ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

R14

Electronics and Communication Engineering

For

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for batches admitted from 2014-2015)

SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

SEETHARAMAPURAM, NARSAPUR-534 280, W.G.DT., A.P.

College Vision: "To provide the society with Center of Learning in Technical Education and Research that motivates the students to evolve into dynamic professionals."

College Mission:

Providing quality education, student centered teaching Learning process and state of the art infrastructure for professional aspirants hailing from both rural and urban areas.

Evolving this organization into a center of Academic and Research Excellence.

Imparting Technical Education that encourages independent thinking, develops strong domain knowledge and positive attitude towards holistic growth of young minds.

Vision of the Department: To impart quality technical education for Electronics and Communication Engineering Professionals by enriching technical knowledge to cater the needs of industry and society.

Mission of the Department:

M1: To facilitate the graduates in acquiring technical exposure to create innovative ideas through state of the art curriculum and conducive learning environment.

M2: To provide individual attention and build the character through quality technical education.

M3: To improve the professional skills of the rural students to fulfill the present industry and society requirements.

PROGRAM EDUCATIONAL OBJECTIVIES:

PEO1: Graduates shall have fundamental and advanced knowledge in Electronics and Communication Engineering in order to get employed in various organizations and to pursue higher studies.

PEO2: Graduates shall have ability in analyzing, designing and creating innovative solutions and projects for solving engineering and societal problems.

PEO3: Graduates shall have organizing capability, presentation skills and ethical practice.

PEO4: Graduates shall have skills for continued independent, lifelong learning to become experts in their profession.

PROGRAM OUTCOMES

1.Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2.Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3.Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7.Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11.Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12.Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1. INTRODUCTION

Academic Programmes of the institute are governed by rules and regulations approved by the Academic Council, which is the highest Academic body of the Institute. These academic rules and regulations are applicable to the students admitted during the academic year 2014-15 into first year of four year undergraduate programme offered by the college leading to Bachelor of Technology (B.Tech) degree in the disciplines viz., Computer Science and Engineering, Electronics and Communication Engineering, Electrical and Electronics Engineering, Information Technology, Mechanical Engineering & Civil Engineering.

EXTENT: All the rules and regulations, specified herein after will be read as a whole for the purpose of interpretation and when a doubt arises, the interpretation of the Chairman, Academic Council, Swarnandhra College of Engineering & Technology (Autonomous) is the final. As per the requirements of the Statutory Bodies, Principal, Swarnandhra College of Engineering & Technology (Autonomous), will be the Chairman of the College Academic Council.

2. ADMISSIONS:

2.1. Admission into first year of any Four Year B.Tech Programmes of study in Engineering:

Admissions into first year of B.Tech Programme of Swarnandhra College of Engineering & Technology (Subsequently referred to as SCET) will be as per the norms stipulated by Jawaharlal Nehru Technological University Kakinada & Govt. of Andhra Pradesh. Admissions in each programme in the Institution are classified into CATEGORY - A (70% of intake) through convener, EAMCET and CATEGORY- B (30% of intake) filled by the college management.

2.2. Admission into the Second year (Lateral Entry) of any Four year B.Tech Programme of study in Engineering: The candidates should have passed the qualifying exam.

(B.Sc. graduation & Diploma holders) for admission into the 3rd semester directly, based on the rank secured by the candidate at Engineering Common Entrance Test [ECET for (FDH)] in accordance with the instructions received from the Convener, ECET and Government of Andhra Pradesh.The candidate has to satisfy the other eligibility requirements stipulated by the JNT University Kakinada and / or the Government of Andhra Pradesh from time to time.

2.3. Admissions with advance standing: These may arise in the following cases:

a) When a student seeks transfer from other colleges to SCET and disireous to pursue the study at SCET in an eligible branch of study.

b) When students of SCET get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.

c) When a student after long discontinuity rejoins the college to complete his/her Programme of study for the award of degree.

d) When a student is not able to pursue his/her existing Programme of study but wishes to

get transferred to another Programme of study.

These admissions may be permitted by the Academic Council of SCET as per the norms stipulated by the statutory bodies and Govt. of Andhra Pradesh. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at SCET will be governed by the transitory regulations.

3.PROGRAMMES OFFERED (UNDER GRADUATE)

Presently, the college is offering Under Graduate Programmes in the following disciplines:

Computer Science and Engineering (CSE)
Electronics and communication Engineering
(ECE) Electrical and Electronics Engineering
(EEE) Information
Technology (IT) Mechanical
Engineering
(ME) Civil Engineering (CE)

3.1 **Structure of the Programme:**

Each Programme of a Discipline or branch of study will consist of:

i). General core courses in Basic Sciences, Engineering & Technology,Humanities, Mathematics and Management.

ii). Interdisciplinary courses in Engineering, to impart the fundamentals of Engineering.

iii). Compulsory core courses to impart broad based knowledge needed in the concerned branch of study.

iv). Elective courses from either the discipline or interdisciplinary areas / industry related opted by the student based on his/her interest in specialization.

v). Seminars, Technical Paper, Comprehensive Viva-Voce, Mini Project and Major Project approved by the Department to be submitted in the course of study.

Each Programme of study will be designed to have 40-45 theory courses and 16-18 laboratory courses. The distribution and types of courses offered from the above is indicated in the following

table.

General Core course	25-30%
Interdisciplinary course in engineering	15-20%
Compulsory Core courses in the branch of study	45-50%
Elective Courses	5-10%

Note: All components prescribed in the curriculum of any Programme of study will be conducted and evaluated.

Contact hours: Depending on the complexity and volume of the course the number of contact hours per week will be determined (4 to 6 hours per week per course).

Credits: Credits are assigned to each course as per norms mentioned in the following table.

Subject	Credits
Theory Course	03
Laboratory Course	02
Seminar/ Technical Paper	02
Soft Skills / Aptitude Lab	01
Comprehensive Viva	02
Mini Project	02
Major Project	06

3.2 Curriculum for each Programme of study:

- The Four year curriculum of any B.Tech Programme of study in any branch of Engineering is formulated based on the guidelines mentioned in 3.1 and will be recommended by the concerned Board of Studies and is approved by the Academic council of the college.
- In case of students admitted under lateral entry, the respective regular curriculum contents from 3rd semester onwards are to be pursued by them.
- In case of students admitted under advanced standing, the Programme of curriculum will be prepared by the concerned Board of Studies and the Academic Council has to approve the same.
- After approval from the Academic Council, Programme of curriculum for the same will be prepared and made available to all the students along with the academic regulations.

3.3 Maximum duration of study and cancellation of admission:

Maximum duration permitted for any student to successfully complete the four year B.Tech. Programme of study will be:

Eight academic years in sequence from the year of admission for a normal student admitted into first year of any Programme.

Six academic years in sequence from the year of admission for a Lateral entry student admitted into second year of any Programme.

For students admitted with advanced standing, the maximum time for completion of Programme of study, will be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

In case, any student fails to meet the above applicable/eligible conditions for the award of degree, his/her admission stands cancelled.

4. **DURATION OF THE PROGRAMME AND MEDIUM OF INSTRUCTION**: The duration of the B.Tech. Programme is four academic years consisting of eight semesters. The medium of instruction and examinations is in English. Students, who fail to fulfill all the academic requirements for the award of the degree within minimum of eight academic years, will forfeit their admission in B.Tech course.
5. **MINIMUM INSTRUCTION DAYS**: Each semester will consist of 22 weeks duration with minimum of 110 working days which includes instruction, Mid examinations and Final examinations. The no. of contact periods per week are 42 to 48.
6. **TRANSITORY REGULATIONS:**

For students admitted under advance standing, these transitory regulations will provide the modus of operandi. At the time of such admission, based on the Programme pursued (case by case) Equivalent courses completed by the student are established by the BOS of concerned discipline. Marks/Credits are transferred for all such equivalent courses and treated as successfully completed in the Programme of study prescribed by SCET.

A Programme chart of residual courses not completed will be derived and a Programme of study with duration specified will be prescribed for pursuit at SCET.

Marks obtained in the previous system, as the case maybe, are converted to grades and CGPA is calculated.

All other modalities and regulations governing will be the same as those applicable to the stream of students with whom, such a candidate is merged with current regulations.

7. DISTRIBUTION AND WEIGHTAGE OF MARKS:

(i) In each semester the course of study consists of 5/6 theory subjects +2/3 laboratories. However, in the 8th semester there will be only 3 theory subjects in addition to the major project work and comprehensive viva-voce.

(ii) The performance of a student in each semester will be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practical subject. In additionSeminars, Technical Paper and Mini Project are also evaluated. Mini Project, Technical paper and Seminar are for 50 marks. Main Project during 8th Semester is for 200 marks.

(iii) Seminar/Technical Paper: The Seminar/Technical paper has two components of study one from the topics of current study (course work) and the other component is suggested by the staff advisor, like reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on Seminar/Technical paper topic in the form of a report is to be submitted for evaluation along with presentation. The two components of the Seminar/Technical paper are evaluated for 50 marks each. in the semester. The average of the two components shall be taken as the final score. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

(iv) Mini Project: The mini project shall be carried out during the summer vacation for a minimum of 4 weeks after the 6th semester and is to be completed before the start of the 7th Semester. A report has to be submitted at the beginning of the 7th semester for assessment by an internal evulation committee comprising Head of the Department and two faculty of the department including the project Supervisor for 50 Marks. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

(v) For each theory subject the distribution will be 30 marks for internal evaluation and 70 marks for the end semester examination. The internal evaluation of 30 marks consists of descriptive test for 20 marks and objective test for 10 marks.

