8 ADM- transmitter and receiver block diagram and working 1.9 DPCM- transmitter and receiver block diagram and working, 1.10 Vocoder	12	16

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02	<p>Probability and Information theory:-</p> <p>2.1 Introduction to probability.</p> <p>2.2 Definitions- outcome, random expt , random events, sample space, mutually exclusive events, intersection of events, occurrence</p> <p>2.3 Probability of random events-concept</p> <p>2.4 Concept of Joint probabilities.</p> <p>2.5 Concept of Conditional probability.</p> <p>2.6 Concept of bit rate, baud rate, information, Message.</p> <p>2.7 Concept of Average information(Entropy), information rate with numerical</p>	10	12
03	<p>Coding techniques:-</p> <p>3.1 Line coding-unipolar, bipolar RZ, NRZ,</p> <p>3.2 Split phase Manchester, AML-waveform representation & concept</p> <p>3.3 Source coding- ASCII,EBCDIC</p> <p>3.4 Huffman coding</p> <p>3.5 Channel coding- concept of error, causes of error, their effects</p> <p>3.6 Error detection and correction using parity with numerical</p> <p>3.7 Error control codes, check sum, VRC, LRC</p> <p>3.8 Hamming code and Hamming Distance</p>	10	12
04	<p>Digital CW Modulation techniques:-</p> <p>4.1 Transmitter, receiver block diagram, working with waveform, bandwidth and constellation diagram of following</p> <p>4.1.1 ASK</p> <p>4.1.2 FSK</p> <p>4.1.3 PSK</p> <p>4.1.4 DPSK</p> <p>4.1.5 QPSK</p> <p>4.1.6 8-QAM</p> <p>4.1.7 M-ary communication system</p> <p style="padding-left: 20px;">4.1.7.1 M-ary PSK</p> <p style="padding-left: 20px;">4.1.7.2 M-ary FSK</p> <p>4.2 Comparison of all shift keying techniques</p>	12	16
05	<p>Multiplexing and multiple access:-</p> <p>5.1 Need of multiplexing</p> <p>5.2 Concept of multiplexing</p> <p>5.3 TDM,FDM</p> <p>5.4 CDM, SDM, Spatial Multiplexing</p> <p>5.5 Comparison of all</p> <p>5.6 Duplexing in time and frequency domain</p> <p>5.7 TDMA,FDMA</p> <p>5.8 CDMA,SDMA</p>	10	12
06	<p>Spread spectrum techniques:-</p> <p>6.1 Concept of spreading the spectrum</p> <p>6.2 Advantages of spread spectrum</p> <p>6.3 Properties of PN sequence</p> <p>6.4 FH-SS- transmitter and Receiver block diagram & working</p> <p>6.5 Slow FHSS and fast FHSS</p> <p>6.6 Direct Sequence spread Spectrum- transmitter and Receiver block diagram & working</p> <p>6.7 Comparison of DS-SS and FH-SS</p> <p>6.8 Application of FHSS</p>	10	12

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Teaching Methodology: Chalk board, Group discussion, Guest lectures, Power Point Presentations

Term work:

Skills to be developed:

i) Intellectual Skills:

- Identification of different digital modulation techniques and codes.
- Understanding the comparison between different modulation techniques.
- Interpretation of various waveforms.
- Understanding the application of various modulation processes.

ii) Motor Skills:

- Ability to draw waveforms for various digital modulation schemes.
- Ability to draw and compare various line codes.

List of Practical :

1. Study of Pulse code modulation and demodulation using direct synchronization technique.
2. Study of Delta modulation and demodulation.
3. Study of Adaptive Delta modulation and demodulation.
4. Study of effect of parities and Hamming code on PCM data.
5. Study of various data encoding and decoding techniques.
(A) NRZ-L, NRZ-M, NRZ-S, BIO-L, BIO-M, BIO-M, BIO-S.
(B) AMI encoding and decoding.
6. Study of various carrier modulation and demodulation techniques.
(A) ASK modulation and demodulation.
(B) FSK modulation and demodulation.
(C) PSK modulation and demodulation.
7. Study of QPSK modulation and demodulation.
8. Study of QAM modulation and demodulation.
9. Study of TDM using direct synchronization technique.
10. Study of DS-SS coherent PSK.
11. Study of PN sequence generator.
12. Study of FH-SS.

Professional practices:

1. Search of applications of various continuous modulation and spread spectrum techniques in different advanced communication techniques and write a report on it.

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Learning Resources:

A)Books:

NO	TITLE	AUTHOR	PUBLISHER
1	Electronic Communication System	Kenedy, Devis	McGraw Hill
2	Electronic Communication System	Roddy Coolen	PHI
3	Principle of Communication System	Taub shelling	McGraw Hill
4	Digital and Analog communication system	K.Sam Shanmugam	Willey publication
5	Principals of electronic communication system	Louis. E.Frenzel	McGraw Hill
6	Wireless communications principles and practice	Thodore S. Rappaport	Pearson

B)Web sites for references:

- <http://goavendano.tripod.com/pulsemod.pdf>
- http://www.eecs.yorku.ca/course_archive/2010-11/F/3213/CSE3213_09_PCM_F2010.pdf
- <http://www.utdallas.edu/~torlak/courses/ee4367/lectures/CodingI.pdf>
- <http://ee.eng.usm.my/eeacad/mandeep/EEE436/CHAPTER2.pdf>
- http://course.ee.ust.hk/elec214/12spg-Song/notes/Elec3100_2012_Ch11_Multiplexing_Final.pdf
- http://www.cs.ucy.ac.cy/courses/EPL657/Fundamental_Concepts.pdf
- <http://elearning.vtu.ac.in/P6/enotes/EC6/Unit7-SU.pdf>
- <http://fetweb.ju.edu.jo/staff/EE/jrahhah/PDF/SpreadSpectrum3.pdf>

C)Magazines:

- Electronics for you
- Digit

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE: SIGNALS & SYSTEMS

COURSE CODE: R14EX3507

COURSE CATEGORY: CORE

CREDITS: 06

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	-	2	-	-	-	-	@50	50	100

Rationale:

This course will introduce the theoretical foundations and practical implementation of signals, systems and transforms.

The goals of the course can be summarized as follows:

- Understanding the fundamental characteristics of signals and systems.
- Understanding signals and systems in terms of both the time/space and transform domains, taking advantage of the complementary insights and tools that these different perspectives provide
- Development of the mathematical skills to solve problems involving convolution, filtering, modulation and sampling.
- Make basic use of professional tools such as Matlab for signal and system analysis.

Objectives:

On successful completion of this course, all students will have developed knowledge and understanding of:

- To understand the representation and classification of signals
- To understand the basics of signal analysis using transforms
- To analyze the linear time invariant systems using Fourier, Laplace Transforms and state equations.
- To study the analysis of Discrete Time signals using DFT and Z-transforms.
- To find the frequency response of linear time invariant discrete time system using FFT and Z-transform analysis.

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COURSE DETAILS:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	SIGNAL: 1.1 Signal modeling. 1.2 Continuous time signal 1.3 Discrete Time Signal. 1.4 Elementary Discrete Time Signals. 1.5 Unit step, Unit Ramp 1.6 Unit Parabolic 1.7 Impulse Function, Properties of Impulse function 1.8 Rectangular function, triangular function 1.9 Signum function , Sinc function 1.10 Gaussian function 1.11 Real and Complex exponential function 1.12 Examples based on above functions	5	
2.	ELEMENTARY DISCRETE TIME SIGNALS: - 2.1 Representation of discrete time signals 2.2 Unit step 2.3 unit Ramp 2.4 Unit sample sequence 2.5 exponential signals 2.6 Examples based on above functions	5	
3.	BASIC OPERATIONS ON SIGNALS:- 3.1 Time shifting 3.2 Time Reversal 3.3 Time scaling 3.4 Amplitude scaling 3.5 Signal multiplier 3.6 Signal addition 3.7 Examples Based on signal operations	5	
4.	CLASSIFICATION OF SIGNALS: - 4.1 Continuous Time and Discrete Time signals 4.2 Deterministic and Random signals 4.3 Periodic and Aperiodic signals 4.4 Even and odd signals 4.5 Energy and Power signals 4.6 Causal and non-causal signals 4.7 examples based on classification of signals	5	
5.	INTRODUCTION TO SYSTEMS:- 5.1 A system, Classification of systems 5.2 Continuous-time and Discrete-time systems 5.3 Lumped parameter and Distributed parameter systems 5.4 Static, Dynamic 5.5 Causal, Non-causal 5.6 Linear, Non-Linear 5.7 Time-invariant, Time-variant 5.8 Stable, Unstable 5.9 Examples based on systems 5.10 system modeling	5	

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6.	Time-domain Analysis of Continuous and Discrete time systems :- 6.1 Representation of Continuous Discrete time signal in terms of Impulses 6.2 Convolution and their properties. 6.3 Causality , FIR and IIR systems. 6.4 BIBO Stability 6.5 Correlation 6.7 Sampling 6.8 Fourier Series 6.9 Introduction to Fourier transform and properties 6.10 Introduction to Z- transform and properties	7	
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Teaching Methodology:

Chalk board, Seminars, Group discussions, Power Point Presentations

Skills to be developed:

i)Intellectual Skills:

- Understanding various operations on signals by graphical method.
- Understand the behavior of signals in time domain and frequency domain.
- Interpretation of mathematical model of signal with graphical plot.

ii)Motor Skills:

- Representation of mathematical model of signal.
- Testing various signals in frequency and time domain.

Professional Practices:

- 1.Generation and operation on signals using C Language.
- 2.Observation of various signals on spectrum analyser.

List Of Practical's:-

Sr. No.	Name of Experient
1.	Matlab Commands
2.	Matlab Exercise
3.	Generate the following signals using MATLAB. i) Sine ii) Square iii) Sawtooth iv) Exponential waves
4.	Generate the following signals using MATLAB. i) Sinc ii) triangular pulse iii)rectangular pulse iv) signum function
5.	To generate unit step sequence, sinusoidal sequence, exponential sequence and addition of two sinusoidal sequences
6.	To generate impulse, unit step and ramp sequence
7.	To generate the user defined Generate the signals
8.	Creating functions in Matlab
9.	To generate amplitude scaling, time scaling and time shifting of a given signal
10.	Obtaining convolution of two given sequences
11.	To verify sampling theorem
12.	To find n-point DFT using FFT function of the given sequence and plot of magnitude and phase response
13.	To find n-point DFT using formula of the given sequence and plot of magnitude and phase response

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A)Books:-

SR. NO.	TITLE	AUTHOR	PUBLISHER
1.	Signals and Systems	P. Ramesh Babu,	SCITECH Publications.
2.	Signals and Systems	Roberts	TATA McGraw Hills.
3.	Signals and Systems	Chen	Oxford University, Press.
4.	Matlab & Its Applications I Engineering	Raj Kamal Bansal	Pearson Education

B)Web Sites for further readings

- <http://nptel.ac.in/courses>
- <http://users.ece.gatech.edu/~bonnie/book/TUTORIAL/tutorial.html>

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE : APPLIED ELECTRONICS COURSE CODE: R14EX4501
 COURSE CATEGORY : APPLIED CREDIT : 6

Teaching and Examination Scheme :

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	50	-	50	200

Rationale :

As an applied technology subject, it intends to teach operating principle and application of electronic circuits and devices like amplifiers, oscillators, switching circuits, wave shaping circuits. The subject knowledge is required in Industrial electronics, Instrumentation and Communication system. Understanding of the subject will provide skill to the students for trouble shooting & testing of some of circuits & devices.

Objectives :

The students will be able to :

- Test SCR, TRIAC, DIAC, UJT, PUT, FET & MOSFET.
- Classify various amplifiers & oscillator circuits based on their characteristics.
- Analyze Triggering & commutation circuits.

UNIT	NAME OF THE REVISED TOPIC	HOURS	MARKS
1	Electronics Devices & Thyristor family :- 1.1 Power diode Constructional detail, symbol, Operation and Characteristics ,Typical Ratings and simple application circuits. 1.2 SCR Constructional detail, symbol ,Operation and Characteristics -V _{bo} , I _L , I _H , V _{bd} , equivalent circuit ,Typical Ratings and simple application circuits. 1.3 TRIAC Constructional detail, symbol ,four quadrant Operation and V-I Characteristics ,Typical Ratings and equivalent circuit ,simple application circuits. 1.4 GTO Constructional detail, symbol ,Operation and V-I Characteristics, Typical Ratings and equivalent circuit of GTO, simple application circuits.	12	16

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2	<p>Triggering devices :-</p> <p>2.1 DIAC Constructional detail, symbol , Operation and V-I Characteristics Typical Ratings and equivalent circuit ,simple application circuits .</p> <p>2.2 UJT Constructional detail, symbol , Operation and V-I Characteristics Typical Ratings and equivalent circuit ,simple application circuits .</p> <p>2.3 PUT Constructional detail, symbol , Operation and V-I Characteristics Typical Ratings and equivalent circuit ,simple application circuits , Comparison with UJT.</p> <p>2.4 LASCR Constructional detail, symbol , Operation and V-I Characteristics, Typical Ratings, simple application circuits, Comparison with SCR.</p>	10	12
3	<p>Principle of Triggering & Commutation circuit</p> <p>3.1 Turn on method of SCR & Triac - Large $V_{AK} \geq V_{BO}$.</p> <p>3.2 Gate triggering.</p> <p>3.3 dv/dt triggering.</p> <p>3.4 Turn on requirement .</p> <p>3.5 Triggering circuit.</p> <p>3.6 Turn off mechanism .</p> <p>3.7 Turn off circuit.</p> <p>3.8 Commutation methods Class-A, Class-B, 3.9 Class-C, Class-D, Class-E with Waveforms.</p>	10	12
4	<p>FET & MOS FET DEVICES:-</p> <p>1.1 Introduction to FET with principle, Advantage and disadvantage.</p> <p>1.2 Basic construction of JFET, symbolic representation, Classification as P and N channel JFET, Characteristics curves –Channel,ohmic regions and pinch-off region.</p> <p>1.3 Characteristic parameters of JFET (rd,gfs, amplification factor,idss,pd,igss).</p> <p>1.4 Need of biasing in JFET and types- voltage, self and fixed biasing methods.Comparison of BJT and FET .</p> <p>1.5 Examples on parameters of JFET (rd,gfs, amplification factor,idss,pd,igss).</p> <p>1.6 Introduction to MOSFET , operating principle, Comparison of BJT / FET/MOSFET .</p>	10	12
5	<p>Negative feedback amplifier and oscillator :-</p> <p>5.1 General theory of feedback, Positive and negative feedback.</p> <p>5.2 Advantage and disadvantage of negative feedback with Comparison of positive and negative feedback .</p> <p>5.3 Different types of negative feedbacks voltage series feedback, voltage shunt feedback , current series feedback, current shunt feedback .</p> <p>5.4 Simple examples on parameters of negative feedback amplifier</p> <p>5.5 Requirement of positive feedback with Criterion for sustained oscillations.</p> <p>5.6 Tank circuit and Types of oscillators</p> <p>5.7 RC phase shift oscillator with design and examples</p> <p>5.8 Crystal oscillator with design and examples.</p>	12	16

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6	Industrial Applications of FET and MOSFET 6.1 FET as a common source amplifier. 6.2 FET as a common drain amplifier. 6.3 FET as a common gate amplifier. 6.4 Dual gate FET mixer. 6.5 FET as voltage variable resistor. 6.6 Differential amplifier using FET. 6.7 MOSFET as a switch. 6.8 Application of DEMOSFET as amplifier. 6.9 EMOSFET as linear amplifier. 6.10 CMOS inverter.	10	12
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Teaching Methodology: Chalk-Board, discussion, Power Point Presentation, Group discussions, Expert Lectures.