(vi) As part of internal assessment for each theory subject there will be 3 cycles of examinations. Each cycle consists of one descriptive test and one objective test which will be conducted after completion of two units of syllabus. Weighted average of three cycle's performance will be considered for award of internal assessment. A weight age of 50% for the first best cycle performance, 35% for

second best cycle performance and reaming 15% for the third cycle performance are given for internal evaluation.

(vii) The descriptive examination consists of 4 questions and three questions need to be answered in 90 minutes. The objective examination consists of 20 multiple choice questions and all are to be answered in 20 min of duration.

(viii) The end semester examination will be conducted for 70 marks covering the total syllabus of concerned subjects. In end semester examination pattern, Part – A consists of a compulsory question from all units (Brainstorming/Thought provoking/Case study) for 22 marks. Part – B has 6 questions (one question from each unit) of which three questions are to be answered and valued for 48 marks.

(ix) End practical examination will be conducted for 50 marks by the teacher concerned and external examiner. For practical subjects there will be continuous assessment during the semester for 25 internal marks with 15 marks for day-to-day work, including record valuation and 10 marks for two internal tests (80% for first best, 20% for second).

(x) For the subjects of design and / or drawing (such as Engineering Drawing, Machine Drawing etc.) and estimation, the distribution will be for 30 marks as internal evaluation with 10 marks for day-to-day work, 20 marks for three Internal tests (50% for first best, 35% for second best and 15% for third). End examination will be conducted for 70 marks.

(xi) Main Project: The project work to be carried out by the students during 8^{th} semester is evaluated for Internal assessment and External Examination.

a) Internal Assessment: Internal Assessment will be carried out by Project internal assessment committee consisting of 1) Head of the Department 2) Supervisor and 3) Senior faculty member appointed by the Principal.

b) External Examination: External Examination will be conducted by Project external examination committee consisting of 1) Head of the Department 2)Supervisoran

3) External Examiner selected from the panel of Examiners.

(xii) Total marks awarded for Project work is 200, of which 60 marks are for Internal Evaluation and 140 marks for External examination through presentation / viva - voice by / of each student. The internal evaluation will be on the basis of two seminars on the topic of the project.

(xiii) The comprehensive viva, evaluated for 50 marks during 8^{th} Semester. The comprehensive viva will be conducted/ evaluated on the topics covering the core aspects of the subjects in which the candidate is likely to be graduated.

8. ATTENDANCE REGULATIONS AND CONDONATION:

(i) A student will be eligible to appear for end semester examinations, if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects.

(ii) Condonation for shortage of attendance in aggregate, up to 10% on medical grounds (Above 65% and below 75%) in any semester may be granted by the College Academic Committee. However, the subject of granting condonation is totally at the discretion of the College Academic Committee (CAC).

(iii) The student will not be promoted to the next semester unless he/she satisfies the attendance requirements of the present semester as applicable. They may seek re-admission for that semester, as and when offered next by the Department.

(iv) Shortage of Attendance below 65% in aggregate in no case be condoned

(v) Students with less than 65% of attendance in any semester are not eligible to take up the end examination of that particular semester and their registration for examination will be cancelled.

(vi) A stipulated fee to be paid by the student towards condonation of attendance.

(vii) Attendance may also be condoned for those who participate in Intercollegiate/university sports, co- and extracurricular activities provided their attendance is in the minimum prescribed range for the purpose (>65% and <75%) and recommended by the concerned authority and condonation fees is to be paid.

(viii) A student will be condoned only twice during his entire course of study.

9. MINIMUM ACADEMIC REQUIREMENTS:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in S.No.8.

(i) A student will be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project if he/she secures not less than a minimum of 35% of marks exclusively in the end semester examinations in each of the subjects, for which the candidate had appeared. However, the candidate should have secured a minimum of 40% marks in both external and internal components put together to declare eligible for pass in the subject.

(ii) A student will be promoted from first sem to second sem , second sem to third and third to fourth sem, if he/she satisfies the minimum attendance requirement.

A student will be promoted from 4^{th} Semester to 5^{th} Semester, if he/she fulfills the academicrequirements of 40% of the credits up to 4^{th} Semester from all the examinations (Regular and Supplementary) whether or not the candidate takes the examinations.

(iii) A student will be promoted from 6^{th} to 7^{th} Semester, only if he/she fulfills the academic requirements of 40% of the credits up to 6^{th} Semester from, all the examinations (Regular and Supply) whether or not the candidate takes the examinations.

(v) There will be Supplementary examinations along with the Regular semester examinations enabling thestudents to give a fair chance to appear in the subject if any failed.

(vi) Student who fails in 8th Semester can re-appear for Advanced Supplementary Examinations soon after the announcement of result.

10. ELIGIBILITY FOR AWARD OF DEGREE:

A student shall be eligible for award of the B.Tech. Degree if he/she fulfills all the following conditions:

(i) Pursued a course of study for a stipulated period of four years and not more than eight years from the year of admission.

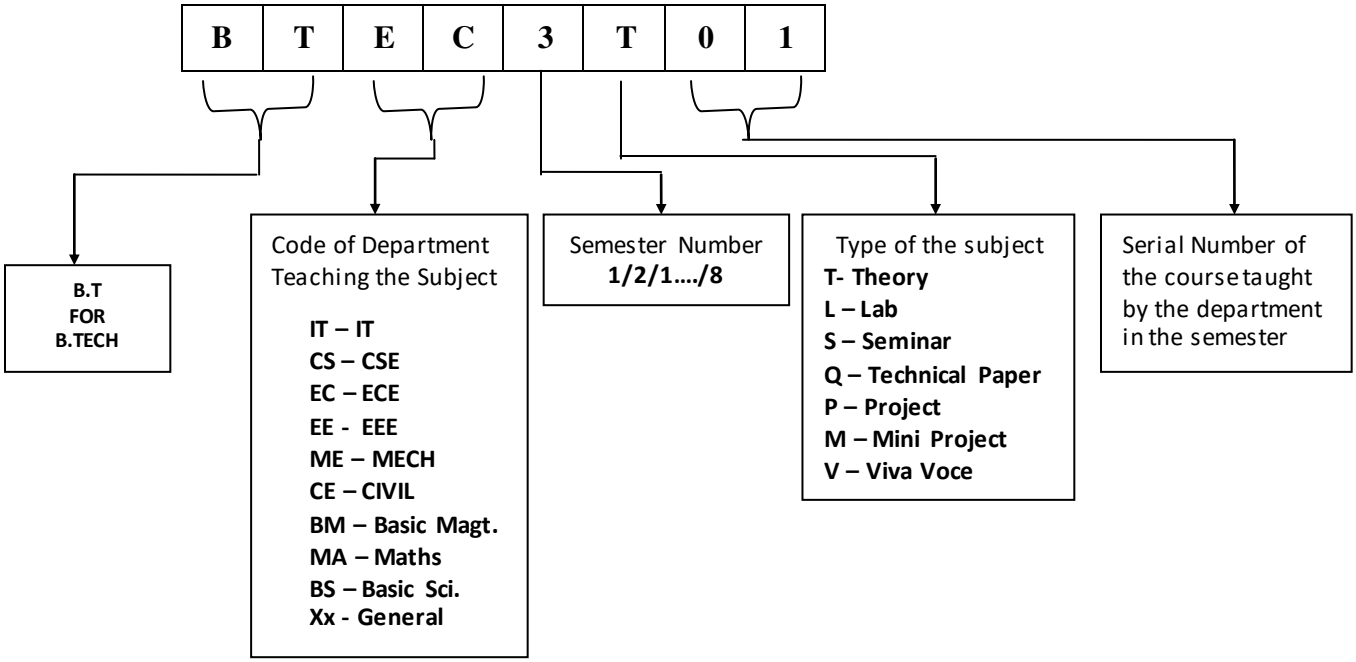
(ii) Registered and successfully completed all the components prescribed in the programme of study to which he/she is admitted.

(iii) Obtained CGPA greater than or equal to 5 (minimum requirements for pass).

(iv) Has no dues to the institute, hostels, libraries, NCC/NSS etc., and No disciplinary action is pending against him/her

11. COURSE CODE & COURSE NUMBERING SCHEME:

The subject codes will be given by the department teaching the subject. Each subject code contains 8 characters. The 8 characters for each subject will be filled as per the following guidelines.



12. GRADING SYSTEM:

12.1 Award of Grade:

(i) Grade Point Average (GPA):

a) The Grade Point Average (GPA) will be calculated according to the formula. $CGPA = \sum CiGi / Ci$ ---------- (1)

Where C_i = number of credits for the subject i

G_i = grade points obtained by the student in the subject.

b) Semester Grade Point Average (SGPA) is awarded to candidates considering all the subjects of the semester. Zero grade points are also included in this computation.

c) To arrive at Cumulative Grade Point Average (CGPA), the formula (2) is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

$CGPA = \sum CiGi / Ci$ ---------- (2)

Where C_i = number of credits for the subject i

G_i = grade points obtained by the student in the subject.

(ii) After a student satisfies the requirements prescribed for the award of UG/PG Program he/she shall be placed in one of the following four grades. The award of the degree is based on CGPA on a grade point scale of 10.

CGPA	Award of Division
8.00*	First Class with Distinction
7.00	First Division
6.00	Second Division
5.00	Pass Division
<5.00	Unsatisfactory

* In addition to the required CGPA of 8, the student must have necessarily passed all the courses of every semester in the minimum stipulated period for the programme.

12.2 Award of Grade in Each Semester:

(i) Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each subject. The letter grades and the corresponding grade points are as given in the Table.

ERCENTAGE OF MARKS SCORED	PERCENTAGE OF MARKS SCORED	GREAD POINTS
>=90	S	10
80 – 89	A	9
70-79	B	8
60-69	C	7
50-59	D	6
40-49	E	5
<40	F	FAIL

(ii) A student earns a minimum of 5 grade points (E grade) in a subject is declared to have successfully completed the subject, and is deemed to have earned the credits assigned to that subject. However it should be noted that a pass in any subject/term paper/seminar/project/mini project shall be governed by the rules mentioned in S.No.7.