A)Term Work : Skills to be developed :

i) Intellectual Skills :

- Ability to explain oscillators at various frequencies.
- Ability to explain the voltage regulators.

ii) Motor Skills :

- Ability to plot and verify the characteristics of thyristor family.
- Ability to measure parameters of feedback amplifiers.

List of Practicals :-

- 1.To plot and verify Transfer and Drain Characteristics of FET & MOSFET.
- 2.To plot and verify V-I Characteristics of SCR .
- 3.To plot and verify V-I Characteristics of TRIAC, DIAC.
- 4.To verify operation of UJT as a relaxation oscillator.
- 5.Measurement of parameters of FET Common Source amplifier.
- 6.To verify operation of FET as voltage variable resistor.
- 7.To test amplifier circuit with voltage series ,shunt type of feedbacks.
- 8.To test amplifier circuit with current series ,shunt type of feedbacks.
- 9.To test given oscillator circuits-RC Phase shift.
- 10.To plot waveforms of triggering circuit of SCR.
- 11.To verify operation of MOSFET as switch.
- 12.To study and verify operation of commutation circuit class A,Class B.

Professional Practices:

1.	Arrange a group discussion on conservation of energy and how each one of us can contribute in it.
2.	Visit a nearby company and find the specification of Inverter used by them.

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Learning Resources :

A) Books :

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Electronic Principles	Paul Malvino	Tata McGraw-Hill
2	Electronics Devices & Circuits	AllenMottershed	Prantice Hall India
3	Pulse Digital & Switching Waveforms	J.Millman and H.Taub	Tata McGraw-Hill
4	Pulse & Digital Electronics	G.K.Mittal and A.R.Varvasai	Khanna Publication

B) Magazines:

- Electronics Maker
- Electronics for You

C) Web sites for references:

- www.knovel.com.
- ieee-ies.org.
- www.industrialelectronics.com.
- www.ralphselectronics.com.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE: ELECTRONICS CIRCUIT DESIGN COURSE CODE: R14EX4502
COURSE CATEGORY: APPLIED CREDITS: 04

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
2	-	2	-	-	-	-	25	25	50

Rationale:

The nature of electronics design continues to change rapidly with the introduction of more complex performance objectives. The basic designs strategies is the key knowledge for designing complex circuit design. The whole course knowledge as an electronic engineer is to be implemented practically for different systems.

Objectives:

The students will be able to

- Implement the knowledge of other subjects which they learn theorally
- Understand the level of design and design strategies.
- Implement paper design to working systems.

COURSE DETAILS:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	DISCRETE ANALOG CIRCUITS: Rectifiers To design a rectifier for a given average output DC voltage and a given load resistance, compare between the theoretical values of Vdc, Vrms, RF, HD, output regulation, transformer utility factor etc.	6	
2.	DC power supplies regulation and protection circuits: To learn designing a series transistor based output regulation circuit, an output current limiting circuit, fold back circuit needed for a given output parameters. To design IC regulator circuits like 723 , 78XX and 79XX series regulators.	5	

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3.	Switch Mode Power Supply Design (SMPS): Need of switch mode power supply. Comparison of linear and switch mode power supply. Working principle of SMPS with block diagram. Switching regulator basic configuration Block diagram of basic step down regulators. Block diagram and working of LM 3524 Specifications of LM3524 Step down switching regulator design Step up switching regulator design	5	
4.	Audio Amplifier Design: a) Single stage audio frequency voltage amplifier with BJT class A , class B and amplifiers with FET b) Amplifier design with audio amplifier IC like LM 380, TBA810	6	
5.	OP AMP based analog circuit design: a) Inverting and Non inverting Amplifier design b) Adder and subtractor c) Comparator/Voltage level detector d) Active filters- LP, HP,BP(FIRST ORDER) e) IC 555 based monostable and astable (50 % duty cycle) f) Oscillators g) Function generators, IC 8038	5	
6.	DIGITAL LOGIC CIRCUIT DESIGN a) BCD to 7-Seg Decoder b) 4-Digit frequency counter c) Designing logic circuits using MUX and DMUX d) Designing sequential circuits like shift registers e) D/A converter	5	

Teaching Methodology : Chalk-Board, Group Discussion, Power Point Presentation, Transparency, Expert Lectures.

Term Work :

Skills to be developed

i) Intellectual Skills:

- Ability to interpret the different specifications of Electronic components ,devices and analog & digital ICs from data sheets.
- Ability to identify the terminology of the devices and ICs.

ii) Motor Skills:

- Ability to make proper connection of electronic circuits on bread board and test it.
- Ability to make PCB . Its fault finding and troubleshooting.

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List of practical's:- (Any 10 practicals)

1. Circuit Tracing
2. Design of Half wave rectifier for given specification.
3. Design of Full wave rectifier for given specification.
4. Design of regulated power supply using IC 723 Regulator
5. Design of regulated power supply using IC 78xx series Regulator
6. Design of single stage BJT-CE amplifier.
7. Design of Op-Amp oscillator.
8. Design of Active filters.
9. Design of UJT Relaxation Oscillator.
10. Design of Schmitt Trigger circuit .
11. Design of Instrumentation Amplifier.
12. Design of fan speed regulator using Triac.
13. Design of transformer less power supply.

A) Books:

SR. NO.	TITLE	AUTHOR	PUBLISHER
1.	Electronic Circuit Design	S.N Talbar	Jeevandeep Prakashan
2.	A monograph on Electronic Design Principles	N.C Goyal & R.K. Khetan	Khanna Publishers

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE : POWER ELECTRONICS COURSE CODE: R14EX4503
 COURSE CATEGORY : APPLIED CREDIT : 6

Teaching and Examination Scheme :

Teaching Scheme			Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	-	--	25	125

Rationale:

Power electronics is a branch of engineering devoted to conversion & control of electric power using electronic converters based on semiconductor power switches, like thyristor power transistor, power MOSFET, IGBT. The vast application area of power electronics include power conditioner, electric lighting, power distribution , generation , transmission , process control & factory automation & electromechanical application like welding, electroplating, induction heating etc.

Objectives:

The student will be able to:

- Describe operating principle of semiconductor power electronic switches.
- Test SCR & MOSFET, and IGBT.
- Understand need of control and driving circuits.
- Analyse few simple industrial circuits like controlled rectifiers and inverters.
- Describe ac phase control method to control output power.
- Understand UPS and able to calculate VA ratings and back up times.

UNIT	NAME OF THE REVISED TOPIC	HOURS	MARKS
1	Power switching Devices: 1.1 Power BJT Constructional detail symbol, operation, Characteristics: input and output Characteristics (cutoff, saturation and linear regions). 1.2 MOSFET Constructional detail symbol, operation, Characteristics: steady state characteristics: transfer and input and output Characteristics (cutoff, saturation and linear regions), Types Enhancement and depletion type, Comparison of Enhancement and depletion type, Equivalent circuit, Typical Ratings. 1.3 IGBT Constructional detail symbol, operation, Characteristics: steady state characteristics: transfer and input and output Characteristics(cutoff, saturation and linear regions), Types : punch through and non punch through type, Comparison of punch through and non punch through type Equivalent circuit, Typical Ratings . 1.4 Control and driving circuits Simple driving circuits, Totem pole driving circuits , Isolated driving circuits, Pulse transformer and Optocoupler type.	12	16

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2	Controlled Rectifiers - 2.1 Single phase half wave controlled rectifier: circuit operation and waveforms with R load . 2.2 Single phase half wave controlled rectifier: circuit operation and waveforms R-L load. 2.3 Effect of freewheeling diode. 2.4 Single phase Centre tap full wave controlled rectifier: circuit operation and waveforms with R load . 2.5 Single phase Centre tap full wave controlled rectifier: circuit operation and waveforms R-L load. 2.6 Single phase controlled bridge rectifier circuit operation with waveforms R and R-L load. 2.7 Single phase controlled Semiconverter rectifier circuit operation with waveforms R and R-L load. 2.8 Three phase controlled converter – three pulse converter circuit operation and waveforms . 2.9 Six pulse converter circuit operation and waveforms. 2.10 Three phase controlled bridge converter circuit operation and waveforms for R and RL load.	10	12
3	Choppers – 3.1 Basic chopper circuit operation and waveforms. 3.2 Classification of chopper: according to o/p voltage. 3.3 Step up circuit operation and waveforms and derivation of o/p voltage. 3.4 Step down chopper circuit operation and waveforms and derivation of o/p voltage. 3.5 Numerical on Step Up and Step Down chopper. 3.6 Control strategies : Time ratio control (constant frequency and variable frequency method) . 3.7 Jones chopper circuit operation and waveforms. 3.8 Multiphase chopper circuit operation and waveforms . 3.9 Ac chopper circuit operation and waveforms. 3.10 Chopper control of Dc series motor.	10	12
4	Inverters- 4.1 Single phase inverter-Principle and operation of half-bridge and waveforms,R ,R-L load. 4.2 Single phase full bridge inverter circuit operation and waveforms R ,R-L load. 4.3 Three phase inverter- voltage source inverter. 4.4 120 degree modes of circuit operation and waveforms. 4.5 180 degree modes of circuit operation and waveforms. 4.6 Current source Inverter- 1phase capacitor commutated with R load circuit operation and waveforms. 4.7 Comparison between VSI and CSI. 4.8 PWM Techniques: Single PWM Principle and operation and waveforms. 4.9 Multiple PWM Principle and operation and Waveforms. 4.10 Sine PWM Principle and operation and waveforms. 4.11 PWM inverter: Principle and operation and waveforms.	12	16

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5	AC converters- 5.1 Single phase A.C Voltage controller. 5.2 Single phase to single phase cycloconverter circuit operation and waveforms. 5.3 Three phase cycloconverter circuit operation and waveforms.(intergroup reactor function). 5.4 Dual Converter-need and advantage . 5.5 Ideal dual converter operation and derivation. 5.6 Single phase dual converter circuit operation and waveforms . 5.7 Three phase dual converter circuit operation and waveforms . 5.8 Dual converter with and without circulating Current circuit operation and waveforms. 5.9 Comparison between non circulating and circulating current mode. 5.10 Dual mode dual converter. circuit operation and waveforms.	10	12
6	Uninterrupted Power Supply(UPS) - 6.1 Concept of Ups system and types with applications. 6.2 Block diagram of ON-Line Ups system. 6.3 Block diagram of Off Line Ups system. 6.4 Block diagram of Line-interactive Ups system. 6.5 Types of batteries. 6.6 Battery capacity and Battery efficiency-AH and WH efficiency. 6.7 Calculation of battery VA ratings with example Charger and inverter ratings and back-up times Calculations. 6.8 Examples on calculation of battery capacity and Selection. 6.9 Comparison of ON-Line Ups and Off Line UPS system.	10	12

Teaching Methodology: Chalk-Board, discussion, Power Point Presentation, Group discussions, Expert Lectures.

A) Term Work :

Skills to be developed :

i) Intellectual Skills :

- Ability to design a UPS .
- Ability to understand need of control circuits.

ii) Motor Skills :

- Ability to test the driver circuits.
- Ability to write report on industrial visit.

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List of Practicals:

- 1.To plot Transfer and Drain characteristics of power MOSFET.
- 2.To plot Transfer and collector characteristics of IGBT.
- 3.To verify Input and output waveforms of Single phase full wave controlled rectifier and calculation of Erms.
- 4.To verify Input and output waveforms of single phase semi converter and calculation of Erms.
- 5.To verify output waveforms of Single AC Voltage controller.
- 6.To verify output waveforms of AC cyclo converter.
- 7.To observe speed control of DC Motor using Dual converter .
- 8.To verify Input and output waveforms of SCR based Dc Jone's chopper.
- 9.To verify operation of speed control of DC Motor using Two quadrant Chopper.
- 10.To verify operation of UPS and calculation of KVA rating of UPS.
- 11.To verify Input and output waveforms of 3 Phase V.S.I. (voltage source Inverter).
- 12.To verify Input and output waveforms of 3 Phase CSI (Current source Inverter).

Professional Practices:

1.	Group discussion on global warming and your contribution to prevent it.
2.	Industrial visit

Learning Resources :

A)Books :

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Power Electronics 2 nd ED.	Muhammad H. Rashid	Tata McGraw Hill
2	Power Electronics	M.D.Singh & Khanchandani	Tata McGraw Hill
3	Power Electronics	P.C. Sen	PH.I
4	Introduction Thyristors	Rammorthy	East West Press Pvt. Ltd.
5	Power Electronics	Mohan/Undelend/Robbins	John Wiley & Sons
6	Power Electronics	C.W. Lander	McGraw Hill
7	Vedam Subhahmanyam	Electric drives	Tata McGraw Hill

B) Magazines:

- Electronic makers.
- Electronics today
- Electronics for You

C) Web sites for references:

- www.knovel.com
- ieeee-ies.org
- www.industrialelectronics.com
- www.ralphselectronics.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : MICROCONTROLLER AND INTERFACING DEVICES

COURSE CODE: R14EX4504

COURSE CATEGORY: APPLIED

CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	-	25	175

Rationale:

Today, Microcontroller has become an integral part of all automatic and semiautomatic machines. Remote controllers, Robotics, consumer goods that use microcontrollers, have certainly improved the functional, operational and performance-based specifications. The microcontroller 8051 and its programming, memory and I/O interfacing is covered in this subject.