(iii) Grade Sheet: A grade sheet (memorandum) will be issued to each student indicating his/her performance in all courses taken in that semester and also indicating the grades and SGPA.

(iv) Transcripts: After successful completion of the total programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

(v) Candidates shall be permitted to apply for recounting/revaluation within the stipulated period with payment of prescribed fee.

(vi) The Academic Council has to approve and recommend to the JNTUK, Kakinada for the award of a degree to any student.

13. **SUPPLEMENTARY EXAMINATIONS**: In addition to the Regular Final Examinations held at the end of each semester, Supplementary Final Examinations will be conducted during the academic year. A student can appear for any number of supplementary examinations till he/she clears all courses which he/she could not clear in the first attempt. However the aximum stipulated period cannot be relaxed under any circumstance.
14. **ADVANCED SUPPLEMENTARY EXAMINATIONS**: Candidate who fails in the subjects of 8th Semester can appear for Advanced Supplementary Examinations soon after the announcement of result.

15. ACADEMIC REGULATIONS FOR B.TECH (LATERAL ENTRY SCHEME):

(i) The students have to acquire 132 credits from 3 Semester to 8 Semester of B.Tech Programme (regular) for the award of the degree.

(ii) Students, who fails to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

(ii) Students, who fails to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

(iii) The same attendance regulations are to be adopted as per the rules mentioned in item No.8.

(iv) Rules for Promotion in to Next Higher Class: (6th Semester to 7th Semester): A student shall be promoted from 6th Semester to 7th Semester only if he/she fulfills the academic requirements of40% credits up to 6th Semester.

16. CONDUCT AND DISCIPLINE:

(a) Students shall conduct themselves within and outside the premises of the institute in a manner befitting to be the student of our institution.

(b) As per the order of Honorable Supreme Court of India, ragging in any form is considered as a criminal offence and is strictly banned. Any form of ragging will be severely dealt with.

(c) The following acts of omission and/or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.

(i) Lack of courtesy and decorum inducement behavior anywhere within or outside the campus.

(ii) Willful damage or distribution of alcoholic drinks or any kind of narcotics or of fellow students/citizens.

(d) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.

(e) Mutilation or unauthorized possession of library books.

(f) Noisy and unseemly behavior, disturbing studies of fellow students.

(g) Hacking in computer systems (such as entering into other person's areas without prior permission, manipulation and/or damage of computer hardware and software or any other cybercrime etc).

(h) Usage of cells phones and cameras in the class room/campus.

(i) Plagiarism of any nature in any academic report of submission.

(j) Any other act of gross indiscipline as decided by the academic council from time to me.

(k) Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute / hostel, debarment from examination, disallowing the use of certain facilities of the institute, suspension for a specified period or even outright expulsion from the institute, or even handing over the case to appropriate law enforcement authorizes or the judiciary, as required by the circumstances.

(l) For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief Warden, the Head of the Department and the principal respectively, shall have the authority to reprimand or impose fine.

(m)Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the principal for taking appropriate action.

(n) All cases of serious offence, possible requiring punishment other than reprimand, shall be reported to the Academic council.

(o) The Institute Level Standing Disciplinary Action Committee constituted by the academic council, shall be the authority to investigate the details of the offence, and recommend

disciplinary action based on the nature and extent of the offence committed.

(p) The Principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Programmes Committee in an appropriate manner, and subsequently such action shall be placed before the academic council for ratification, Any emergency modification of regulation,

approved by the academic council earlier, shall be reported to the academic council for ratification.

(q) "Grievance and Redressal Committee" (General) constituted by the principal shall deal with all grievances pertaining to the academic / administrative/disciplinary matters.

(r) All the students must abide by the code and conduct rules of the college.

17. MALPRACTICES: The Principal shall refer the cases of malpractices in internal assessment tests and Semester-End Examinations, to a Malpractice Enquiry Committee, constituted by him/her for the purpose. The principal will take necessary action, against the erring students basing on the recommendations of the committee and shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Heads of the Departments in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved in the Heads of the Departments meetings, shall be reported to the academic council for ratification.

18. AMENDMENTS TO REGULATIONS:

The Academic Council of Swarnandhra College of Engineering & Technology (Autonomous) reserves the right to revise, amend or change the Regulations, Schemes of Examinations, and/or Syllabi or any other matter pertained suitable to the needs of the students, society, industry without any notice.

ELECTRONICS & COMMUNICATION ENGINEERING
COURSE STRUCTURE – UG

SEMESTER - I

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTBS1T01	English-I	3	-	-	3	30	70	100
2	BTMA1T01	Differential Equations	3	1	-	3	30	70	100
3	BTMA1T02	Numerical Methods and Integral Transforms	3	1	-	3	30	70	100
4	BTBS1T02	Engineering Chemistry	3	1	-	3	30	70	100
5	BTBS1T04	Environmental Studies	3	1	-	3	30	70	100
6	BTCS1T01	C-Programming	3	1	-	3	30	70	100
7	BTBS1L01	English Communication Skills Lab-1	-	-	3	2	25	50	75
8	BTBS1L02	Engineering Chemistry Lab	-	-	3	2	25	50	75
9	BTCS1L01	C-Programming Lab	-	-	3	2	25	50	75
		Total				**24**	**255**	**570**	**825**

SEMESTER – II

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTBS2T01	English-II	3	-	-	3	30	70	100
2	BTMA2T01	Linear Algebra and Vector Calculus	3	1	-	3	30	70	100
3	BTEE2T01	Networks & Synthesis	3	1	-	3	30	70	100
4	BTBS2T03	Engineering Physics	3	1	-	3	30	70	100
5	BTME2T01	Engineering Drawing	1	3	-	3	30	70	100
6	BTCS2T01	OOPS through C++	3	1	-	3	30	70	100
7	BTBS2L01	English Communication Skills Lab-II	-	-	3	2	25	50	75
8	BTBS2L03	Engineering Physics Lab	-	-	3	2	25	50	75
9	BTCS2L01	OOPS through C++ Lab	-	-	3	2	25	50	75
		Total				**24**	**255**	**570**	**825**

SEMESTER – III

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTEC3T01	Electronic Devices & Circuits	3	1	-	3	30	70	100
2	BTMA3T02	Mathematics of Communication Engineering	3	1	-	3	30	70	100
3	BTEC3T02	Signals & Systems	3	1	-	3	30	70	100
4	BTCS3T04	JAVA Programming	3	1	-	3	30	70	100
5	BTBM3T02	Principles of Economics & Management	3	3	-	3	30	70	100
6	BTEE3T04	Electrical Technology	3	1	-	3	30	70	100
7	BTEC3L01	Electronic Devices & Circuits Lab	-	-	3	2	25	50	75
8	BTEE3L03	Electrical Engineering Lab	-	-	3	2	25	50	75
9	BTBS3L01	Soft Skills/Aptitude Lab-I	-	-	2	1	25	-	25
		Total				**23**	**255**	**570**	**775**

SEMESTER – IV

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTEC4T01	Electronic Circuit Analysis	3	1	-	3	30	70	100
2	BTEC4T02	Essentials of Analog Communications	3	1	-	3	30	70	100
3	BTEC4T03	EM Waves And Transmission Lines	3	1	-	3	30	70	100
4	BTEE4T02	Control Systems	3	1	-	3	30	70	100
5	BTEC4T04	Pulse & Digital Circuits	3	1	-	3	30	70	100
6	BTEC4T05	Switching Theory & Logic Design	3	1	-	3	30	70	100
7	BTEC4L01	Electronic Circuit Design and Testing Lab	-	-	3	2	25	50	75
8	BTEC4L02	Analog Communications Lab	-	-	3	2	25	50	75
9	BTBS4L01	Soft Skills/Aptitude Lab-II	-	-	3	1	25	-	25
		Total				**23**	**255**	**520**	**775**

SEMESTER – V

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTEC5T01	Antennas & Wave Propagation	3	-	-	3	30	70	100
2	BTEC5T02	Digital Communications	3	1	-	3	30	70	100
3	BTEC5T03	Digital IC Applications	3	1	-	3	30	70	100
4	BTEC5T04	Linear IC Applications	3	1	-	3	30	70	100
5	BTEC5T05	Electronic Measurements & Instrumentation	3	1	-	3	30	70	100
6	BTCS5T06	Computer Organization & Architecture	3	1	-	3	30	70	100
7	BTEC5L01	Digital Communications Lab	-	-	3	2	25	50	75
8	BTEC5L02	Linear IC Applications Lab	-	-	3	2	25	50	75
9	BTEC5S01	Seminar	-	-	-	2	50		50
		Total				**24**	**280**	**520**	**800**

SEMESTER – VI

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTEC6T01	Digital Signal Processing	3	-	-	3	30	70	100
2	BTEC6T02	Microprocessors And Micro Controllers	3	1	-	3	30	70	100
3	BTEC6T03	Microwave Engineering	3	1	-	3	30	70	100
4	BTEC6T04	Basics of VLSI and Subsystem design	3	1	-	3	30	70	100
5	BTCS6T06	Computer Networks	3	1	-	3	30	70	100
6		Elective-I	3	1	-	3	30	70	100
7	BTEC6L01	HDL Lab	-	-	3	2	25	50	75
8	BTEC6L02	Microprocessors & Micro Controllers Lab	-	-	3	2	25	50	75
9	BTEC6Q01	Technical Paper	-	-	3	2	25	25	50
10	BTEC6H01	Hobby Project	MANDATORY						
		Total				**24**	**255**	**545**	**800**