The knowledge of interfacing of peripherals will help the students in acquiring the design skills and for applications like keyboard, LCD, 8255 interfacing. Microcontroller must be treated as a tool for computing and communication.

The subject will help the students understand the design of simple microcontroller systems.

Objectives:

The student will be able to:

- Differentiate between microcontroller and microprocessors.
- Understand architecture microcontroller 8051.
- Understand the programming logic and assembly language programs using instruction set of 8051.
- Explain various applications of microcontrollers.
- Familiar with PIC microcontrollers.

Course Details :

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1.	The 8051 Microcontroller 1.1 Introduction to computing –Binary ,Hex Number system(addition & Subtraction) 1.2 Comparison of Microprocessor, Microcontroller. 1.3 Overview of 8051 family 1.4 Terminology: - RISC, CISC Processors 1.5 Harvard and Von Neumann Architectures 1.6 Semiconductor Memory- Memory capacity, organization, speed 1.7 Memory types:-PROM,EPROM,EEPROM, FLASH & NVRAM 1.8 8051 pin description. Clock and reset logic. 1.9 Block diagram of 8051 and description. 1.10 Resister Bank and PSW. 1.11 Internal and external memory organization. 1.12 SFR's – Hardware addresses	12	16

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2.	8051 assembly language programming. 2.1 Software development cycle. 2.2 8051 Data Types and Directives (DB, ORG, EQU, END etc) 2.3 Development system and tools 2.4 Loop instruction and programs. 2.5 Jump instructions-conditional & unconditional 2.6 Stack –Push & Pop instructions 2.7 Subroutine – Call instructions 2.8 Programs on jump and call instruction 2.9 Time delay generation –machine cycle 2.10 Delay calculations for 8051	10	12
3.	Addressing Modes of 8051 3.1 Addressing Modes of 8051 3.2 Bit addresses for I/O and RAM 3.3 Data transfer and arithmetic instructions 3.4 Signed number concept 3.5 Logical and compare instructions 3.6 Rotate and swap instructions. 3.7 BCD & ASCII Applications 3.8 I/O Programming-bit manipulation instructions 3.9 Single bit operations-8051 Programs 3.10 8051 Programs	10	12
4.	Programming 8051 timers 4.1 Basic registers of Timer 4.2 TMOD register. 4.3 Mode 1 Programming 4.4 Mode 2 Programming 4.5 Counter programming- 4.6 TCON register 4.7 Basics of serial communication- RS232 4.8 SCON Register 4.9 Serial port programming in assembly. 4.10 Interrupt in 8051-interrupt vs polling 4.11 Level triggered & Edge triggered interrupt 4.12 IE register	12	16
5.	Memory and I/O interfacing 5.1 LCD- Basic Concept 5.2 LCD operation, pin description. 5.3 Keyboard interfacing -flowchart 5.4 Interfacing with external ROM 5.5 Interfacing with external RAM 5.6 8255 chip & features 5.7 8255 control word format(I/O)mode 5.8 Interfacing of LCD , 5.9 Interfacing of 7 segment display 5.10 Interfacing of stepper motor	10	12
6.	Introduction to PIC Microcontrollers- 6.1 PIC microcontroller overview 6.2 PIC microcontroller features 6.3 PIC 18FXX 6.4 PIC 18FXX block diagram 6.5 PIC reset action 6.6 PIC oscillator connections 6.7 PIC memory organization 6.8 Register file structure 6.9 PIC 18FXX instructions	10	12

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Teaching Methodology: - Chalk-Board, discussion, Power Point Presentation, Simulation.

Term Work:

Skills to be developed:

i) Intellectual Skills:

- Ability to design algorithms and draw flowcharts for program.
- Ability to design interfacing of memory and I/O devices to 8051 kit.
- Ability to write ALP for 8051 microcontroller.

ii) Motor Skills:

- Recognize various pins of the 8051 microcontroller
- To establish serial communication between microcontroller development board and PC.
- Ability of interfacing I/O devices with 8051 development board.

List Of Practical :

1. Study of 8051 kit and Keil simulator
2. Addition and subtraction of 8bits and 16 bits hex numbers.
3. Programming on multiplication and division
4. To develop program for finding smallest/largest number
5. Finding a Square of a given number using lookup table.
6. Ascending and descending order manipulation.
7. ALP for transfer of block of data in internal or external memory.
8. I/O Port programming using simulator –I/O port.
9. Generate square wave or rectangular wave on port pin with a program.
10. Seven segment display programming.
11. LCD display programming.
12. ALP for serial communication using RS232.
13. ALP for stepper motor interfacing.
14. Designing simple application like flashing LEDs using microcontroller 89C51, on breadboard, by programming the IC

Professional Practices:

- Searching the information of microcontroller 8051 and PIC processors.
- Submit the comparative report of 8051, PIC processors

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Learning Resources:

A)Books :-

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	The 8051 microcontroller	K Ayela Predko	Pearson Education Asia
2	The 8051 Microcontroller and Embedded Systems	M. A. Mazidi and J. G. Mazidi	Pearson Education Asia
3	The PIC Microcontroller and Embedded Systems	M. A. Mazidi and J. G. Mazidi	Pearson Education Asia
4	Embedded System Design Using The 8051 Microcontroller Family	Satish Shah	Benison Education
5	Microcontrollers – Architecture, Programming, Interfacing & System Design	Raj Kamal	Pearson Education
6	Microcontrollers –Theory and Applications	Ajay V. Deshmukh	Tata McGraw Hill Companies

B) Web sites for references:

- www.keil.com
- <http://www.ti.com>
- <http://microcontroller.com>
- www.atmel.com
- www.philips.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME IN: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE NAME : OPTICAL & MICROWAVE COMMUNICATION

COURSE CATEGORY: APPLIED

COURSE CODE : R14EX4505

CREDIT : 06

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	-	25	175

Rationale:

Modern high capacity telecommunication networks based on optical fiber technology have become an integral and indispensable part of society. Applications for these sophisticated networks range from simple web browsing and e-mail exchanges to critical healthcare diagnosis and complex business transactions. Due to importance of these networks to everyday life, users have come to expect the communication services to always be available and to function properly.

The students who are preparing themselves for electronics or communication industries need to understand theoretical, experimental analysis based on satellite, microwave and fiber optics technology. This subject familiarize students with ray theory, optical couplers, losses, optical networks, microwave devices.

Objectives:

The students will be able to understand

- Basics of fiber optic cable.
- signal propagation in fiber optic cable.
- losses in the fiber optic cable.
- Budgeting in fiber optic cable link.
- Basics of OTDR.
- working principles of optical sources and optical detectors.
- working principles of microwave devices and waveguides.
- Basics of satellite communication alongwith link calculations.

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Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Optical fiber structures and optocouplers 1.1 Optical communication systems -block diagram and working. 1.2 Advantages of Optical communication 1.3 Types of fiber optic cables, their construction 1.4 Comparison between all types of optical cables 1.5 Light propagation in fiber Optic cable 1.6 Snell's law, critical angle, acceptance angle, 1.7 numerical aperture 1.8 Numerical based on ray theory 1.9 Optical sources-LED-edge emitter LED, surface emitter LED-construction, principle of working 1.10 LASER-injection laser- construction working principle(Basic concept, absorption and emission of radiation, population inversion) 1.11 PIN photodiode - construction, working and characteristics 1.12 Avalanche photodiode - construction, working and characteristics	12	16
2	Signal degradation in optical fibers 2.1 Attenuation 2.2 Absorption due to atomic defects 2.3 Extrinsic and intrinsic absorption 2.4 linear scattering losses- linear Rayleigh scattering, Mie scattering 2.5 Nonlinear scattering losses-Raman, Brillouin 2.6 Macro bending losses 2.7 Micro bending losses 2.8 Intermodal dispersion 2.9 Intramodal dispersion	10	12
3	Optical joints and networks 3.1 Fusion splices, V- groove splicing 3.2 Elastic tube splicing 3.3 Principle requirement of good connectors 3.4 Butt joint connectors 3.5 Expanded beam connectors 3.6 Optical fiber system link budget 3.7 Rise time budget. 3.8 Numerical based on power budget 3.9 Optical network categories and topologies 3.10 Operational principal of WDM	10	12
4	Transmission Lines and waveguides : 4.1 Introduction 4.2 Characteristic impedance, line termination 4.3 Standing wave ratio, VSWR 4.4 Losses in transmission line 4.5 Types of transmission line used 4.6 Numerical based on SWR, VSWR 4.7 Rectangular wave guide 4.8 Propagation of waves through rectangular wave guides, various modes 4.9 Cut-off frequency, group velocity, phase velocity, guide wavelength 4.10 numerical based on rectangular waveguide	10	12

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5	Microwave components 5.1 Two cavity klystron - Construction, characteristics along with working 5.2 Reflex klystron- Construction, characteristics along with working 5.3 Magnetron- Construction, characteristics along with working 5.4 Gunn diode - Construction, characteristics along with working 5.5 parametric amplifier-Construction, characteristics along with working 5.6 Directional coupler 5.7 E plane tee, H plane tee - construction and working 5.8 Magic tee- construction and working 5.9 Isolator- construction, working and applications. 5.10 Circulator- construction, working and applications.	12	16
6	Satellite communication: 6.1 Introduction to satellite communication 6.2 satellite orbits-GEO, LEO,MEO,HEO 6.3 Inclined elliptical and polar circular orbits 6.4 satellite frequencies 6.5 satellite attitude and control systems 6.6 Station keeping 6.7 Link calculations 6.8 factors affecting satellite communication 6.9 Satellite applications 6.10 LOS microwave system- concept	10	12

Teaching Methodology: Chalk board, Seminars, Group discussions, Power Point Presentations

Term Work:

Skills to be developed:

i)Intellectual Skills:

- Identification of different optocoupler pairs.
- Understanding various reasons of signal degradation.
- Identification of various microwave components.
- Understanding the satellite link.

ii)Motor Skills:

- Ability to plot and verify characteristics of optical sources.
- Ability to verify the characteristics of microwave components.

List of Practical:

- 1.To plot P-I characteristics of Laser(Unit 1).
- 2.To plot V-I characteristics of LED(Unit 1).
- 3.To plot V-I characteristics of Photodiode(Unit 1).

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- 4.Measurement of NA of optical fiber cable(Unit 1).
- 5.To plot radiation pattern of LED.(Unit 1)
- 6.Design of analog link and digital link using fiber optic cable(Unit 3).
- 7.Measurement of VSWR and characteristic impedance of transmission(Unit 4).
- 8.Indirect frequency measurement – using micrometer(Unit 5).
- 9.To calculate coupling factor of MHD coupler(Unit 5).
- 10.Verification of port characteristics of circulator(Unit 5).
- 11.Verification of port characteristics of Isolator(Unit 5)
- 12.Verification of port characteristics of E-plane, H-plane and magic Tee junctions(Unit 5).

Professional Practices:

- 1.Search the informations regarding optical measurement & present a report on it.

Learning Resources:

A) Books :

SR. NO	TITLE	AUTHOR	PUBLISHER
1	Optical Fiber Communication Principles	John M. Senior	PHI
2	Optical Fiber Communications (Fourth edition)	Gerd Keiser	The MCGraw-Hill
3	Microwave & Radar Engineering	M. Kulkarni	Umesh
4	Satellite communication	Pratt	PHI

B) Magazines:

- Electronics for you.

C) Web sites for references:

- http://course.ee.ust.hk/elec342/notes/lecture2_ray%20theory%20transmission.pdf
- <http://www.icnirp.de/documents/Led.pdf>
- <http://stanwir.seecs.nust.edu.pk/Lectures/FOCS/LED.pdf>
- http://course.ee.ust.hk/elec342/notes/Lecture%2013_laser%20diodes%282%29.pdf
- <http://opti500.cian-erc.org/opti500/pdf/Lecture%2024%20Bend%20Loss,%20Nonlinear%20Effects.pdf>
- <http://opt.zju.edu.cn/zjuopt2/upload/resources/chapter22%2520Fiber-Optic%2520Communications.pdf>
- http://www.arcelect.com/Calculating_fiber_loss_and_distance.pdf
- <http://www.ece.rutgers.edu/~orfanidi/ewa/ch10.pdf>
- http://www.srmuniv.ac.in/sites/default/files/files/TE0320_labmanual.pdf
- http://www.mu.ac.in/myweb_test/Satelight%20Comm..pdf

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE NAME : CONSUMER ELECTRONICS COURSE CODE: R14EX4506
COURSE CATEGORY: APPLIED CREDIT: 06

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	-	-	25	125

Rationale:

The objective of this subject is to give students an in depth knowledge of various real world circuits. This subject focuses on Hi-Fi audio system, colour television details, home appliances like microwave oven, washing machine etc. It also makes them familiar with many real life medical instruments like BP monitors, thermometers etc. The practical assignments will further reinforce the knowledge and the skill of the students.