SEMESTER – VII

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTEC7T01	EMI/EMC	3	-	-	3	30	70	100
2	BTEC7T02	Digital Image Processing	3	1	-	3	30	70	100
3	BTEC7T03	Optical Communications	3	1	-	3	30	70	100
4	BTEC7T04	Tele Communication Switching Systems	3	1	-	3	30	70	100
5		Elective-II	3	1	-	3	30	70	100
6		Elective-III	3	1	-	3	30	70	100
7	BTBM7T01	Professional Ethics & Intellectual Property Rights	3	1	-	MANDATORY			
8	BTEC7L01	Micro Wave & Optical Communications Lab	-	-	3	2	25	50	75
9	BTEC7L02	Digital Signal Processing Lab	-	-	3	2	25	50	75
10	BTEC7M01	Mini Project	-	-	-	2	25	25	50
		Total				24	255	545	800

SEMESTER – VIII

S.No	Course Code	Course Name	L	T	P	C	I	E	TM
1	BTEC8T01	Radar Systems	3	-	-	3	30	70	100
2		Elective-IV	3	1	-	3	30	70	100
3	BTEC8P01	Project Work	-	-	6	6	60	140	200
4	BTEC8V01	Comprehensive Viva Voce	-	-	-	2	50	-	50
		Total				14	170	280	450

ELECTIVE I

S.NO	Course Code	Course Name
1	BTEC6TE1	Audio & Video Engineering
2	BTCS6TE5	Data structures
3	BTEE6TE4	Power Supplies

ELECTIVE II

S.NO	Course Code	Course Name
1	BTEC7TE1	software defined radio
2	BTEC7TE2	CPLD&FPGA Architecture and Applications
3	BTCS7TE7	Operating Systems

ELECTIVE III

S.NO	Course Code	Course Name
1	BTEC7TE3	Cellular Mobile Communications
2	BTEC7TE4	Satellite Communications
3	BTEC7TE5	Embedded Systems

ELECTIVE IV

S.NO	Course Code	Course Name
1	BTEC8TE1	Bio-Medical Engineering
2	BTCS8TE5	Cloud computing
3	BTEC8TE2	GNSS

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SEMESTER-I	L	T	P	C
	3	1	-	3
BTBS1T01: ENGLISH-I				

DETAILED TEXT-I English Essentials : Recommended Topics :

1. IN LONDON: M.K.GANDHI

   OBJECTIVE: To apprise the learner how Gandhi spent a period of three years in London as a student.

   OUTCOME: The learner will understand how Gandhi grew in introspection and maturity.

2. THE KNOWLEDGE SOCIETY- APJ KALAM

   OBJECTIVE: To make the learners rediscover India as a land of Knowledge.

   OUTCOME: The learners will achieve a higher quality of life, strength and sovereignty of a developed nation.

3. PRINCIPLES OF GOOD WRITING:

   OBJECTIVE: To inform the learners how to write clearly and logically.

   OUTCOME: The learner will be able to think clearly and logically and write clearly and logically.

4. MAN'S PERIL

   OBJECTIVE: To inform the learner that all men are in peril.

   OUTCOME: The learner will understand that all men can come together and avert the peril.

5. THE DYING SUN—SIR JAMES JEANS

   OBJECTIVE: This excerpt from the book "The Mysterious Universe" presents the mysterious nature of the Universe and the stars which present numerous problems to the scientific mind. Sir James Jeans uses a poetic approach to discuss the scientific phenomena.

   OUTCOME: This provides the students to think about the scientific phenomena from a different angle and also exposes the readers to poetic expressions.

6. LUCK—MARK TWAIN

   OBJECTIVE: This is a short story about a man's public image and his true nature. The theme of the story is that luck can be a factor of life, so that even if one is incompetent but lucky, one can still succeed.

   OUTCOME: The story is humorous in that it contains a lot of irony. Thus this develops in the learner understand humorous texts and use of words for irony.

TEXT BOOK : "English Essentials by Ravindra Publications

NON-DETAILED TEXT: (From Modern Trailblazers of Orient Blackswan) (Common single Text book for two semesters) [Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)]

1. G. D. Naidu

OBJECTIVE: To inspire the learners by G. D. Naidu's example of inventions and contributions. OUTCOME: The learner will be in a position to emulate G. D. Naidu and take to practical applications.

2. G. R. Gopinath

OBJECTIVE: To inspire the learners by his example of inventions.

OUTCOME: Like G. R. Gopinath, the learners will be able to achieve much at a low cost and help the common man.

3. Sudhamurthy

OBJECTIVE: To inspire the learners by the unique interests and contributions of Sudhamurthy.

OUTCOME: The learner will take interest in multiple fields of knowledge and make life worthwhile through social service.

4. Vijay Bhatkar

OBJECTIVE: To inspire the learner by his work and studies in different fields of engineering and science.

OUTCOME: The learner will emulate him and produce memorable things.

TEXT BOOK: "Trail Blazers" by Orient Black Swan Pvt. Ltd. Publishers

SEMESTER-I	L	T	P	C
	3	1	-	3
BTMA1T01: DIFFERENTIAL EQUATIONS				

UNIT – I

Differential equations of first order and first degree

Linear-Bernoulli-Exact-Reducible to exact.

Applications: Newton's Law of cooling-Law of natural growth and decay- Orthogonal trajectories.

UNIT – II

Linear differential equations of higher order Non-homogeneous equations of higher order with constant coefficients with RHS term of the type

ax ax

e^{ax}, sin ax, cos ax, polynomials in x, e V(x), xV(x). Method of Variation of parameters for solving second order linear differential equations

Applications: LCR circuit, Simple Harmonic motion

UNIT – III:

LAPLACE TRANSFORMS

Laplace transforms of standard functions-Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function-

UNIT – IV

Inverse Laplace transforms

Inverse Laplace transforms -Convolution theorem (without proof).

Application: Solutions of ordinary differential equations of using Laplace transforms.

UNIT – V

Mean value theorems (Without poof) & Partial Differentiation

Rolle's Theorem-Lagrange's mean value Theorem –Cauchy's mean value theorem - Taylor series and Maclaurin's series expansions of functions of single variable - Jacobian, Functional dependence.

UNIT – VI

First order Partial differential equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations-Solutions of Linear Partial differential equations with constant coefficients by the method of separation of Variables.

TEXT BOOKS:

1. B.S. GREWAL, Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. B.V. RAMANA, Higher Engineering Mathematics, Tata McGraw

Hill REFERENCES:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, 9th Edition, Wiley-India

SEMESTER-I	L	T	P	C
	3	1	-	3
BTMA1T02: NUMERICAL METHODS & INTEGRAL TRANSFORMS				

UNIT – I

Solution of Algebraic and Transcendental Equations:

Introduction- Bisection Method – Method of False Position – Iteration Method – NewtonRaphson Method.

UNIT – II

INTERPOLATION

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences –Central differences – Symbolic relations and separation of symbols, Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unevenly spaced points – Lagrange's Interpolation formula

UNIT – III

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Solution by Taylor's series-Picard's Method of successive Approximations - Euler's Method– Runge-Kutta Methods

UNIT – IV

FOURIER SERIES

Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series

UNIT – V

FOURIER TRANSFORMS

Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms

UNIT –VI

Z-TRANSFORM:

Introduction– properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse z transform- -Convolution theorem.

Applications: Solution of difference equation by Z-transforms.

TEXT BOOKS:

1. B.S. GREWAL, Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. B.V. RAMANA, Higher Engineering Mathematics, Tata McGraw Hill
3. V. RAVINDRANADH, P. VIJAYA LAXMI, A Text Book on Mathematical Methods by Himalaya Publishing House.

REFERENCES

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. S. S. Sastri (PHI), Introductory Methods of Numerical Analysis.

SEMESTER-I	L	T	P	C
	3	1	-	3
BTBS1T02: ENGINEERING CHEMISTRY				

UNIT – I

WATER TECHNOLOGY:

Hard water-Estimation of Hardness By EDTA Method-Potable Water-Sterilization and Disinfection-Boiler Feed Water-Boiler Troubles-Priming And Foaming, Scale Formation, Corrosion, Caustic Embrittlement, Turbine Deposits-Softening of Water – Lime Soda, Zeolite Processes – Ion Exchange Process- Reverse Osmosis-Electro Dialysis.

UNIT – II

ELECTRO CHEMISTRY:

Electro Potential –Determination of single electrode potential –Standard electrode potential - Nernst Equation(problems) – Electro Chemical cell (Galvanic Cell) -Reference Electrodes-Standard Hydrogen Electrode, Calomel Electrode -– Ion Selective Electrode –Glass electrode – Determination of pH –conductometric titration- Potentiometric titrations-Batteries – Primary Cell: Dry Cell, Alkaline Battery – Secondary Cell: Lead Acid Accumulator, Lithium Ion Battery – Fuel Cells – Hydrogen – Oxygen Fuel Cell, Methanol – Oxygen Fuel Cell- solar cell - Photovoltaic Cell-Applications.

UNIT – III

CORROSION:

Introduction - Theories of Corrosion(i) Dry Corrosion (Pilling Bed worth rule) (ii) Wet Corrosion – Galvanic Series – Types of Corrosion: Galvanic Corrosion, Differential Aeration Corrosion, Pitting Corrosion, Stress Corrosion – Factors Influencing Corrosion – Nature of The Metal , Nature of The Environment – Corrosion Control: Material Selection & Design – Cathodic Protection- Surface Coatings – Methods of Applications on Metals -Hot Dipping, Electroplating, Electroless Plating) – Organic Surface Coating – Paints – Their Constituents & Their Function.