Objectives: The students will be able to understand

- Fundamentals of audio amplifiers and DVD players
- Basics of composite video signals and colour television
- Fundamentals of modern electronic home appliances
- Fundamentals of working principles of biomedical instruments

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
01	Hi-Fi Audio amplifier and DVD players 1.1 Introduction to amplifiers: mono, stereo, public address 1.2 Comparison - of mono, stereo and public address amplifiers. 1.3 Block diagram of Hi-Fi amplifier and its working 1.4 Controls available on Hi-Fi amplifier and their function 1.5 Graphic equalizer concept- circuit diagram and operation (5 point circuit diagram) 1.6 Significance of graphic equalizer 1.7 Moving Coil loudspeaker 1.8 Types of speakers- woofers, tweeters, mid frequency rangers 1.9 CD - material used, size & capacity 1.10 DVD- material used, size & capacity 1.11 DVD player-Block diagram and working 1.12 Introduction to Blu ray disc and Blu ray disc players	12	16

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02	COLOUR TELEVISION 2.1 Concept- Aspect ratio, image continuity, interlace scanning, scanning periods, 2.2 Resolution-vertical resolution, horizontal resolution 2.3 Concept-Bandwidth for colour signal. 2.4 Brightness, contrast, viewing distance, luminance, hue,saturation 2.5 Three colour theory, grassman's law 2.6 Composite video signal 2.7 TV camera tube, principle and working of solid state camera based on CCD 2.8 Luminance and chrominance signals 2.9 PAL- D encoder- block diagram and working 2.10 PAL- D decoder- block diagram and working	10	12
03	HDTV AND DTH SYSTEMS 3.1 Introduction to HDTV 3.2 Comparison of standard TV and HDTV 3.3 HDTV block diagram & working 3.4 LED/LCD technology- principal of working of LCD and LED TV system 3.5 CCTV- applications, different models, lenses used 3.6 Advantages and disadvantages of DTH 3.7 DTH system-block diagram and working 3.8 LNB concept 3.9 specifications of components used in DTH (antenna sizes, the dish etc) 3.10 Set top box-block diagram and working	10	12
04	MOBILE UNIT 4.1 Mobile unit- block diagram and working 4.2 Frequency synthesizer- block diagram and working 4.3 Transmitter- block diagram and working 4.4 Receiver- block diagram and working 4.5 SIM type 4.6 SIM card features 4.7 Mobile antennas and its types 4.8 Antenna Specifications in mobile handset(2G) 4.9 Logic unit 4.10 Control unit- block diagram and working	12	16
05	MODERN CONSUMER PRODUCTS 5.1 FAX machine-block diagram and working 5.2 Calculators- block diagram and working 5.3 Remote controls- block diagram and working 5.4 Microwave oven- block diagram and working 5.5 Safety Precautions while using microwave 5.6 Concept of fuzzy logic 5.7 Washing machine- block diagram and working 5.8 Video game- block diagram and working 5.9 Electronic musical instrument- block diagram and working 5.10 Digital Clock - block diagram and working	10	12
06	HEALTHCARE CONSUMER PRODUCTS 6.1 Thermometer- block diagram and working 6.2 BP monitors- block diagram and working 6.3 Electronic weighing machine- block diagram and Working 6.4 Pulse rate measurement- block diagram and working 6.5 concept of ECG,EEG 6.6 ECG monitors- block diagram and working 6.7 Introduction to telemedicine system 6.8 scope, benefits, limitations and applications of Telemedicine 6.9 Glucometer- block diagram and working	10	12

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

Teaching Methodology: Chalk board, Seminars, Guest lectures, Group discussion.

Term work:

Skills to be developed:

i)Intellectual Skills:

- Ability to understand the working principle of various home appliances
- Ability to understand the recording and reproduction mechanism in DVD player

ii)Motor Skills:

- Ability to troubleshoot DVD player and DTH system.
- Ability to draw the layout for various appliances.

List of Practicals:

- 1.Voltage analysis of DVD player
- 2.Voltage analysis of Hi-Fi amplifier
- 3.To trace different sections of colour television receiver
- 4.Voltage analysis of remote control
- 5.Voltage analysis of microwave oven
- 6.Voltage analysis of washing machine
- 7.Voltage analysis of EGC trainer
- 8.Voltage analysis of BP monitor
- 9.To study PA system
- 10.Voltage analysis of LED/LCD trainer
- 11.Voltage analysis of pulse rate measurement
- 12.Voltage analysis of DTH system

Professional Practices:

- 1.Find out the technical specifications and the features of various home appliances like washing machine, microwave oven etc. and present a seminar on your search.
- 2.Write a report on latest consumer products.

Learning Resources:

A)Books:

SR.NO	TITLE	AUTHOR	PUBLISHER
1	Monochrome & colour Television	R.R. Gulati	New Age International Ltd.
2	Audio & Video Systems	R.G. Gupta	Tata McGraw-Hill
3	Consumer Electronics	S.P.Bali	Pearson Education
4	Consumer Electronics for Engineers	Philip Hoff	Cambridge university press

B)Web sites for references:

1. <http://www.geniusnet.sk/om3bc/datasheets/TDA2052.PDF>
2. <http://www.slideshare.net/PravinShirke07/colour-television>
3. http://www.ti.com/solution/microwave_oven
4. http://www.ti.com/solution/washing_machine_high_end
5. http://www.freescale.com/files/32bit/doc/app_note/AN4328.pdf?tid=AMdIDR
6. <http://www.weather.gov.hk/publica/tnl/tnl025.pdf>

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : CONTROL SYSTEM COURSE CODE: R14EX4507
COURSE CATEGORY: APPLIED CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	-	-	-	100

Rationale:

The concept and theory of control systems is needed in almost all electronics engineering fields and in many other engineering and scientific disciplines as well. The main objective of this course is to introduce and give an exposure about the fundamentals of control systems, various components in the control system, time domain, frequency domain analysis and also the system stability analysis.

This course would also provide the basics for controlling the different control actions & to have knowledge of control system, which is beneficial for process control industry which equips the student for maintenance and quality analysis.

Objectives:

The students will be able to

- Understand the steady state, time response and frequency response analysis.
- Understand the relationships between the parameters of a control system and its stability, accuracy, transient behavior.
- Identify the parameters that the system is sensitive. Determine the stability of a system and parameter ranges for a desired degree of stability.
- Understand the different controllers controlling action.
- Develop fundamentals associated with the analysis.

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UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	<p>Basics of Control Systems</p> <p>1.1 Introduction to linear and non-linear control system. 1.2 Elements of control systems, Open loop and Closed loop control system. 1.3 Effect of Feedback and feed forward control system. 1.4 Comparison of Open loop and Closed loop control system . Comparison of Feedback and feed forward control system .</p> <p>Laplace Transform :</p> <p>1.5 Introduction and Definition of Laplace transform . 1.6 Basic Laplace transform theorems . 1.7 Inverse Laplace transform . 1.8 Use of Laplace transform in control system .</p>	12	16
2	<p>Controllers:</p> <p>2.1 Control system Parameters: Error, Set point, Offset, Threshold, Process Dead time, Dead zone. 2.2 On/Off Control Action. 2.3 Continues control actions: P, I, D controllers. 2.4 Composite control actions: PI, PD and PID controllers. 2.5 Controllers output for different types of Input signals: Step, Ramp, Pulse, Sinusoidal. 2.6 Current to pressure, pressure to current converter 2.7 Comparison of Hydraulic, pneumatic and electric controllers.</p>	10	12
3	<p>Time Domain Analysis</p> <p>3.1 Type and Order of the Control Systems . 3.2 Types of Standard Inputs: Step, Ramp and Parabolic input signals. 3.3 Response of First Order System to Step, Ramp and Parabolic Inputs . 3.4 Response of Second Order System to Step Input . 3.5 Time Domain Specifications of Second Order Systems . 3.6 Role of ξ in Second Order System . 3.7 Numericals on Time Domain Specifications .</p>	10	12
4	<p>Frequency Domain Analysis</p> <p>4.1 Need of Frequency Domain Analysis . 4.2 Frequency Domain Specifications . 4.3 Correlation between Time & Frequency Domain . 4.4 Effects of addition of Poles and Zeros . 4.5 Numericals on Frequency Domain Specifications . 4.6 Different techniques used in Frequency Domain Analysis . 4.7 Introduction to Gain margin and phase margin .</p>	10	12
5	<p>Stability</p> <p>5.1 Introduction of s-plane . 5.2 Stability: Stable, unstable, critically stable & conditionally stable system . 5.3 Routh's stability criterion: Different cases & conditions . 5.4 Stability analysis using Routh's stability criterion . 5.5 General method for Drawing Root Locus . 5.6 Stability analysis using Root Locus . 5.7 Bode plots of Standard Factors . 5.8 Stability analysis using Bode plots .</p>	12	16
6	<p>Control System Components</p> <p>6.1 Servo system –definition, block diagram . 6.2 Concept and principle of AC & DC servo systems . 6.3 Comparison of AC & DC servo systems . 6.4 Servo components: i) Potentiometer as error detector ii) Synchro as error detector iii) Rotary encoder 6.5 Synchro Transmitter 6.6 Synchro Transmitter - Receiver</p>	10	12

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

Teaching Methodology: Chalk-Board, Group Discussion, Power Point Presentation, Expert Lectures, Industrial visits.

TERM WORK: Skills to be developed:

i) Intellectual Skills:

- Able to select the Controller.
- Able to interpret the result from the gives system.
- Able to read Bode plot and stability.
- Able to understand the functioning of control system components.

ii) Motor Skills :

- Able to measure response of test signals for various control systems.
- Able to test various control systems.
- Able to comment on stability.

List of Practical's:-

- 1.Perform the experiment on Electronic PI, PD and PID controller.
- 2.Study of Electronic Pneumatic control system.
- 3.Perform the experiment on Current to pressure, pressure to current converter.
- 4.Perform the experiment on transient response of second order system.
- 5.Observe response of type 0, 1 and 2 systems for step, ramp and parabolic inputs.
- 6.Determine the stability of a system using Routh Hurwitz Criterion, marginal value of K and frequency of sustained oscillations.
- 7.Draw Bode Plot for the given Transfer function. Find PM and GM. Comment on the stability.
- 8.To study the Characteristics of synchro as error detector.

Note: Expt. No.: 05, 06 & 07 solve therotically and simulate on MATLAB.

A)Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Process control system	C. D. Johnson	Prentice Hall India
2	Automatic Control Systems	S. Hasan Saeed	Katson educational series
3	Control Systems	Smarajit Ghosh	Pearson
4	Modern Control Engineering	Katsuhiko Ogata	Prentice Hall India
5	Control Systems Engineering	I.Nagrath, M.Gopal	New Age Int.Publishers

B)Magazines:

- Electronics world.
- Electronics bazaar.
- Digit.

C) Web sites for references:

- www.electronics-tutorials.com
- www.controlnet.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE : CIRCUIT SIMULATION LAB COURSECODE : R14EX4508
 COURSE CATEGORY : APPLIED CREDITS : 4

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	TW	TOTAL
2	2	-	-	-	@50	25	75

@ Internal Exam

Rationale:

Electronic circuit simulation uses mathematical models to replicate the behavior of an actual electronic device or circuit. Simulating a circuit's behavior before actually building it greatly improves efficiency and provides insights into the behavior of electronics circuit designs. In particular, for integrated circuits, the tooling (photomasks) is expensive, breadboards are impractical, and probing the behavior of internal signals is extremely difficult. Therefore almost all IC design relies heavily on simulation

Objectives:

The students will be able to

- Understand different simulation packages.
- Able to design layout and artwork for PCB using design software.
- Test different electronic circuits using circuit simulation software.
- Able to design and simulate small projects using simulators.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction to Circuit simulation: Circuit simulation package like EAGLE, Multisim 2011, Electronic workbench or equivalent, Network Analysis: series and parallel resonance circuits, frequency selective network (Twin T or Wein bridge), frequency response of a filters .	06	
2	Power Supply simulation: Rectifier Circuits, Power Supplies, IC Voltage Regulators, Dual Power Supply Using LM317 and LM337. Switching Regulators.	05	
3	Simulation of Small Signal Amplifiers: Bias Circuit, Single Stage CE Amplifier, JFET amplifier Design. Negative Feedback Amplifier	05	
4	Simulation of Large Signal Amplifiers: Class A , Class B, Class AB , Class C Power Amplifiers Complimentary Symmetry Power Amplifiers Simulation of High Frequency Amplifiers: Multivibrators, Single Tuned Amplifiers and Oscillators	06	

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5	Simulation of Analog Integrated Circuits: Amplifiers, A/D and D/A Converters, Active Filters: LPF , HPF, BPF and BSF. Simulation of Digital Circuits. Flip-Flops, Counters, Registers etc.	05	
6	PCB design: PCB design and Schematic drawing package like NI - UltiBoard, ORCAD, CADSTAR , or equivalent.	05	

Teaching Methodology: Chalk-Board, Group Discussion, Power Point Presentation, Transparency, Expert Lectures.

Term Work : Skills to be developed:

i) Intellectual Skills:

- Understanding
- Designing

ii) Motor Skills:

- Proper connection
- Measurement
- Testing
- Simulation

List of Practicals: (Any Ten)

Two assignments from each topic to be assemble and test .Prepare Voltage /signal /load analysis report.

- 1.Laboratory exercises based on Circuit simulation package like spice, Electronic workbench or equivalent
- 2.Plot resonance curves for series and parallel resonance circuits for given values of R, L and C. Find resonance frequency, bandwidth and Q for given values of L, C and R
- 3.Design and Simulate Dual Power Supply Using LM 317 and LM 337
- 4.Design and Simulation of Switching Regulator Circuits
- 5.Design and Simulate Single Stage CE Amplifier
- 6.Design and Simulate Single Stage CS FET Amplifier
- 7.Design and Simulate Large Signal (Power) Amplifiers
- 8.Design and Simulate High Frequency Amplifiers
- 9.Design and Simulate A/D and D/A conversion Using OP-AMP
- 10.Design and Simulate Active Filters Design Using OP-AMP
- 11.Design and Simulate Ripple Counter
- 12.PCB design and Schematic drawing package like NI- UltiBoard, ORCAD, CADSTAR, EAGLE or equivalent (Note: Student may be given exposure to any latest available software tools related to circuit simulation, schematic layout & PCB design.

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Professional Practices:

1. Learn other Simulation techniques and softwares .
2. Learn the Simulation of Project work using Simulators

Learning Resources:

A)Books :

SR. NO.	TITLE	AUTHOR	PUBLISHER
1	Design of Electronics Circuits And Computer Aided Circuits	M.M. Shah	Wiley Eastern
2	Applications and Design with Analog Integrated Circuits	Michael Jacob	PHI Second Ed.
3	Design with OPAMP And Analog Integrated Circuits	Sergio Franco	TMH Third Ed.
4	Electronics Design	Martin S Roden, Gordon	Shroff Pub. Fourth Ed.
5	PCB Design	Waller C Booshart,	Tata M Hill
6	Interactive simulation	Intersim Design	

A)Magazines/Journals :

- Embedded For You
- Electronics For You
- Digit

Software:

- MultiSim
- NI-UltiBoard

B)Web sites for References:

- www.embedded.com
- www.electronics-design.com
- www.analog.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : ELECTRONIC MEASUREMENT COURSE CODE: R14EX4509
COURSE CATEGORY: APPLIED CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	2	3	80	20	50	-	50	200

Rationale:

While working as a technician in electronics the student must understand how to select, measure & use proper measuring instruments. This subject presumes that the students are familiar with basic utilization of measuring instruments. The era of this subject consists of the information about concepts, principles and procedures of analog and digital electronic measuring instruments and measuring techniques.

It is also necessary to know the basic principles of transducers & show how they can be exploited for the measurement of large number of variables. With the background of measuring instruments, this subject deals with measurement of different physical parameters like temperature, pressure etc.

Objectives: The students will be able to,

- Understand the working concepts of measuring instruments.
- Understand different parameters measurement of measuring instruments.
- Understand the working principles of various transducers use in control system.
- Develop fundamentals associated with the analysis.
- Understand the selection of transducers.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Measurement Concepts: 1.1 Static characteristics of Instruments: Accuracy, Precision, Sensitivity, Linearity, Resolution, Static error, Reproducibility, Drift, Dead Zone. 1.2 Dynamic characteristics of Instruments: Speed of response, Lag, fidelity, Dynamic error. 1.3 Units and standards of measurements. 1.4 Classification of standards:- International, Primary, Secondary, Working. 1.5 Types of Errors:- Gross, Systemic, Random. 1.6 PMMC instruments:- Construction, working principle, applications. 1.7 True RMS meters:- Construction, working principle, applications. 1.8 Auto- ranging DMM:- Construction, working principle, applications.	12	16

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2	<p>Measuring Instruments:</p> <p>2.1 Cathode Ray Oscilloscopes block schematic & applications. 2.2 Digital Storage Oscilloscope- block schematic & applications. 2.3 Function Generators- block schematic & applications. 2.4 RF Signal Generators- block schematic & applications. 2.5 Frequency Counters- measurement of frequency and time Interval. 2.6 Universal Counter- block schematic & applications. 2.7 LCR meter - block schematic & applications.</p>	10	12
3	<p>Transducers Basic:</p> <p>3.1 Introduction - Electrical and Mechanical transducers. 3.2 Characteristics of electrical transducers. 3.3 Classification of Electrical Transducer: Primary and Secondary, Active and Passive, analog and digital transducers 3.4 Transducer Selection Criterion. 3.5 Transduction Principle: Capacitive, Inductive, Electromagnetic and Piezoelectric transduction.</p>	10	12
4	<p>Temperature measurement :</p> <p>4.1 Introduction - Definition and units. 4.2 Different temperature scales & their conversions. 4.3 Classification of temperature measuring transducers. 4.4 Thermistors – PTC and NTC. 4.5 Resistance Thermometer – RTD (PT-100): 2 /3/4 wire systems. 4.6 Thermocouple – Seeback & Peltier effect , Types J, K, R , S, T etc. 4.7 Pyrometer - Optical, Radiation.</p> <p>Note: Each transducer should be studied on the basis of working principle, construction, material used, measurement range, advantages, disadvs. and applications.</p>	12	16
5	<p>Pressure measurement:</p> <p>5.1 Introduction - Definition and units: Absolute, Gauge, Atmospheric, Vacuum. 5.2 Classification of Pressure measuring devices. 5.3 Non elastic pressure transducer: U tube, Inclined Tube, Well type Manometer. 5.4 Elastic pressure transducer: Bourdon Tube, Bellows, Diaphragm, Capsule. 5.5 Electronic pressure transducers: Bourdon tube with LVDT . 5.6 Diaphragm with Strain gauge. 5.7 Calibration of pressure gauge using dead weight tester.</p> <p>Note: Each transducer should be studied on the basis of working principle, construction, material used, measurement range, advantages, disadvs. and applications.</p>	10	12
6	<p>Special Transducers and Measurements :</p> <p>6.1 Light intensity Transducers:- working principle, construction, advantages, disadvantages and applications. 6.2 Piezoelectric Transducers:- working principle, construction, advantages, disadvantages and applications. 6.3 Ultrasonic Transducers:- working principle, construction, advantages, disadvantages and applications. 6.4 Humidity measurement:- Psychrometer and Hygrometer. 6.5 Speed measurement:- Photoelectric and Magnetic pick-up. 6.6 pH Measurement concept.</p>	10	12

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

Teaching Methodology: Chalk-Board, Group Discussion, Power Point Presentation, Expert Lectures, industrial visits.

TERM WORK: Skills to be developed:

i) Intellectual Skills:

- Able to select the instrument for various measurements.
- Able to interpret the result from measurement.
- Able to understand the functioning of measuring instruments.

ii) Motor Skills:

- Able to measure various physical parameters using transducers.
- Able to select the transducer for specific parameter measurement.
- Able to select the measuring instrument for specific signal measurement.

List of Practical's:

1. Determination of random error by using Statistical analysis.
2. Measurement of Resistance, Voltage, Current using DMM and Auto Range DMM.
3. Perform the experiment on Dual Trace CRO controls & component test using CRO.
4. Perform the experiment on DSO & Measurements by storing a wave form.
5. Perform the experiment on Freq. Counter & measurement of frequency and period.
6. Perform the experiment on LCR-Q meter and measurement of L, C, R & Q.
7. Perform the experiment on temperature measurement using RTD. (Pt-100)
8. Perform the experiment on temperature measurement using Thermocouple (using R, J, K etc.)
9. Perform the experiment on pressure measurement using Bourdon tube with LVDT.
10. Calibration of Pressure gauge using Dead Weight Pressure gauge Tester.
11. Observe and interpret humidity of air using wet & dry bulb Hygrometer.
12. Perform the experiment on speed measurement by Photo-electric/ Inductive effect.

A)Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Electronic Instrumentation & Measurement Technique	W. D. Cooper	Prentice Hall India
2	Electrical and Electronic Measurements and Instrumentation	A.K.Sawhney	Dhanpat Rai & Sons.
3	Digital Instrumentation	A. J. Bouerns	McGraw Hill
4	Transducers & Instrumentation	D. V. S. Murty	Prentice Hall India
5	Instrument Engineers Hand Book	Bela G. Liptak	

B)Magazines:

- Electronics Information & Planning.
- Electronics bazaar.

C) Web sites for references:

- www.electronics-tutorials.com
- www.indianscientificinstrument.com.
- <http://boson.physics.sc.edu/~hoskins/Demos/CathodeRay.html>

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : PROJECT AND SEMINAR **COURSE CODE: R14EX4510**
COURSE CATEGORY : APPLIED **CREDIT : 4**

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
-	04	-	-	-	-	50	100	150

Rationale:

The project will simplify the learning process for students by providing worked solutions to common electronic sensing, control and interfacing requirements. The project is to encourage the students to acquire the knowledge as per the requirement.

Objectives :

The students will be able to

- Work in group, plan the work and coordinate.
- Develop the leadership qualities.
- Develop innovative ideas
- Develop basic technical skills.
- Understand the importance of cost-time analysis.
- Write project report.
- Understand the importance of cost-time analysis.

Course Details:

UNIT	NAME OF THE TOPIC	REMARK
1	Design Concept For Electronic Circuit	The seminar will be conducted on timely completion of project activity e.g selection of project , component selection, Testing, Trouble shooting etc.
2	Development Process For Design	
3	3.1Block Diagram Development 3.2 Circuit selection, 3.3 Component selection, 3.4 Technology	
4	4.1Design Process 4.2 Verification	
5	Use of Instruments for Testing	
6	Trouble shooting the circuits	

Teaching Methodology: Chalk-Board, Group Discussion, Seminars, Power Point Presentations.

A) Term Work: Skills to be developed:

i) Intellectual Skills:

- Interpret with the circuit design process and specifications of the prototype circuits.
- able to understand the hardware implementation of the circuit.

ii) Motor Skills:

- able to troubleshoot the electronics circuits and controls.
- able to test prototype circuits.

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE : ROBOTICS SYSTEM COURSE CODE: R14EX5501
 COURSE CATEGORY: SPECIALISED CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	TW	TOTAL
4	2	3	80	20	50	50	200

Rationale: In this course, the students learn the fundamentals of robotics and its engineering. Robotics is the science or study of the technology associated with the design, fabrication, theory, and application of robots. Problem Solving Decision Making, Goal Setting, Logical Thinking / Sequencing, Troubleshooting, Modification Skills, Engineering Basics, Computer Programming.

Objectives:

The students will be able to

- Use a cyclical problem solving method, including definition of the task, testing of prototypes, and communication of the solution
- Apply a basic knowledge of structural engineering
- Program control structures include conditional statements, loops, and events/subroutines
- Understand the mechanisms using various forms of gears and cams.
- Design algorithms for accomplishing various common tasks
- Design algorithms for accomplishing various common tasks

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction : 1.1 Robot anatomy-Definition, law of robotics 1.2 History and Terminology of Robotics 1.3 Accuracy and Repeatability of Robotics-Simple problems 1.4 Specifications of Robot 1.5 Speed of Robot 1.6 Robot joints and links 1.7 Robot classifications 1.8 Architecture of robotic systems- 1.9 Robot Drive systems- Hydraulic, Pneumatic and Electric system.	12	16

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2	END EFFECTORS AND ROBOT 2.1 Mechanical grippers 2.2 Slider crank mechanism, Screw type, Rotary actuators, cam type 2.3 Magnetic grippers-Vacuum grippers-Air operated grippers-Gripper force analysis-Gripper design-Simple problems 2.4 Robot controls-Point to point control, Continuous path control, 2.5 Intelligent robot 2.6 Control system for robot joint-Control actions 2.7 Feedback devices-Encoder, Resolver, LVDT - Motion Interpolations-Adaptive control.	10	12
3	ROBOT TRANSFORMATIONS AND SENSORS 3.1 Robot kinematics-Types 3.2 2D, 3D Transformation-Scaling, Rotation, Translation- Homogeneous coordinates, multiple transformation-Simple problems. 3.3 Sensors in robot – Touch sensors, Tactile sensor, Proximity and range sensors, Robotic vision sensor, Force sensor, Light sensors, Pressure sensors.	10	12
4	ROBOT CELL DESIGN AND APPLICATIONS 4.1 Robot work cell design and control-Sequence control, Operator interface, 4.2 Safety monitoring devices in Robot. 4.3 Robot applications- Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting and undersea robot.	12	16
5	MICRO/NANO ROBOTICS SYSTEM 5.1 Micro/Nanorobotics system overview-Scaling effect-Top down and bottom up approach - 5.2 Actuators of Micro/Nano robotics system - 5.3 Nanorobot communication techniques- 5.4 Fabrication of micro/nano grippers-Wall climbing micro robot working principles-Bio-mimetic robot-Swarm robot-Nanorobot in targeted drug delivery system.	10	12
6	ROBOTICS TECHNOLOGY OF THE FUTURE 6.1 Robot intelligence, 6.2 Advanced Sensors, Capabilities, 6.3 Tele robotics, 6.4 Mechanical design Features, Mobility, locomotion and Navigation. 6.6 The universal Hand Systems Integration and Networking. 6.7 Robots in RPT.	10	12

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Teaching Methodology : Chalk-Board, Group Discussion, Power Point Presentation, Transparency, Expert Lectures.

Term Work : Skills to be developed :

i) Intellectual Skills:

- Identify
- Selection
- Understanding
- Programming

ii) Motor Skills:

- Proper connection
- Measurement
- Graphical presentation
- Simulation

List of Practicals : (Any Eight)

- 1) Perform motion conversion (rotary to rotary, rotary to linear) using mechanical components.
- 2) To build robot arms using mechanical components and applying motor drive.
- 3) Mechanical Actuating Components.
- 4) Perform Displacement measurement using LVDT.
- 5) To build robot for given configuration and degrees of freedom.
- 6) Motion of robot for each degree of freedom. (Teaching a sequence to robot using Teach Pendant.)
- 7) Force analysis and measurement by using Mechanical Gripper.
- 8) To perform pick and place operation using Simulation Control Software.
- 9) Robot path planning using Simulation & Control Software.
- 10) Pneumatic Robot OR Study of Robot Vision System.
- 11) 2D simulation of a 3 DOF robot arm. (C / C++ OR MATLAB)
- 12) Spray Painting using Robotic Arm.

Professional Practices:

1. Visit to industry for acquaintance to Robotic system..
2. Learn Problem solving skills

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Learning Resources :

A)Books:

SR. NO.	TITLE	AUTHOR	PUBLISHER
1	Fundamentals of Robotics: Analysis and Control	Robert J Schilling	Prentice Hall of India New Delhi.
2	Robotic Engineering	Klafter, Thomas, Negin	Prentice Hall of India New Delhi.
3	Handbook of Robotics	Siciliano, Khatib, Eds	Springer, 2008
4	Fundamentals of Robotics	T.C. Manjunath	Nandu Publishers, Mumbai
5	Robotics and Control	R. K. Mittal, I. J. Nagrath	TMH, NewDelhi
6	Introduction to Autonomous Mobile Robots	Siegwart, Nourbakhsh	MIT Press, 2004
7	Robotics: Modelling, Planning and Control	Siciliano.	3rd Edition, Springer, 2009

B)Magazines/ Journals :

- Mechatronics
- Automation and Control
- IEEE Robotics and Automation

C)Software:

- Matlab/simulink
- Labview8.0

D)Web sites for References:

- www.springerlink.com
- www.iris.ethz.ch

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : PLC & SCADA COURSE CODE: R14EX5502
COURSE CATEGORY: SPECIALISED CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	TW	TOTAL
4	2	3	80	20	50	50	200

Rationale:

PLCs are increasingly used to connect and work with other computer and automated systems and components. Use of PLC s has also expanded in safety systems and redundancy for greater reliability. This course makes the students to learn, to read and to understand basic ladder logic, able to aware the potential problems and hazards.

The students will also learn how to connect PLC systems and how to troubleshoot PLC system problems effectively & logically. This course is also design to provide solid conceptual knowledge base for future learning.

Objectives:

The students will be able to;

- Know the control modes
- Understand the control strategies
- Know the PLC architecture, general programming procedures, etc.
- Understand the DCS and SCADA systems.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Programmable Logic Controller: 1.1 Industrial Automation and need of PLC 1.2 The difference between PLC and a Microcontroller 1.3 PLC Architecture 1.4 Introduction to PLC components & their assembling 1.5 I/O types, concepts 1.6 Connecting the I/O to PLC 1.7 Understanding the basic concept of SCAN 1.8 Introduction of HMI 1.9 Introduction to various language of PLC programming 1.10 Elements of ladder diagram,	12	16

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2	PLC Communication Protocols 2.1 RS-232 interface standard 2.2 RS-485 interface standard 2.3 Fieldbus 2.4 Modbus 2.5 DNP3.0 2.6 Comparison of typical protocols 2.7 Hardware selection and wiring. 2.8 PLC programme analysis, modification and trouble shooting.	10	12
3	Programming techniques: 3.1 Programming Input and outputs. 3.2 Logical Commands. 3.3 Arithmetic Commands. 3.4 High Speed Processing Commands. 3.5 Sequential Logics. 3.6 Data Transmission Commands.	10	12
4	PLC networking: 4.1 PLC networking standards 4.2 Vertical integrator of Industrial -automation 4.3 Field bus & Ethernet 4.4 HMI system 4.5 Text display 4.6 Operator panel, Touch panel 4.7 Integrated display – PLC & HMI. 4.8 Position Control of Servo Motor using PLC & HMI	12	16
5	Application of PLC: 5.1 Elevator system 5.2 Washing machine 5.3 Burner management systems 5.4 Bottle filling plant 5.5 Brewery, Cement, Automobile plants etc. 5.6 Interfacing of GSM with PLC 5.7 Interfacing of Barcode with PLC	10	12
6	SCADA system. 6.1 Supervisory control & DAS an overview 6.2 Developer & runtime packages 6.3 Architecture 6.4 Tools 6.5 Internal & external graphics 6.6 Alarm logging, tag log, structured tags 6.7 Report generation, 6.8 Interfaces of SCADA with PLC, 6.9 SCADA application.	10	12

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Teaching Methodology : Chalk-Board, Group Discussion, Power Point Presentation, Expert Lectures.