UNIT – IV

FUELS:

Introduction to Fuels – Classification – Solid Fuels Merits & Demerits - Calorific Value – HCV and LCV– Bomb Calorimeter - Problems Based on Calorific Values – Analysis of Coal (Proximate and Ultimate Analysis) – Numerical Problems Based on Analysis – Working of Thermal Power Station; Liquid Fuels Merits & Demerits – Petroleum – Refining – Cracking (types) –Petrol – Diesel Knocking – Octane Number, Cetane Number - Gaseous Fuels Merits & Demerits – Natural Gas – LPG, CNG.

UNIT – V

POLYMERS SCIENCES & TECHNOLOGY

POLYMERS – Introduction – Types of Polymers – Mechanism of Polymerization (Addition and Condensation) – Individual Polymers (Preparation Properties and uses of PS, PVC and

Bakelite) Conducting Polymers – Biodegradable Polymers – Stereo Specific Polymers, Ziegler Natta Catalysis.

PLASTIC – Types – Compounding of Plastics – Moulding (Four Types) – Fiber Reinforced Plastics - Bullet Proof Plastics – Engineering Applications.
RUBBER &ELASTOMERS: Introduction –Preparation – Vulcanization – Compounding of Rubber – Preparation, Properties and Uses of Buna-S, Buna-N and Thiokol-Engineering Applications.

UNIT – VI
ENGINEERING MATERIALS

Refractories – Ceramics (Types, Properties Applications) – Cement – Hardening and Setting-Deteriorations of cement concrete – Nanomaterials (Preparation, Properties & Applications of Carbon Nano tubes) – Definitions of Green Chemistry – Principle – Engineering Applications.

TEXT BOOKS

1. Jain and Jain (Latest Edition), Engineering Chemistry, Dhanpat Rai Publishing company Ltd.
2. N. Y. S. Murthy, V. Anuradha, K Ramana Rao" A Text Book of Engineering Chemistry",
   Matuthi Publications.
3. K.Sesha Maheswaramma and Mridula Chugh (2013) A Text Book of Engineering Chemistry,
   Pearson Publications.

REFERENCES:

1. Shashi Chawal "A Text Book of Engineering Chemistry, Dhanpat Rai Publishing company Ltd,
2. S. S. Dara (2013) Text Book of Engineering Chemistry, S. Chand Technical Series.

SEMESTER-I	L	T	P	C
	3	1	-	3
BTBS1T04: ENVIRONMENTAL STUDIES				

UNIT – I
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance –Sustainability: Stockholm and Rio Summit–Global Environmental
Challenges: Global warming and climate change, acid rains, ozone layer depletion.

UNIT – II
NATURAL RESOURCES: NATURAL RESOURCES AND ASSOCIATED PROBLEMS
Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity
Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable life styles.

UNIT – III
ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION:
Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems. Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels - India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV
ENVIRONMENTAL POLLUTION:
Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies.Solid Waste Management: Sources, classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products.

UNIT – V
SOCIAL ISSUES AND THE ENVIRONMENT

Population growth and explosion, effects. Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Role of information Technology in Environment and human health. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act – Motor Vehicle Act - Issues involved in enforcement of environmental legislation - Public awareness.

UNIT – VI
ENVIRONMENTAL MANAGEMENT

Environmental ethics - Issues and possible solutions and Environmental Education - Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism The student should submit a report individually on any issues related to Environmental Studies course and make a power point presentation – Field work: visit to an industrial area/ecosystem area (Forest, Grassland, Desert, and Aquatic)

TEXT BOOK:

1. Environmental Studies by K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. A text book of Environmental Studies by C. P. Kaushik & Anubha Kaushik, New Age International Publishers.

REFERENCE:

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A text book of Environmental Studies by Shaashi Chawla, TMH, New Delhi.

SEMESTER-I	L	T	P	C
	3	1	-	3
BTCS1T01: C-PROGRAMMING				

UNIT-I

INTRODUCTION:

Introduction to Computer System, Hardware and Software, Algorithm, Flowchart, Types of Computer Languages.

FUNDAMENTALS OF C:

C Character Set, Tokens, Identifiers, Constants, Basic Data Types and Sizes, Operators: Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operator, Increment and Decrement Operators, Assignment Operators, Bit-wise Operators, Special Operators, Expressions, Operator Precedence and Order of Evaluation, Evaluation of Expressions, Type Conversions: Implicit and Explicit.

UNIT-II:

CONTROL STRUCTURES:

Selection Statements: if-else Statement, null else Statement, nested if Statement, else-if Statement, switch Statement, Applications.

Iterative Statements: break statement, continue statement, counter and event controlled loops, while loop, do-while loop, for loop, Looping Applications.

ARRAYS:

Introduction to arrays, declaration, initialization and accessing array elements of 1-D Arrays, declaration, initialization and accessing elements of 2-D Arrays, Strings, String Functions, Application of Arrays.

UNIT-III:

FUNCTIONS:

Introduction to Functions, User-Defined & Library Functions, Parameter Passing, Return Statement Storage Class, Recursion, Recursive Functions and Recursive Solutions for different problems, C Preprocessor, Passing 1-D Arrays and 2-D Arrays to Functions.

UNIT-IV:

POINTERS:

Introduction to Pointers, Declaration, Initialization and Accessing a Pointer, Passing by Address, Pointer as Function Argument, Pointer Arithmetic, Pointer to Pointer, Pointer to Multi-dimensional Arrays, Dynamic Memory Management Functions, Command Line Arguments.

UNIT-V:

DERIVED TYPES:

Definition, Declaration and Initialization of Structures, Accessing Structures, Nested structures, Array of Structures, Structures and Functions, pointer to structure, Self-Referential Structures,bit-fields, Definition, Declaration and Initialization of Unions, Type-definition.

UNIT-VI:

FILES:

Introduction to Files, File Streams: binary and text, Formatted I/O functions: fprintf( ), fscanf( ), and File I/O Functions: feof ( ), rewind( ), ferror ( ), fopen ( ), fclose ( ).

TEXT BOOKS:

1.The C Programming Language Kernighn & Ritchie
2.PHI Programming in C: A Practical Approach Ajay Mittal.
3.Pearson Programming in ANSIC: E.Balagurusamy TMH.

REFERENCES:

1. Understanding and using C Pointers Richard Reese Oreilly.

SEMESTER-I	L	T	P	C
	-	-	3	2
BTBS1L01: ENGLISH COMMUNICATION SKILLS LAB – I				

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

BASIC COMMUNICATION SKILLS

UNIT 1 A. Greeting and Introductions
B. Pure Vowels

UNIT 2 A. Asking for information and Requests
B. Diphthongs

UNIT 3 A. Invitations
B. Consonants

UNIT 4 A. Commands and Instructions
B. Accent and Rhythm

UNIT 5 A. Suggestions and Opinions
B. Intonation

TEXT BOOK: 'Strengthen your Communication Skills' Part-A by Maruthi Publications

REFERENCES:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

SEMESTER-I	L	T	P	C
	-	-	3	2
BTBS1L02: ENGINEERING CHEMISTRY LAB				

List of Experiments

Introduction to chemistry lab
Estimation of HCl using standard Na_2CO_3

Analysis of Water

1 Determination of Total hardness of water

2 Estimation of Ferric iron

3 Estimation of $KMnO_4$ using standard $H_2C_2O_4$

4 Estimation of Copper (Iodometry)

5 Estimation of Dissolved Oxygen by Wrinkles Method

6 Determination of pH the of given water sample

7 Conductometric titration of strong acid Vs Strong base.

8 Potentiometric Titration of Strong Acid Vs Strong Base

9 Preparation of Phenol-Formaldehyde Resin

Estimation of properties of Oil

10 Acid Number

11 Saponification value

Student has to do Any Ten Experiments of the Following

MANUAL:

1. Engineering Chemistry Lab Manual Prepared by Chemistry Faculty.

SEMESTER-I	L	T	P	C
	-	-	3	2
BTCS1L01: C- PROGRAMMING LAB				

EXERCISE 1

a) Write a C Program to calculate the area of triangle, circumference of a circle.

b) Write a C program to find the largest of three numbers using ternary operator. c)Write a C Program to swap two numbers without using a temporary variable.

EXERCISE 2

a) Write a C program to find the roots of a Quadratic Equation.

b) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

EXERCISE 3

a) Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and

1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

EXERCISE 4

a) Write a C Program to print the multiplication table of a given number n up to a given value, where n is entered by the user.

b) Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.

c) Write a C Program to check whether the given number is Armstrong number or not & Perfect number or not.

EXERCISE 5

a) Write a C program to interchange the largest and smallest numbers in the array.

b) Write a C program to Search and element in the array using linear search. Exercise 6

a) Write a C program to input two m x n matrices, check the compatibility and perform addition and multiplication of them

EXERCISE 7

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

i. To insert a sub-string in to given main string from a given position.

ii. To delete n Characters from a given position in a given string.

iii. To replace a character of string either from beginning or ending or at a specified location

EXERCISE 8

a) Write C Programs for the following string operations without using the built in functions - to concatenate two strings - to append a string to another string - to compare two strings

EXERCISE 9

a) Write C Programs for the following string operations without using the built in functions - to find t he length of a string - to find whether a given string is palindrome or not

EXERCISE 10

a) Write a C functions to find both the largest and smallest number of an array of integers. b)Write C programs illustrating call by value and call by reference concept.

EXERCISE 11

Write C programs that use both recursive and non-recursive functions for the following i)To find the factorial of a given integer.

ii)To find the GCD (greatest common divisor) of two given integers.

iii)To find Fibonacci sequence

EXERCISE 12

a) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

b)Write a C program to swap two numbers using pointers

c)Write a C Program to compare two arrays using pointers

EXERCISE 13

Examples which explores the use of structures, union and other user defined variables Exercise 14

a) Write a C program which copies one file to another using command line argument. b)Write a C program to count the number of characters and number of lines in a file.

c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

SEMESTER-II	L	T	P	C
	3	-	-	3
BTBS2T01: ENGLISH-II				

DETAILED TEXT-II : Sure Outcomes: English for Engineers and Technologist

Recommended Topics :

1. **TECHNOLGY WITH A HUMAN FACE**

OBJECTIVE: To make the learner understand how modern life has been shaped by technology. OUTCOME: The proposed technology is people's technology. It serves the human person instead of making him the servant of machines.

2. **CLIMATE CHANGE AND HUMAN STRATEGY**

OBJECTIVE: To make the learner understand how the unequal heating of earth's surface by the Sun, an atmospheric circulation pattern is developed and maintained.

OUTCOME: The learner's understand that climate must be preserved.

3. **EMRGING TECHNOLOGIES**

OBJECTIVE: To introduce the technologies of the 20th century and 21st centuries to the learners.

OUTCOME: The learner will adopt the applications of modern technologies such as nanotechnology.

4. **WATER- THE ELIXIR OF LIFE**

OBJECTIVE: To inform the learner of the various advantages and characteristics of water.

OUTCOME: The learners will understand that water is the elixir of life.

5. **THE SECRET OF WORK**

OBJECTIVE: In this lesson, Swami Vivekananda highlights the importance of work for any development.

OUTCOME: The students will learn to work hard with devotion and dedication.

6. **WORK BRINGS SOLACE**

OBJECTIVE: In this lesson Abdul Kalam highlights the advantage of work.

OUTCOME: The students will understand the advantages of work. They will overcome their personal problems and address themselves to national and other problems.

TEXT BOOK : "Sure Outcomes" by Orient Black Swan Pvt. Ltd. Publishers

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)
(Common single Text book for two semesters)
(Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)

1. J.C. Bose
   OBJECTIVE: To apprise of J.C.Bose s original contributions.
   OUTCOME: The learner will be inspired by Bose s achievements so that he may start his own original work.
2. HomiJehangirBhaba
   OBJECTIVE: To show Bhabha as the originator of nuclear experiments in India.
   OUTCOME: The learner will be inspired by Bhabha s achievements so as to make his own experiments.
3. Vikram Sarabhai
   OBJECTIVE: To inform the learner of the pioneering experiments conducted by Sarabhai in nuclear energy and relevance of space programmes.
   OUTCOME: The learner will realize that development is impossible without scientific research.
4. A Shadow- R.K.Narayan
   OBJECTIVE: To expose the reader to the pleasure of the humorous story
   OUTCOME: The learner will be in a position to appreciate the art of writing a short story and try his hand at it.

TEXT BOOK : "Trail Blazers by Orient Black Swan Pvt. Ltd. Publishers

SEMESTER-II	L	T	P	C
	3	1	-	3
BTMA2T01: LINEAR ALGEBRA & VECTOR CALCULUS				

UNIT I

LINEAR SYSTEMS OF EQUATIONS:

Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination-Gauss Jordon and Gauss Seidal Methods. Application: Finding the current in an electrical circuit.

UNIT II

EIGEN VALUES - EIGEN VECTORS AND QUADRATIC FORMS:

Eigen values - Eigen vectors– Properties (without proof)– Cayley-Hamilton Theorem (without proof) - Quadratic forms- Reduction of quadratic form to canonical form – Rank, index, signature and nature of the Quadratic form.

Applications: Finding Inverse and powers of a matrix by using Cayley-Hamilton theorem.

UNIT III

MULTIPLE INTEGRALS:

Multiple integrals - Double and triple integrals – Change of variables – Change of order of Integration

Application: Applications of Integration to Lengths, Volumes and Surface areas of solids of revolution in Cartesian and Polar Coordinates.

UNIT IV

SPECIAL FUNCTIONS:

Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Application: Evaluation of improper integrals.

UNIT V

VECTOR DIFFERENTIATION:

Gradient- Divergence- Curl - Laplacian and second order operators - Vector identities Application: Equation of continuity, potential surfaces

UNIT VI

VECTOR INTEGRATION:

Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (without proof) and related problems. Application: Work done by a force

TEXT BOOKS:

1 B.S. GREWAL, Higher Engineering Mathematics, 42 nd Edition, Khanna Publishers
2. B.V. RAMANA, Higher Engineering Mathematics, Tata McGraw Hill

REFERENCES:

1.ERWIN KREYSZIG, Advanced Engineering Mathematics, 9th Edition, Wiley-India
2.S. S. SASTRI (PHI), Introductory Methods of Numerical Analysis.
3.V. RAVINDRANADH, P. VIJAYA LAXMI, A Text Book on Mathematical Methods by Himalaya Publishing House.

SEMESTER-II	L	T	P	C
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BTEE2T01: NETWORKS & SYNTHESIS				

UNIT – I

INTRODUCTION TO ELECTRICAL CIRCUITS:

Network elements classification, Electric charge and current, Electric energy and potential, Resistance parameter – series and parallel combination, Inductance parameter – series and parallel combination, Capacitance parameter – series and parallel combination. Energy sources: Ideal, Non-ideal, Independent and dependent sources, Source transformation, Kirchhoff's laws, Mesh analysis and Nodal analysis.

UNIT – II

A.C FUNDAMENTALS AND NETWORK TOPOLOGY:

Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor- problem solving, Phase angle, Phasor representation, Addition and subtraction of Phasors, mathematical representation of sinusoidal quantities, explanation with relevant theory, problem solving. Principle of Duality with examples.Network Topology: Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, Basic Tie-set schedule, Basic Cut-set schedule.

UNIT – III

STEADY STATE ANALYSIS OF A.C. CIRCUITS:

Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and Phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, Problem solving.

UNIT – IV

COUPLED CIRCUITS AND RESONANCE:

Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance, general case-resistance present in both branches, anti resonance at all frequencies.

UNIT – V

Network Theorems: Thevenin's, Norton's, Millman's, Reciprocity, Compensation, Substitution, Max.

Power Transfer, Tellegen's Theorems - problem solving using dependent sources also.

UNIT-VI

Network synthesis: Positive real function, Basic Synthesis procedure, LC Immittance functions, RC Impedance functions, RL impedance function or RC admittance functions, Foster and Cauer methods.

TEXT BOOKS:

1. Engineering Circuit Analysis – William H. Hayt, Jack E.Kemmerly, and S. Durbin, Ta McGraw-Hill Company,6 th edition.

2.Electrical Circuit Analysis (Including Passive Network Synthesis) – C. L. Wadhwa, 2nd Edition,New Age International Publishers.

REFERENCES:

1.Network Analysis – A. Sudhakar and Shyammohan S Palli, 1st Edition, Tata McGraw- Hill Publications.

2.Network Analysis – N.C.Jagan, C.LakshmiNarayana, 2nd edition , BS Publications.

3.Network Synthesis – Van Valkenburg, Prentice-Hall of India Private Ltd.

4.Introduction to circuit analysis and design – Tildon Glisson, Jr. Springer Publications

SEMESTER-II	L	T	P	C
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BTBS2T03: ENGINEERING PHYSICS				

UNIT – I

CRYSTALLOGRAPHY AND X-RAYDIFFRACTION (6HOURS)

Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Crystal systems – Bravais lattices – Structures and packing fractions of SC, BCC and FCC-Directions and planes in crystals – Miller indices – Separation between successive (h k l) planes – Bragg's law- Bragg's Spectrometer.

UNIT – II

QUANTUM MECHANICS FOR ELECTRONIC TRANSPORT:

Quantum Mechanics And Electron Theory Of Metals Schrodinger Time Independent and Time Dependent wave equations – Particle in a box – Classical free electron theory – electrical conductivity – Mean free path– Relaxation time and drifty velocity – Quantum free electron theory– Fermi – Dirac distribution function (analytical) and its dependence on temperature – Fermenergy.

BAND THEORY OF SOLIDS: Bloch theorem (qualitative) – Kronig – Penney model – Origin of energy band formation in solids – Classification of materials into conductors, semi – conductors & insulators – Concepts of effective mass of electron and concept of hole.

UNIT – III

MAGNETIC RESPONSE OF MATERIALS & SUPERCONDUCTIVITY

MAGNETIC PROPERTIES : Magnetic permeability – Magnetization – Origin of magnetic moment – Classification of Magnetic materials – Dia, Para, Ferro, Anti-Ferro and Ferri-magnetism – Hysteresis curve by Weiss Domain Theory -Soft and Hard Magnetic materials

SUPERCONDUCTIVITY: General properties – Meissner effect – Type I and Type II superconductors – London's equations – Penetration depth – BCS Theory- Flux quantization – DC and AC Josephson effects-Applications of Superconductors .

UNIT – IV

COHERENT OPTICS – COMMUNICATIONS AND STRUCTURE OF MATERIALS:

LASERS: Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – three level and four level laser pumping schemes – Population inversion – Ruby laser – Helium-Neon laser- Applications of Laser.

FIBER OPTICS: Introduction-Principle of wave propagation in Optical Fiber-Acceptance angle and acceptance cone-Numerical aperture-Types of optical fibers - Application of optical fibers.

UNIT – V

SEMICONDUCTOR PHYSICS

Introduction – Intrinsic semiconductor and carrier concentration – Equation for conductivity – Extrinsic semiconductor and carrier concentration – Drift and diffusion – Einstein's equation – Hall Effect – direct & indirect band gap semiconductors.

UNIT – VI

DIELECTRIC PROPERTIES& ACOUSTICS:

DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, ionic and orientation polarizations - Internal fields in solids - Clausius-Mossotti equation - Ferro and Piezo electricities

ACOUSTICS: Sound absorption, absorption coefficient and its measurements, Reverberations time– Sabine's formula, Eyring's formula.