Term Work : Skills to be developed :

i) Intellectual Skills:

- able to understand the programming techniques in PLC.
- able to interface the different hardwares with PLC.

ii) Motor Skills:

- able to measure the parameters in automatic control system.
- able to implement the system using PLC and its simulation.

List of Practicals: (Any Eight)

1. Perform experiment on closed loop system for temp. Control.
2. Development of ladder diagram for process control using on-off type input/output sequencer.
3. Development of ladder diagram for process control using timer and master control relay.
4. PLC Programming I- (Interfacing of Input and Output Modules with PLC)
5. PLC Programming II- (Application of PLC)
6. PID algorithm using PLC.
7. Study of PLC simulator.
8. Position Control of Servo Motor using PLC.
9. Interfacing of GSM with PLC.
10. Interfacing of Barcode with PLC.
11. Case study using PLC.
12. Temperature Control and measurement by using SCADA.

NOTE: Experiments should be executed using PLC Simulators or Virtual Lab platform

Professional Practice:

1. Visit to industry for acquaintance to PLC.
2. Learn Programming and simulation of PLC

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Learning Resources:

A)Books:

SR. NO.	TITLE	AUTHOR	PUBLISHER
1	Industrial control	B.J. Liptak	Chilton book co.
2	Programmable Logic Controllers and Industrial Automation - An introduction	Madhuchhanda Mitra & Samarjit sen Gupta	Pernem International publishing (india) Pvt. Ltd
3	Programmable Logic Controller	J.D. Otter	PHI
4	Programmable Logic Controller Principles and applications	J.W. Webb	PHI
5	PLC Manual	--	--
6	Cimlicity SCADA Packages Manuals	Fanuc India ltd	

B)Magazines/Journals :

- PLC
- Automation and Control
- IEEE Robotics and Automation

C)Software:

- Ladder Logic Simulators
- Animated Process Simulations
- LABVIEW 8.0

D)Web sites for References:

- www.plcs.net
- www.engineersedge.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Course : MECHATRONICS Course Code: R14EX5503

Course Category : SPECIALISED Credits : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	TW	TOTAL
4	2	3	80	20	50	50	200

Rationale:

Mechatronics, as an engineering discipline, is the synergistic combination of Mechanical, Electronics, Control Engineering and Computers, all integrated through the design process. It involves the application of complex decision making to the operation of physical systems. Mechatronics depends their unique functionality on computer software. This course studies mechatronics at a theoretical and practical level; balance between theory/ analysis and hardware implementation is emphasized; emphasis is placed on physical understanding rather than on mathematical formalities. A problem- solving approach is used throughout the course.

Objectives:

The students will be able to;

- Know the explanation of mechatronics from the model based perspective.
- Understand the modified analogy approach for creating dynamical models of physical systems.
- Understand the operation of sensors and transducers.
- Select analog and digital hardware components for real time computer interfacing.
- Know the classical control incorporating real world constraints.
- Understand component based system design.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction to Mechatronics: 1.1 Introduction and Definition of Mechatronics 1.2 Scope and it's importance with respective Inter- disciplinary approach 1.3 Origins, Evaluation of Mechatronics 1.4 Classification of Mechatronics System 1.5 Functions of Mechatronics System 1.6 Mechatronics key Elements 1.7 Role of Electronics in Mechatronics 1.8 Mechatronics System Design. 1.9 Ways of Integration. 1.10 Integrated design issues in Mechatronics 1.11 Mechatronics Design approach to Automatic Printer Elevator system and Robotics (Overview only)	12	16

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2	Sensor Modeling: 2.1 Temperature sensing: Thermocouple 2.2 Strain, Stress and Force Measurement using Strain Gauges. 2.3 Piezoelectric Strain Sensors and Accelerometer 2.4 Analog Position Measurement : Potentiometers 2.5 Digital Position Measurement: Optical Encoders 2.6 Velocity Measurement: Tachometers 2.7 Introduction to Micro sensors in Mechatronics: Measurement Principle and applications	10	12
3	Signal Conditioning and Data Acquisition : 3.1 Introduction and Basic Principle of operation of Signal conditioning. 3.2 Use of Bridge Circuits: Wheatstone Bridge, Wein Bridge 3.3 Protection Circuits 3.4 The Operational Amplifiers as Amplifiers Filtering, Comparator, Sample and Hold circuits. 3.5 Instrumentation amplifier ICs AD633, AD522/524 with specifications 3.6 A to D and D to A converter related to Mechatronics application	10	12
4	Programmable Logic Controller(PLC) 4.1 Basic PLC structure, principle of PLC 4.2 Architecture and components 4.3 PLC programming 4.4 Selection of PLC 4.5 Interfacing of sensors with PLC. 4.6 PLC applications 4.7 Ladder diagrams circuits 4.8 Simple Ladder programming examples Data Presentation System: 4.9 Data Presentation System: Analog and Digital 4.10 Computer based data acquisition system. 4.11 Multichannel Data Logger (Block diagram),	12	16
5	Actuation Systems: 5.1 Pneumatic and Hydraulic systems: Actuation system, Directional control valve, Pressure control valves, Cylinders, Process control valve 5.2 Electrical Actuation Systems: Electrical Systems, solid state switches, Solenoids, Relays, DC Motors, AC motors and Stepper Motor (selection criteria and specification) 5.3 Mechanical Actuation Systems: Mechanical Systems, Types of Motion, Kinematic Chains, Cams Gear Trains, Ratchet and Pawl, Belt and chain Drives, Bearing, Mechanical Aspects of Motor Selection.	10	12
6	Advanced Applications in Mechatronics: Mechatronics Control in Automated Manufacturing: 6.1 Monitoring of Manufacturing Processes 6.2 On-Line Quality Monitoring, Model Based Systems 6.3 Hardware in the loop Simulation 6.4 Supervisory control in manufacturing 6.5 Inspection, Integration of Heterogeneous Systems. Artificial Intelligence in Mechatronics: 6.6 Artificial Neural Networks in Mechatronics and Quality Control. 6.7 Knowledge based Systems: Case Study of Real time Robotic Interface.	10	12

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Teaching Methodology : Chalk-Board, Group Discussion, Power Point Presentation, Expert Lectures.

Term Work :

Skills to be developed :

i) Intellectual Skills:

- able to Identify and proper selection of sensors and transducers
- component based system design approach

ii) Motor Skills:

- able to measure the important parameters of sensors and transducers
- hardware implementation of any mechatronics based system and its simulation.

List of Practicals: (Any Eight)

1. Plot the characteristics of pressure transducer (strain gauge/any pressure sensor).
2. Plot the characteristics of temperature transducer (thermocouple / RTD/Thermistors).
3. Position Measurement by using Analog and Digital Sensors.
4. Perform Displacement, velocity and Acceleration Measurement (Conversion of Non electrical parameter into electrical parameter).
5. Measurement of Temperature using Instrumentation Amplifier IC.
6. Electro hydraulic components (Electro Hydraulic trainer Kit and Simulator)
7. Electro pneumatic components (Electro Pneumatic trainer kit and Simulator)
8. Mechanical Actuating Components
9. Computer based Data Acquisition system
10. PLC Programming: Write simple PLC program and execute on PLC
11. Mechatronics case study of ROBOTICS – operation of pick and place robot including programming in linear / circular mode.
12. Measurement of Multiple input signals using Multichannel Data Logger.

NOTE: Experiments should be executed using Simulators, Virtual Lab platform such as Lab View.

Professional Practice:

1. Visit to industry for acquaintance to Mechatronics based system.
2. Learn Problem solving skills.

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Learning Resources:

A)Books :

SR. NO.	TITLE	AUTHOR	PUBLISHER
1	Mechatronics Principles concepts and applications	N.P.Mahalik	Tata McGraw Hill
2	Mechatronics Electronics Control System in Mechanical and Electrical Engineering	W. Bolton	Pearson Education
3	Introduction to Mechatronics and Measurement Systems	David Alcitore, Michael B. Histan	Tata McGraw Hill
4	Mechatronics (integrated mechanical electronics systems)	K.P.Ramchandran, G.K.Vijayaraghavan M.S.Balsundarm	Wiley india pvt.ltd (first edition)
5	Instrumentation Devices and Systems	Rangan Sarma, Mani	Tata McGraw Hill

B)Magazines/Journals :

- IEEE Robotics and Automation
- IEEE/ASME Transactions on Mechatronics.
- Mechatronics Journal

C)Software:

- Matlab/simulink
- Labview
- Ladder Programming: RS logix 500

D)Web sites for References:

- mechatronic-design.com
- www.springerlink.com
- www.iris.ethz.ch

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE: DIGITAL SIGNAL PROCESSING COURSE CODE: R14EX5504
COURSE CATEGORY: SPECIALISED CREDITS: 06

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
4	-	2	3	80	20	50	-	50	200

Rationale:

The signal for processing is mathematically modeled as a function or a sequence of numbers that represent the state or behavior of a physical system. The examples of the signals range from speech, audio, image and video in multimedia systems, electrocardiograms in medical systems (ECG/EKG), to electronic radar waveforms in military. Signal processing is concerned with the representation, transformation, and manipulation of signals and the information they contain. For example, we may wish to remove the noise in speech to make it clear, or to enhance an image to make it more natural. Signal processing is one of the fundamental theories and techniques to construct modern information systems.

Objectives:

Students completing this course are expected to have a good understanding of the

- Fundamentals and applications of discrete-time signals and systems, including sampling, convolution, filtering, and discrete Fourier transforms.
- They are expected to be able to design digital filters, and perform spectral analysis on real signals using the discrete Fourier transform.

COURSE DETAILS:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	1.1 Introduction to DSP 1.2 Review of discrete linear systems: [1] Discrete time signals. [2] Special sequences. [3] Shift invariance. [4] Stability and causality. [5] Impulse response. [6] Difference equations. 1.3 Discrete-Time Fourier Transform and Linear Time Invariant Systems: [1] Transform definitions. [2] Theorems. [3] Frequency response of linear time invariant systems. [4] Phase and group delays.	10	12

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2.	<p>2.1 The Z transform: [1] Z-transforms by summation of left, right, and two-sided sequences. [2] Regions of convergence and Z-transform properties. [3] Inverse Z-transform.</p> <p>2.2 Sampling: [1] Fourier transform review. [2] Sampling continuous-time signals: the sampling theorem. [3] Aliasing. [4] Re-sampling digital signals. [5] A/D conversion and quantization [6] D/A conversion [7] Poly phase decomposition [8] Poly phase DFT filter banks [9] Band pass sampling</p>	12	16
3.	<p>3.1 The discrete Fourier transform: [1] Definition of DFT and relation to Z-transform. [2] Properties of the DFT. [3] Linear and periodic convolution using the DFT. [4] Zero padding, spectral leakage, resolution and windowing in the DFT.</p>	10	12
4.	<p>4.1 The fast Fourier transform: [1] Decimation in time FFT. [2] Decimation in frequency FFT.</p> <p>4.2 Properties of digital filters: [1] Averaging filter. [2] Recursive smoother. [3] First-order notch filter. [4] Second-order unity gain resonator. [5] All-pass filters. [6] Comb filters. [7] Equalization filters. [8] Group delay, linear phase, all-pass, minimum phas</p>	10	12
5.	<p>5.1 Introduction to Digital filter design: 5.2 Magnitude and Phase response 5.3 Finite impulse response (FIR) filters: [1] Fourier series method [2] Frequency Sampling method</p> <p>[3] Window design techniques. [4] window functions [5] Kaiser window design technique.</p> <p>5.4 Infinite impulse response (IIR) filters: [1] Approximation of derivatives method [2] Impulse Invariant method [3] Bilinear transform method. [4] Butterworth , Chebysive [5] Frequency transformation</p>	12	16

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6.	6.1 Structures and properties of FIR and IIR filters: [1] IIR - Direct, parallel and cascaded realizations. [2] FIR – Direct and cascaded realizations. [3] Coefficient quantization effects in digital filters	10	12
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Teaching Methodology:

Chalk board, Group discussion, Guest lectures, Power Point Presentations

Term work:

Skills to be developed:

i) Intellectual Skills:

- Develop model -based thinking for systems and specifications
- Perform hierarchical abstractions during analysis and synthesis
- Integrate and evaluate information from a variety of sources
- Formulate and test hypotheses
- Be creative in the solution of problems and in the development of hypotheses

ii) Motor Skills:

- Analyse and design digital signal processing systems (Filters)
- Employ appropriate software tools in the design of digital signal processing circuits
- Ability to show input-output bindings

Softwares Required : .

TC , TCPP, Matlab

List of practical's:- using TC or Matlab. (Any Eight)

1. Program for linear convolution and circulation.
2. Program for cross correlation and Auto correlation.
3. Program for FFT.
4. Implementation of IIR Butterworth analog filter low pass and high pass filter.
5. Implementation of IIR Butterworth analog filter band pass and band stop filter.
6. Implementation of IIR Butterworth digital filter low pass and high pass filter.
7. Implementation of IIR Butterworth digital filter band pass and band stop filter.
8. Implementation of FIR filter for low pass , high pass, band pass and band stop filter using blackman window.