TEXT BOOKS:

1. A Text Book of Engineering Physics by M. N. Avadhanulu & P. G. Kshirasagar (S. Chand publications)
2. Engineering Physicsby Mani Naidu S (Pearson Publications)

REFERENCES:

1. Introduction to solid state physics by Charles Kittle (Willey India Pvt.Ltd)
2. Applied Physics by T. Bhimasenkaram (BSP BH Publications)
3. Applied Physics by M. Arumugam (Anuradha Agencies)
4. Engineering Physics by Palanisamy (Scitech Publishers)
5. Engineering Physics by D.K.Bhattacharya (Oxford University press)
6. Engineering Physics by Sanjay D Jain and Girish G Sahasrabudhe (University Press)
7. Engineering Physics by B.K.Pandey & S. Chaturvedi (Cengage Learning)

SEMESTER-II	L	T	P	C
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BTME2T01: ENGINEERING DRAWING				

UNIT – I

INTRODUCTION:

Engineering Drawing and Plane Curves, Use of Drawing Instruments and Conventions.

GEOMETRICAL CONSTRUCTIONS: Constructions of Polygons using General Method

CONICS: Construction of Ellipse, Parabola and Hyperbola by Eccentricity Method.

CYCLOIDAL CURVES: Construction of Cycloid, Epi-Cycloid and Hypo-Cycloid.

UNIT – II

PROJECTIONS OF POINTS AND LINES:

Introduction to Orthographic Projections - Projection of Points, PROJECTION OF STRAIGHT LINES: Parallel to both the Planes, Parallel to One Plane and Inclined to Other Plane, Inclined to Both the Planes.

UNIT – III

PROJECTIONS OF PLANES:

Introduction to Perpendicular Planes, Perpendicular to both the Reference Planes, Perpendicular to One Plane and Parallel to Other Plane, Perpendicular to One Plane and Inclined to Other Plane, Inclined to Both the Reference Planes.

UNIT – IV

PROJECTIONS OF SOLIDS:

Projections of Simple Solids like Prism, Cylinder, Pyramids and Cones. Projections of Solids with Axis Perpendicular to one Plane, Projections of Solids with Axis Parallel to Both the Planes.

UNIT – V

PROJECTIONS OF SOLIDS – AXIS INCLINED TO ONE PLANE: Projections of Solids with Axis inclined to one plane and Parallel to other Plane (Axis inclined to the VP and Parallel to the HP, Axis Inclined to the HP and Parallel to the VP).

UNIT – VI:

ISOMETRIC PROJECTIONS: Principles of Isometric Projections - Isometric Scale, Isometric Projections of Planes,

Simple Solids, Conversion of Isometric to Orthographic Views and Vice Versa.

TEXT BOOKS:

1) Engineering Drawing by K.L. Narayana & P. Khannaiah., SCIETECH Publishers.
2) Engineering Drawing by M.B. Shah & B.C. Rana., Pearson's Publishers.

REFERENCE BOOKS:

1) Engineering Drawing by N.D. Bhatt, Charotar Publishers.
2) Engineering Drawing by K. Venugopal., NEW AGE Publications.

SEMESTER-II	L	T	P	C
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BTCS2T01: OOPS THROUGH C++				

UNIT – I

INTRODUCTION:

Differences between C and C++ , The Object Oriented Technology, Disadvantages of Conventional Programming, Advantages of OOP, Structure of a C++ Program, Header Files and Libraries.

INPUT and OUTPUT in C++:

Streams, Stream Classes, Pre-defined Streams and Stream Classes, Formatted and Unformatted Data, Unformatted Console I/O Operations, Member Functions of Input Stream Classes, Formatted Console I/O Operations, Bit Fields, Manipulators, User Defined Manipulators.

UNIT – II

Tokens in C++, Variable Declaration and Initialization, Data Types, Operators in C and C++, Scope Access Operators, Comma Operator, Revision of Decision Statements, Control Loop Statements

FUNCTIONS IN C++:

Structure of a Function, Passing Arguments, L Value and R Values, Return by reference, Returning more values by reference, Default arguments, Const Arguments, Inputting Default Arguments, Inline Functions, Function Overloading, Recursion

UNIT – III

CLASSES AND OBJECTS:

Classes in C++, Declaring Objects, Access Specifiers and their scope, Member functions, Outside member functions as inline, Data Hiding or Encapsulation, Classes, Objects and Memory, Static Member variables, Static Member Functions Static Object, Array of Objects, Objects as Function Arguments, Friend Functions, The Const Member Functions, The Volatile Member Functions, Recursive Member Functions, Local Classes, Empty , Static and Const Classes, Member Function and Non-Member Function, Overloading Member Functions, Nested Classes

UNIT – IV

CONSTRUCTORS AND DESTRUCTORS:

Characteristics of Constructors & Destructors, Applications of Constructors, Parameterized Constructors, Overloading Constructors, Constructor with Default Arguments, Copy Constructor, the Const Objects, Destructors, Qualifiers and Nested Classes

OPERATOR OVERLOADING AND TYPE CONVERSION:

Overloading Unary Operators, Constraint on Increment and decrement operators, Overloading binary operators, Overloading with friend functions, Overloading Assignment operator, type conversion, rules for overloading operators

UNIT – V

INHERITANCE:

Reusability, Access Specifiers and Simple Inheritance, Protected data with private inheritance, types of inheritances, virtual base class, Constructors, Destructors and Inheritance, Object as Class member, Abstract Classes, Qualifier Classes and Inheritance, Constructor in Derived Class, Pointer and Inheritance, Overloading member function, advantages and disadvantages of Inheritance

UNIT – VI

APPLICATIONS WITH FILES:

File Stream Classes, File Opening Modes, File Pointers and manipulators, Manipulators with Arguments, Sequential Access Files, Binary and ASCII Files, Random Access Files

EXCEPTION HANDLING:

Principles of Exception handling, the keywords: try catch, throw, exception handling mechanism, multiple catch statements, catching multiple exceptions

TEXT BOOKS:

1. Programming in C++, Ashok N Kamthane, Pearson 2nd Edition.
2. Object Oriented Programming through C++, E Balagurusamy, Mc Graw Hill Education.

REFERENCES:

1. Object Oriented Programming C++, Joyce Farrell, Cengage.
2. Mastering C++, Venugopal, Rajkumar, Ravi Kumar TMH.
3. Object Oriented Programming with C++, 2nd Ed, Sourav Sahay OXFORD.

SEMESTER-II	L	T	P	C
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BTBS2L01: ENGLISH COMMUNICATION SKILLS LAB – II				

Suggested Lab Manuals:

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

ADVANCED COMMUNICATION SKILLS

UNIT 1 Body Language

UNIT 2 Dialogues

UNIT 3 Interviews and Telephonic Interviews

UNIT 4 Group Discussions

UNIT 5 Presentation Skills

UNIT 6 Debates

TEXT BOOK: 'Strengthen your Communication Skills' Part-B by Maruthi Publications

REFERENCES:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

SEMESTER-II	L	T	P	C
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BTBS2L03: ENGINEERING PHYSICS LAB				

Student has to do Any Ten Experiments of the Following

1. Determination of the Rigidity Modulus of given material wire using Torsional Pendulum.
2. Determination of the Acceleration due to Gravity and Radius of Gyration using Compound Pendulum.
3. Determination the Frequency of vibration in Transverse and Longitudinal Modes using Melde's Apparatus.
4. Determination Frequency of A.C supply by using Sonometer
5. Determination of wavelength using Laser.
6. Determination of Numerical Aperture of an Optical Fiber.
7. Determination of the Planck's constant using Photo-Cell.
8. Study the variation of Magnetic Field along the axis of a solenoid coil using Stewart - Gee's Apparatus.
9. Determination of the Time Constant for a C-R Circuit.
10. Determination of the Band Gap of a Semiconductor using a p-n junction diode.
11. Study of Characteristic curves (I/V) of a Zener diode to determine its Breakdown voltage.
12. Determination of Thermoelectric coefficient of a Thermistor by using its Characteristic curve.

MANUAL:

1. Engineering Physics Lab Manual Prepared by Physics Faculty.

SEMESTER-II	L	T	P	C
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BTCS2L01: OOPS THROUGH C++ LAB				

EXERCISE 1

Write a CPP program that contains a function to exchange values of two arguments (swap) by using pointers and reference parameters.

EXERCISE 2

Write a CPP program to find the given string is palindrome or not. Declare private member function to find palindrome of the given string and access it using public member function.

EXERCISE 3

Write a CPP program to find transpose of 2D matrix and allocate memory dynamically to the matrix using dynamic memory allocation. Initialize and display contents of the matrix and de-allocate memory.

EXERCISE 4

Write a CPP program to add two polynomials of any degree using object as function arguments. Hint: create two objects each represent one polynomial equation.

EXERCISE 5

Write a CPP program to add corresponding elements of two 2D matrices using friend function. Create two classes each capable of storing one 2D matrix. Declare the matrix under private access specifier and access them outside the class.

EXERCISE 6

Write a program to find total and average marks of each student in class. Create a student class with student number, name, 6 subject marks as its members and initializes the details. Use friend class that access the details of student and calculates total, average marks and prints the result.

EXERCISE 7

Write a program to add two matrices of same copy. Create two objects of the class and each of which refers one 2Dmatrix. Use constructor to allocate memory dynamically and use copy constructor to allocate memory when one array object is used to initialize another.

EXERCISE 8

Write a Program to Generate Fibonacci Series by using Constructor to Initialize the Data Members.

EXERCISE 9

Write a program for finding area of different geometric shapes (circle, Rectangle, cube). Use function overloading with type, order, sequence of arguments to find the area of shapes.