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9.Implementation of FIR filter for low pass , high pass, band pass and band stop filter using hamming window

10.Implementation of FIR filter for low pass , high pass, band pass and band stop filter using hanning window

11.Implementation of IIR filter design using impulse invariant method

12.Implementation of IIR filter design using bilinear transformation method

Professional practices:-

1.Collection of DSP processors and their comparison

2.Design and implementation of telephone line filters for echo cancellation

A)Books:-

SR. NO.	TITLE	AUTHOR	PUBLISHER
1.	Digital Signal Processing – Principles, Algorithms and Applications	J.G.Proakis & D.G.Manolakis	Pearson Ed.
2.	Digital Signal processing – A Computer Based Approach	S.K.Mitra	TMH Publishing Co.
3	Digital Signal Processing	P. Rameshbabu	Scitech Publications (India).
4	Digital Signal Processing	S.Salivahanan, A.Vallabraj & C. Gnanapriya Abhay K	TMH Publishing Co.
5	Digital Signal Processing	A. Nagoor Kani	TMH Education

A)Web sites for reference :

1. [http:// www.dspguide.com](http://www.dspguide.com)

2. <http://www.journals.elsevier.com/digital-signal-processing/>

3. http://www.analog.com/en/content/beginners_guide_to_dsp/fca.html

4. <http://www.dspguru.com/>

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DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : EMBEDDED SYSTEMS COURSE CODE: R14EX5505
COURSE CATEGORY: SPECIALISED CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	-	50	200

Rationale:

Due to tremendous growth of Embedded Systems in recent years, one needs to be familiar with its design aspects, characteristics. Also the knowledge and programming of Real Time Embedded System is must. This subject is the advanced part of the subject Microcontroller and Intefacing devices

This course enables students to know the devices, buses & also learn the embedded design of microcontroller. It helps student to get thorough explanation of embedded hardware architecture, interfacing techniques, buses and protocols, hardware and software interrupt, embedded software programming, modeling, inter-process synchronization and real time operating system.

Embedded System is exciting and challenging field. To meet the challenges of this growing technology, students should be well conversant with embedded system and real time implementation which provide actual applications of the embedded system.

Objectives:

The student will be able to:

- Describe the major components of embedded systems.
- Know about System on Chip (SoC) and its applications.
- Familiar with serial and parallel interfaces used in Embedded Systems.
- Explain the need of Inter-process communication & RTOS.
- Develop Programs in C language for interfacing various devices.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1.	Introduction to Embedded Systems- 1.1 Embedded Systems 1.2 Application Areas 1.3 Categories of Embedded Systems 1.4 Specialties of Embedded Systems 1.5 Recent trends in Embedded Systems Embedded System Architecture 1.6 Embedded Hardware Units 1.7 Examples of Embedded Systems 1.8 Embedded System on chip (SOC)& Use of VLSI circuit design Technology 1.9 SOC –block diagram 1.10 Case Study of digital camera 1.11 Case Study of automatic chocklet vending machine	12	16

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2.	<p>Survey of Software Architecture</p> <p>2.1 Round Robin architecture</p> <p>2.2 Round Robin with Interrupt architecture</p> <p>2.3 Function Queue Scheduling Architecture</p> <p>2.4 Real Time Operating System Architecture</p> <p>2.5 Selecting Architecture</p> <p>2.6 Embedded Software tools</p> <p>2.7 Embedded software development</p> <p>2.8 Application Software ,Communication Software</p> <p>2.9 Process of Generating Executable Image</p> <p>2.10 Cross platform Development</p>	10	12
3.	<p>Devices and Buses for Device Network</p> <p>3.1 Serial Communication & Parallel communication- concept and need</p> <p>3.2 IrDA</p> <p>3.3 Bluetooth</p> <p>3.4 I²C,</p> <p>3.5 CAN</p> <p>3.6 Ethernet</p> <p>3.7 USB</p> <p>3.8 IEEE 1394</p> <p>3.9 ISA Bus</p> <p>3.10 PCI,PCI-X Bus</p>	10	12
4.	<p>Inter-process Communication</p> <p>4.1 Multiple Process in an application</p> <p>4.2 Multiple Threads in an application</p> <p>4.3 Task</p> <p>4.4 Task State</p> <p>4.5 Task and Data</p> <p>4.6 Task and Task scheduler</p> <p>4.7 Interprocess communication</p> <p>4.8 Semaphore</p> <p>4.9 Mutex</p> <p>4.10 Mailbox</p> <p>4.11 Message Queue</p> <p>4.12 Pipes</p>	12	16
5.	<p>Device Driver</p> <p>5.1 Device Driver</p> <p>5.2 ISR concept</p> <p>5.3 Interrupt sources</p> <p>5.4 Interrupts handling Mechanism</p> <p>5.5 Multiple Interrupt</p> <p>5.6 Context-context switching</p> <p>5.7 Interrupt latency ,Deadline</p> <p>5.8 Direct memory access</p> <p>5.9 Parallel port device driver</p> <p>5.10 Device driver programming</p>	10	12
6.	<p>Embedded /RTOS concepts</p> <p>6.1 Architecture of Kernel</p> <p>6.2 Interrupt service routine</p> <p>6.3 Concepts of RTOS</p> <p>6.4 Requirement and Need of RTOS.</p> <p>6.5 Specification of RTOS in Embedded systems</p> <p>6.6 Starvation, Deadlock, Multiple process</p> <p>6.7 Problem of sharing data by Multiple task and routines</p>	10	12

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Teaching Methodology: Chalk-Board, discussion, Power Point Presentation, Simulation.

Term Work:

Skills to be developed:

i) Intellectual Skills:

- Ability to design algorithms and draw flowcharts for program.
- Ability to design the interfacing of memory, I/O devices to 8051 kit.
- Ability to write C programs for interfacing I/O devices.

ii) Motor Skills:

- Ability to handle PSoC development board.
- To establish serial communication between microcontroller development board and PC.
- Ability of interfacing I/O devices with 8051 development board.

List of Practical (Any Eight):

- 1.PSoC Development Board.
- 2.Addition of 8 bit & 16 bit numbers using PSoC Development Board.
- 3.C language programming – Stepper motor interfacing Serial port communication
- 4.C language programming – Servo motor interfacing
- 5.C language programming – Serial port communication
- 6.TFT display interfacing
- 7.GSM Module interfacing
- 8.Bluetooth Interface Card
- 9.ANDROID TABLET
- 10.ARM 9 –Board

Professional Practices:

- Arrange a guest lecture on Device Driver
- Market Survey of Embedded system –Digital camera and Cell Phone

Learning Resources:

A)Books :

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Embedded Systems-Architecture, Programming and Design	Raj Kamal	Tata McGraw-Hill Publishing Company Limited
2	Programming for Embedded systems	Dreamtech Software Team	Wiley Publications
3	Embedded / Real-Time Systems (Black Book)	Dr. K.V.K.K. Prasad	Dreamtech press
4	An Embedded Software primer	David E. Simon	Pearson Education Asia
5	Embedded System Design	Frank Vahid/Tony Givargis	Wiley India Education

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B) Magazines:

- i) Embedded For You
- ii) Electronics For You
- iii) Digit

C) Web sites for references:

- i) www.atmel.com
- ii) www.philips.com
- iii) www.xilinx.com
- iv) www.embedded.com

D) Web sites for references:

- www.atmel.com
- www.philips.com
- www.keil.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE: ADVANCED MICROPROCESSORS COURSE CODE: R14EX5506
COURSE CATEGORY: SPECIALISED CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50		50	200

Rationale: This subject comes under the technology area. The prerequisite of this subject is the thorough knowledge of architecture of 8051 microcontroller. The PIC and ARM microcontroller architecture is covered in this subject. The knowledge of programming & interfacing of peripherals will help the students in acquiring the design skills for standalone and real time embedded systems.

Objectives:

The student will be able to:

- Describe architecture and operation of PIC & ARM controllers.
- Develop assembly language programs.
- Design and develop microcontroller based standalone and real time systems.
- Use of special features of microcontrollers.
- Interface various devices using ports.

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1.	1.1 Overview of 8-bit, 16-bit and 32-bit Microprocessors and Microcontrollers. 1.2 PIC microcontroller framework 1.3 HARVARD architecture and pipelining 1.4 PIC18 family architecture. 1.5 Program memory considerations. 1.6 Register file structure. 1.7 Addressing modes. 1.8 CPU Registers, interrupts, special features.	12	16

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2.	2.1 PIC Instruction set. 2.2 Byte oriented, Single bit manipulation 2.3 Clear/move instructions. 2.4 Increment/decrement, complement. 2.5 Multiple bit manipulation , addition/subtraction , rotate instructions. 2.6 Conditional branch, GOTO/call/return from instruction	10	12
3.	3.1 MPASM Assembler and its use. 3.2 MPASM operations. 3.3 MPASM installation 3.4 Assembler Directives 3.5 Programs based on arithmetic instructions. 3.6 Programs based on logical instructions. 3.7 Creating and downloading Hex files into PIC RAM	10	12
4.	4.1 PIC I/O Port Programming 4.2 PIC18 Hardware Connection and ROM loaders 4.3 PIC18 Timers Programming 4.4 PIC18 Serial Port Programming 4.5 Interrupt Programming	12	16
5.	5.1 LCD Interface 5.2 Keypad Interface 5.3 External EEPROM 5.4 I2C interface 5.5 USB and HID Class 5.6 ADC and DAC Interfacing 5.7 Sensor and other Applications	10	12
6.	6.1 Introduction to 16/32 bit processor 6.2 ARM architecture and organization 6.3 ARM/Thumb programming model 6.4 CPU programming model of Registers, address data buses 6.5 ARM/Thumb Instruction Set –data transfer 6.6 ARM/Thumb Instruction Set –arithmetic 6.7 ARM/Thumb Instruction Set –logical 6.8 ARM/Thumb Instruction Set –program flow control 6.9 Assembly and C programming. 6.10 Development Tools	10	12

Teaching Methodology: Chalk-Board, discussion, Power Point Presentation, Expert Lectures.

A)Term Work: Skills to be developed:

i)Intellectual Skills:

- Ability to select the constraint wise microcontroller for system design.
- Ability to use special features PIC and ARM.

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ii) Motor Skills:

- Ability to interface various I/O devices to PIC.
- To design test systems based on PIC.

List Of Practicals (Any Eight) :

1. Study of MPASM assembler and simulator.
2. Simple arithmetic operation programs.
3. LCD display interfacing.
4. Sensor interfacing.
5. Port control programming using PIC.
6. ADC Interfacing.
7. DAC Interfacing.
8. Stepper Motor control.
9. Interfacing LCD to Arm microcontroller.
10. Interfacing KEYPAD to Arm microcontroller.

Professional Practices:

1. Searching the information about PIC and ARM Embedded products.
2. Guest lecture on RISC processors applications.

Learning Resources:

A) Books:

NO.	TITLE	AUTHOR	PUBLISHER
1	Design with PIC Microcontrollers	John B. Peatman	Pearson Education Asia
2	The PIC Microcontroller and Embedded Systems	M. A. Mazidi and J. G. Mazidi	Pearson Education Asia
3	Architecture Programming Interfacing and system Design	Rajkamal	Pearson Education Asia
4	ARM Architecture	Philips	Philips

B) Magazines:

- i) Embedded For You
- ii) Electronics For You

C) Web sites for references:

- i) www.atmel.com
- ii) www.philips.com
- iii) www.xilinks.com
- iv) www.embedded.com

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
COURSE : NETWORK COMMUNICATION COURSE CODE: R14EX5507
COURSE CATEGORY: SPECIALISED CREDIT : 06

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	--	50	200

Rationale:

In today's networking environment, we need to know about different networking technologies and configurations. Networking of computer is necessary in various business applications like online Banking, Railway Reservation, Industrial Automation, E-Business, E-Commerce etc. So we need to know the basic concept of networking, its applications, topologies, communication media, network directing devices, protocol used, OSI reference model and TCP/IP model, network devices and network operating system, installation and applications.

Objectives:

The students will be able to-

- Identify the types of network.
- Describe different types of topology.
- Describe different types of network devices.
- Compare OSI and TCP model.
- Describe functions of each layer of OSI model.
- Describe various communication networks like ISDN

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction: 1.1 Types of Networks -LAN,MAN,WAN, 1.2 Network Hardware-network topology 1.3 HUB, Bridge, Router, Repeater, Gateway 1.4 Design issues for the layers 1.5 Connection Oriented & Connectionless services. 1.6 Reference Models - OSI & TCP/IP, their comparison . The Physical Layer: 1.7 Transmission Media – magnetic media, twisted pair, coaxial cable, fiber optics. 1.8 Wireless Transmission - radio, Microwave, infrared wave . The Data Link Layer: 1.9 Data Link Layer Design issues, Error Detection & Correction. 1.10 Point -To-Point protocol	12	16

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2	Medium Access Sub layer: 2.1 Channel Allocation Problem - Static & Dynamic. 2.2 Multiple Accesses protocols - ALOHA, CSMA. 2.3 Collision Free Protocols 2.4 The Ethernet MAC sub layer Protocol 2.5 Wireless LAN- The 802.11 Protocol stack 2.6 IEEE 802.3 (CSMA/CD) 2.7 IEEE 802.4 (Token Bus) 2.8 IEEE 802.5 (Token Ring)	10	12
3	The Network Layer: 3.1 Network layer Design issues. 3.2 Circuit Switching 3.3 Packet Switching. 3.4 Routing Algorithm 3.5 Shortest Path routing 3.6 The network layer in the internet - the IP protocol, 3.7 IP addresses subnets. 3.8 Address Resolution Protocol.	10	12
4	The Transport Layer: 4.1 Process-To-Process Delivery. 4.2 The Internet Transport Protocols (TCP). 4.3 Port Numbers. 4.4 TCP Services. 4.5 Numbering bytes, Sequence Number. 4.6 TCP Segment Header. 4.7 TCP Connection-Connection Establishment, Termination & Resetting. 4.8 User Datagram Protocol (UDP) 4.9. Port Number, User Datagram and Applications	12	16
5	The Application Layer 5.1 Client -Server model. 5.2 Socket Interface. 5.3 Domain name system. (DNS) 5.4 Electronic mail (SMTP) and File Transfer. (FTP) 5.5 HTTP- The hypertext transfer protocol 5.6 World Wide Web- Architectural overview 5.7 Introduction to digital audio 5.8 Concept and applications of Internet Radio 5.9 Concept of Voice over IP 5.10 Applications of VoIP	10	12
6	Communication networks and security 6.1 Concept of ISDN 6.2 principles of broadband ISDN 6.2 Architecture of B-ISDN 6.3 Concept of ATM 6.4 Features of ATM 6.5 Definitions: CBR,VBR,ABR,UBR 6.6 ATM reference model 6.7 Concept of cryptography 6.8 Cryptographic principles 6.9 Secret key algorithms 6.10 Digital signature	10	12

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Teaching Methodology: Chalk board, Seminars, Guest lectures, Group Discussion, Power Point Presentations.

Term Work: Skills to be developed

i) Intellectual Skills:

- Ability to design a LAN using suitable topology.
- Ability to understand the different protocols used in networking.

ii) Motor Skills:

- Ability to install a LAN using switch.
- Ability to fault finding and troubleshooting in networking.

List of Practical (Any Eight) :

Group I :

1. Identification of various transmission media used in networking
2. Identification of various components required for LAN networking
3. Preparation of patch cords & cross connection cable required for LAN
4. Installation of Windows XP and Network operating system and creation of two subnets.

Group II :

1. Installation and configuration of Web Server
2. Installation of shared devices (for e.g. printer)
3. Implementation of LAN using star topology and connectivity between two computers using cross over UTP CAT5 cable.
4. Installation and configuration of Network Application FTP.
5. Installation and configuration of Network Application Telnet.
6. Installation of network browser for dialup connecting to network.
7. Installation of TCP/IP (version 4) protocols and configurations of advanced features
8. Execution of simple TCP/IP utilities and network commands (ping pong, ipconfig etc.)

Professional Practices :

1. Information Search, data collection on following topic
 - a. WAP
 - b. VoIP applications
 - c. High speed LANS

Student should submit a brief report of above topics as a part of term work.

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Learning Resources:

A)Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Computer Networks	Andrew S. Tanenbaum .	Pearson Education.
2	Data & Computer Communications	William Stallings.	Printice-Hall India
3	Computer Networks and Internetworking	D. E. Comer	Pearson Education.
4	Data Communication & Networking	Behrouz A. Forouzan.	Tata McGraw -Hill.

B) Web sites for references:

- 1 <http://www.cengagebrain.co.nz/content/9781133893820.pdf>
2. http://iwayan.info/Lecture/ISDN_S1/chap05b_OverviewISDN.PDF
3. http://www.webopedia.com/TERM/L/local_area_network_LAN.html
4. <http://www.csie.ntpu.edu.tw/~yschen/course/2011-2/CN/Chapter2.pdf>
5. http://tristan.host.cs.st-andrews.ac.uk/teaching/cs78_spring05/slides/transport-layer.pdf

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME: ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE NAME : WIRELESS COMMUNICATION COURSE CODE: R14EX5508

COURSE CATEGORY: SPECIALISED CREDIT : 06

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	-	50	200

Rationale:

The rapid progress and convergence of the field has created a need for new techniques and solutions, knowledgeable professionals to create and implement them, and courses to teach the background theory and technologies while pointing the way towards future trends. As cellular telephones become commonplace business tools, interest in wireless technology is booming. This course responds to that demand with comprehensive survey of field.

Wireless communication focuses on the cellular fundamentals including frequency reuse, channel assignments, third generation technologies. Also it covers concepts of upcoming technologies like OFDM, WLL, UWB etc.

Objectives: The students will be able to understand

- Concept of cellular telephone.
- Fundamentals of IP telephony.
- Concepts of GSM and CDMA technologies.
- Basics of channel structures of GSM and CDMA.
- Fundamentals of WLL, UWB, OFDM.

Course Details

UNIT	NAME OF THE TOPIC	HOURS	MARKS
01	Wireless standards and the cellular concept 1.1 Evolution of wireless standards (1G, 2G, 3G and 4G) 1.2 Comparison of all standards 1.3 Concept of the cell site, marketing image of hexagonal cells 1.4 Definitions: offered load, busy hour, GOS, average calling time, trunking efficiency, base station, forward channel, reverse channel, control channel. 1.5 Numerical based on Erlang B table 1.6 Frequency reuse concept 1.7 Cochannel and adjacent channel interference 1.8 Improving coverage and capacity in cellular system: cell splitting, cell sectoring, 1.9 Microcell zone concept 1.10 Handoff mechanism: need, type of handoff (hard, soft) 1.11 Roaming procedure 1.12 Numerical based on frequency reuse	12	16

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02	GSM and GPRS 2.1 GSM services 2.2 GSM architecture 2.3 MS identities (IMEI, IMSI, TMSI) 2.4 GSM radio subsystem 2.5 GSM channels: 2.5.1 Traffic channels 2.5.2 Control channels 2.6 Frame structure for GSM 2.7 Signal processing in GSM 2.8 Mobile originated call in GSM 2.9 Mobile terminated call in GSM 2.10 GPRS architecture	10	12
03	IP Telephony: 3.1 OSI model 3.2 IPv4 protocol header 3.3 Introduction to VoIP 3.4 PSTN architecture 3.5 Comparison of VoIP & PSTN. 3.6 H.323 network architecture 3.7 H.323 Protocol stack 3.8 SIP architecture 3.9 SIP call establishment (description of various SIP messages) 3.10 Applications & advantages.	10	12
04	CDMA and Channel allocation schemes 4.1 frequency and channel allocations (FCA, DCA, HCA) 4.2 Comparison of FCA, DCA, HCA 4.3 IS-95 system architecture 4.4 Concept of Walsh codes (Hadamard matrix introduction) 4.5 Comparison of GSM and CDMA technologies 4.6 CDMA channel structure(tree diagram) 4.7 Physical channels for CDMA 4.8 Logical channels for CDMA (message parameters carried over logical channels) 4.8.1 Pilot channels 4.8.2 sync channels 4.8.3 paging channels 4.8.4 access channels 4.9 CDMA traffic channels 4.9.1 forward traffic channels 4.9.2 reverse traffic channels	12	16
05	IMT 2000 (Third generation) 5.1 Introduction to 3G technologies 5.2 Comparison of 2G and 3G technologies 5.3 CDMA 2000: features 5.4 CDMA 2000 system architecture 5.5 TD-CDMA Architecture 5.6 TD-SCDMA Architecture 5.7 Concept of WCDMA 5.8 Commonality among WCDMA, CDMA2000, TD-CDMA, TD-SCDMA 5.9 Introduction to UMTS 5.10 UMTS services	10	12

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06	Emerging trends in wireless communication 6.1 Concept of WLL 6.2 Concept of LMDS 6.3 Concept of Wi-max 6.4 Features of Wi-max 6.5 Concept of UWB 6.6 Applications of UWB 6.7 Concept of orthogonality 6.8 Introduction of OFDM 6.9 OFDM transmitter and receiver- block diagram and working 6.10 OFDM applications	10	12
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Teaching Methodology: Chalk board, Seminars, Guest lectures, Group Discussion, Power Point Presentations.

Term work:

Skills to be developed:

i) Intellectual Skills:

- Ability to compare various generations of wireless communication.
- Ability to understand GSM, CDMA architecture.

ii) Motor Skills:

- Ability to draw waveforms at various stages in mobile handset.
- Ability to observe the simulation of CDMA technology.

List of Practicals (Any Eight) :

1. Observation and verification of waveforms at various points on mobile trainer kit.
2. Observation and verification of waveforms at various points on PSTN network system.
3. To verify various call control GSM AT commands
4. To verify various phone control and SMS text mode GSM AT commands
5. Observation and verification of waveforms at various points on CDMA network system.
6. Observation and verification of waveforms at various points on 3G mobile trainer kit.
7. MATLAB simulation of CDMA using CDMA blockset in SIMULINK
8. MATLAB simulation of OFDM using SIMULINK
9. Case study demonstration of VoIP technique
10. Design of 3/4 bit PN sequence
11. Configuration of Wimax cards as wireless bridge mode and as wireless repeater mode.
12. Observation and verification of waveforms at various points on OFDM trainer kit.

Professional practices:-

1. Present a report on various wireless standard.
2. Present the information report about different handsets of various companies like Nokia, LG, Samsung etc.

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Learning Resources:

A)Books:

SR.NO	TITLE	AUTHOR	PUBLISHER
1	Mobile Communication Engineering	William C.Y. Lee	McGraw Hill Telecommunications.
2	Mobile Communications	Jochen Schiller	Pearson
3	3G wireless networks	Client Smith, Daniel collins	Tata McGraw Hill
4	Wireless Communication Principles & Practice	T.S. Rappaport	Pearson Education
5	IS 95 CDMA and CDMA2000	Vijay K Garg	Pearson Education

B)Web sites for references:

1. http://www.tutorialspoint.com/gsm/gsm_architecture.htm
2. <https://www.eff.org/files/filenode/Division%20Multiple%20Access%20Technology.pdf>
3. <http://3g-network.blogspot.in/2009/05/cdma2000-mobile-wireless-network.html>
4. <http://www.agir.ro/buletine/687.pdf>
5. http://www.ieee.li/pdf/viewgraphs/introduction_orthogonal_frequency_division_multiplex.pdf
6. <https://sites.google.com/site/the4gtelecom/the-cdma-physical-layer>
7. http://web.ee.ccu.edu.tw/~wl/wireless_class/Chapter1%20Cellular%20Concepts.pdf

CUSROW WADIA INSTITUTE OF TECHNOLOGY, PUNE 1

DIPLOMA PROGRAMME : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 COURSE : SATELLITE AND RADAR COMMUNICATION
 COURSE CATEGORY: SPECIALIZED COURSE CODE : R14EX5509
 CREDITS : 6

Teaching and Examination Scheme:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
04	02	03	80	20	50	-	50	200

Rationale:

The use of satellites in communication systems is very much a fact of everyday life as is evidenced by many homes equipped with antennas used for satellite TV & telephones.

This subject provides a brief coverage of fundamentals of satellite & Radar.

Objectives:

The students will be able to

- Understand the principle of satellite communication system
- Describe various subsystems in satellite communication
- Understand the principle of radar system
- Know antenna and display systems used in radar engineering

Course Details:

UNIT	NAME OF THE TOPIC	HOURS	MARKS
01	Fundamentals Of Satellite Communication:- 1.1 Evolution and growth of communication satellite 1.2 Classification of satellite-synchronous, asynchronous, active and passive(only concept) 1.3 Satellite orbit(GEO, MEO, LEO, HEO) 1.4 Comparison of satellite orbits 1.5 Terms related to satellite communication- apogee, perigee, major axis, minor axis 1.6 Concept of footprint, satellite beams 1.7 Concept of station keeping 1.8 Satellite frequencies, frequency reuse 1.9 Kepler's laws of orbital motion 1.10 Orbital calculations 1.11 Numericals based on orbital calculations 1.12 Satellite communication applications	12	16

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02	Satellite Angles And Controls:- 2.1 Frequency bands used in satellite communication 2.2 Satellite speed and period 2.3 Look angle, azimuth angle 2.4 Angle of elevation, angle of inclination 2.5 Satellite communication system-Transponder, repeaters(uplink model) 2.6 Satellite communication system-Transponder, repeaters(downlink model) 2.7 Communication satellite-block diagram and working 2.8 Satellite subsystem Communication Subsystems-block diagram and working 2.9 Power subsystem- block diagram and working 2.10 Telemetry, command and control subsystem	10	12
03	Satellite Earth Station and applications 3.1 Satellite ground station-block diagram and working 3.2 Antenna subsystem 3.3 Receiver subsystem 3.4 Transmitter subsystem 3.5 Main and auxiliary propulsion subsystem 3.6 Communication channel subsystem 3.7 Satellite television- block diagram and working 3.8 Satellite telephone services –block diagram and working 3.9 Systems using geostationary satellites- Inmarsat, MSAT 3.10 Systems using low earth orbit satellites- Iridium, Globalstar	10	12
04	Fundamentals Of Radar:- 4.1 Concept of radar, 4.2 Simple radar system- block diagram and working 4.3 Terms related to radar -PRF, MUR, duty cycle, duplexer 4.4 Classification of radar-CW, pulse radar 4.5 Pulse radar- block diagram and working 4.6 Comparison of CW and pulse radar 4.7 Frequencies and power used in radar 4.8 Radar range equation-derivation 4.9 Factors influencing maximum range 4.10 Numerical 4.11 Significance of duplexer in radar 4.12 Radar receivers- general principles, concepts	12	16

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05	MTI And CW Radar: 5.1 Doppler effect 5.2 MTI radar block diagram, working and applications 5.3 Concept of analog and digital MTI radar 5.4 Comparison of analog and digital MTI radar 5.5 Applications of MTI radar 5.6 Blind speed 5.7 Radar beacons-concept and applications 5.8 CW Doppler radar- block diagram, working 5.9 Applications of CW Doppler radar 5.10 Concept of phased array and planar array radar	10	12
06	Displays And Antennas:- 6.1 Antenna scanning- horizontal scan pattern, vertical scan pattern, helical scan pattern, spiral scan pattern 6.2 Comparison of various scanning patterns 6.3 Antenna tracking-lobe switching, conical switching, monopulse switching 6.4 Tracking in range, tracking in doppler 6.5 Horn antenna, 6.6 Parabolic reflector 6.7 Concept of display methods-A-scope, plan position indicator, automatic target detection 6.8 Limitations and advantages of various display methods 6.9 Applications of various display methods 6.10 Comparison of various display methods	10	12

Teaching Methodology: Chalk-Board, Group Discussion, Seminars, Power Point Presentations.

Term Work:

Skills to be developed:

i)Intellectual Skills:

- Ability to understand active & passive satellite link.
- Ability to understand the transmission of data, audio and video over satellite link.

ii)Motor Skills:

- Ability to plot the characteristics of various microwave antennas.
- Ability to observe the audio delay effects.

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List of Practicals (Any Eight) :

1. Formation of passive satellite link
2. Formation of active satellite link
3. Transmission of data, audio and video simultaneously over satellite link.
4. Determine of telemetry & telecommand in satellite link.
5. Measurement of received signal strength through direct link and through satellite link.
6. Observation of audio delay effect.
7. Determination of audio and video bandwidth for active satellite link.
8. Plot characteristics of Horn antenna.
9. Study of phased array radars.
10. Determination of doppler shift in doppler Radar.
11. Measurement of frequency of piezo electric buzzer in doppler Radar.
12. Determination of accuracy of Radar.

Professional Practices:-

1. To search the technical specifications of radar used in ARMY, Aerodrum.
2. Find out the designing aspects of radar system.

Learning Resources:

A) Books:

SR.NO.	TITLE	AUTHOR	PUBLISHER
1	Satellite communication	Denis Roddy	Tata McGraw Hill
2	Satellite communication	Dr.D.C.Agarwal	Khanna publication
3	Principles of electronic communication	Louis.E.Frenzel	Tata McGraw Hill
4	Electronic communication system	Kennedy,Devis	Tata McGraw Hill
5	Microwave and radar engineering	M.Kulkarni	Umesh publication

B) Web sites for references:

- www.directv.com/learn/pdf/SelfInstallGuide.pdf
- www.connected-earth.com
- www.new.dli.ernet.in/rawdataupload/upload/.../20005bb0_268.pdf
- www.geo-orbit.org/sizepgs/sizemainp.html