EXERCISE 10

Write a program which prompts the user to enter a string and returns the length of the longest sequence of identical consecutive characters within the string using pointers to data members and member function. For example, in the string "aaaAAAAAjjB", the longest sequence of identical consecutive characters is "AAAAA".

EXERCISE 11

Write a program to calculate gross and net pay of employee from basic salary. Create employee class which consists of employee name, emp_id, and basic salary as its data members. Use parameterized constructor in the derived class to initialize data members of the base class and calculate gross and net pay of the employee in the derived class.

EXERCISE 12

Write a program to calculate bonus of the employees. The class master derives the information from both admin and account classes which intern derives information from class person. Create base and all derived classes having same member functions called get data, display data and bonus. Create a base class pointer that capable of accessing data of any class and calculates bonus of the specified employee. (Hint: Use virtual functions)

EXERCISE 13

Write a program to add two matrices of mxn size using binary operator over loading.

Exercise 14

Write a program to find transpose of a given matrix of mxn size using unary operator overloading.

EXERCISE 15

Write a program to concatenate one string to another using binary operator overloading.

EXERCISE 16

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

a. To copy contents of one file into another file.
b. To replace a word with other word in a given file
c. To count the no of occurrences of a word in a given file

EXERCISE 17

Write a program to sort a given set of elements using function template.

EXERCISE 18

Write a program to search a key element in a given set of elements using class template.

EXERCISE 19

Write a program to find average marks of the subjects of a student. Throw multiple exceptions and define multiple catch statements to handle division by zero as well as array index out of bounds exceptions.

EXERCISE 20

Write a program to find factorial of a given number. Throw multiple exceptions and define multiple catch statements to handle negative number and out of memory exception. Negative number exception thrown if given number is negative value and out of memory exception is thrown if the given number is greater than 20.

SEMESTER-III	L	T	P	C
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BTEC3T01: ELECTRONIC DEVICES AND CIRCUITS				

UNIT - I

ELECTRON BALLASTICS:

Motion of a charged particle in electric and magnetic fields, simple problems involving electric and magnetic fields only, electrostatic and magneto static deflection sensitivities, constituents of cathode ray oscilloscope, cathode ray tube, the electron gun, focusing, deflection system, uses of cathode ray oscilloscope.

UNIT-2

JUNCTION DIODE CHARACTERSTICS:

P and N Type semiconductors, open circuited PN Junction, forward bias and reverse bias, current components in PN diode, diode equation volt-ampere characteristics, diffusion capacitance and diode resistance(static and Dynamic).Energy Band of PN Diode.

SPECIAL DIODES: Avalanche and zener breakdown, zener diode characteristics, Tunnel diode characteristics with the help of band diagrams, varactor diode,

UNIT-3

RECTIFIERS AND FILTERS :

Half wave rectifier, ripple factor, full wave rectifier(with and without transformer), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, - section filter, Multiple L- section and Multiple section filter, and comparison of various filter circuits in terms of ripple factors, Simple circuit of a regulator using zener diode.

UNIT-4:

BIPOLAR JUNCTION TRANSISTORS:

Introduction, transistor construction,transistor operation,transistor

current components,transistor as an amplifier, common base configuration, common emitter configuration,common collector configuration, limits of operation, transistor specifications.

FIELD EFFECT TRANSISTORS:

Junction Field Effect Transistor (JFET) - Principle of operation, volt ampere characteristics, advantages of JFET over BJT. Introduction to MOSFETs - depletion and enhancement type MOSFETs, operation, specifications and volt-ampere characteristics.

SPECIAL SEMICONDUCTOR DEVICES: Principle of operation, Characteristics and applications of UJT,DIAC, TRIAC, Photo Diode, LED, LCD, SCR.

UNIT-5:

TRANSISTOR BIASING AND THERMAL STABILIZATION

Transistor Biasing and Thermal Stabilization: Operating point, Basic Stability, Collector toBase Bias, Self ' ''Bias, Stabilization against variations in V_{BE},, and β for the self bias circuit, Stabilization factors, (S, S , S),Bias Compensation,Thermistor and Sensitor compensation, Compensation against variation in V_{BE}, I_{co},, Thermal runaway and thermal stability.

FET BIASING: Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias.

UNIT-6:

AMPLIFIERS:

Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of AI, Ri , Av, Ro.

APPLICATIONS OF SEMICONDUCTOR DEVICES: Electronic voltage Regulator using DIAC andTRIAC, phase controlled voltage Regulators using SCR, UJT sweep Generator.

TEXT BOOKS:

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.

REFERENCES:

1. G. K. Mittal (1999), Electronic Devices and Circuits, 22nd edition, Khanna Publications, New Delhi.
2. Electronic Devices and Circuits – S Salivahanan, N.Suresh Kumar and A Vallavaraj, McGraw Hill, 5th edition, 2010.
3. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
4. Electronic Devices and Circuits–Dr. K.Lal Kishore, B.S.Publications, 2nd Edition, 2005.
5. Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt. Ltd 2006.

SEMESTER-III	L	T	P	C
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BTMA3T02: MATHEMATICS OF COMMUNICATION ENGINEERING				

UNIT-I

Functions of a complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne– Thompson method.

UNIT-II

COMPLEX INTEGRATION:

Line integral – evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula (only statements).

UNIT-III

COMPLEX POWER SERIES:

Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity (only statements).

UNIT-IV

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem(statement only).

UNIT-V

THE RANDOM VARIABLE:

Introduction, Definition of a Random Variable, Discrete and Continuous random variables, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential distributions, Properties.

UNIT-VI

OPERATION ON ONE RANDOM VARIABLE-EXPECTATION:

Introduction. Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function.

TEXT BOOKS:

1. A text Book of Engineering Mathematics, B. V. Raman, Tata McGraw Hill.
2. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna publishers.
3. Probability, Statistics and Random Process,, K, Murugesan, p. Guruswamy, Anuradha Publication

REFERENCES:

1. Probability, Random variables & Random Signal Principles – Peytoon Z Peebles, TMH, 4th Edition 2001.

SEMESTER-III	L	T	P	C
	3	1	-	3
BTEC3T02: SIGNALS & SYSTEMS				

UNIT-I

SIGNAL ANALYSIS & FOURIER SERIES:

Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Exponential and sinusoidal signals, Concepts of Impulse function, Unit step function, Signum function. Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum

Unit-II

FOURIER TRANSFORMS & SAMPLING:

Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform, Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling..

UNIT-III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:

Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT-IV

CONVOLUTION AND CORRELATION OF SIGNALS:

Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation,

Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT-V:

LAPLACE TRANSFORMS:

Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT-VI:

Z–TRANSFORMS:

Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.

TEXT BOOKS:

1. Signals, Systems and Communications – B.P.Lathi.
2. Signals and Systems – A.V.Oppenheim, A.S.Willsky and S.H.Nawab

REFERENCES:

1. Signals and Systems – A Anandh Kumar, PHI Publications..
2. Signals and Systems – Simon Haykin and Van Veen.

SEMESTER-III	L	T	P	C
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BTEC3T02 JAVA PROGRAMMING				

B

UNIT I:

BASICS OF OBJECT ORIENTED PROGRAMMING (OOP):

Introduction to OOPS: Paradigms of Programming Languages - Basic concepts of Object Oriented Programming – Differences between Procedure Oriented Programming and Object Oriented Programming Objects and Classes – Data abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic binding, Message communication – Benefits of OOP – Application of OOPs.Introduction to Java : History – Java features – Java Environment – JDK1.7 – API, Creating and Executing a Java program – Java Tokens: Keywords, Character set, Identifiers, Literals, Comments in Java program Separator – Java Virtual Machine (JVM).

UNIT II

JAVA BASICS:

Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT III:

INHERITANCE:

Defining a subclass – Deriving a sub class – Single Inheritance – Multilevel Inheritance – Hierarchical Inheritance – Overriding methods – Final variables and methods – Final classes - Abstract methods and classes – Visibility Control: public access, private access, protected. Member access rules, super uses, polymorphism, abstract classes.

UNIT IV:

PACKAGES AND INTERFACES:

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT V:

EXCEPTION HANDLING:

Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

UNIT VI:

MULTITHREADING:

Creating Threads – Life Cycle of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization – Implementing run able interface – Thread Scheduling. Differences between multi threading and multitasking, daemon threads, thread groups.

TEXT BOOKS:

1. Java; the complete reference, 7th edition, Herbert Scheldt, TMH.
2. Java: How to Program, 8/e, Dietal, Dietal, PHI
3. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.
4. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.
5. Introduction to Java Programming, 7th ed, Y Daniel Liang, Pearson.

REFERENCES:

1. JAVA Programming, K.Rajkumar, Pearson.
2. Core JAVA, Black Book, Nageswara Rao, Wiley, Dream Tech.
3. Core JAVA for Beginners, Rashmi Kanta Das, Vikas.
4. Object Oriented Programming Through Java, P.Radha Krishna, Universities Press.
5. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.

SEMESTER-III	L	T	P	C
	3	1	-	3
BTBM3T02: PRINCIPLES OF ECONOMICS & MANAGEMENT				

UNIT-I:

INTRODUCTION TO ECONOMICS:

Concept, Nature & Scope of Economics-Macro and Micro Economics- Demand Analysis: Demand Determinants- Law of Demand& its exceptions-Elasticity of Demand-Types –Demand Forecasting-Methods.

UNIT-II

MARKET STRUCTURES:

Types of Markets-Price output determination in Perfect Competition,Monopoly, Monopolistic Competition, Oligopoly - Pricing methods - Break – Even Analysis (simple problems)

UNIT-III:

INTRODUCTIONTO MANAGEMENT:

Concept - Functions of Management - Scientific Management-Principles of Management-Leadership Styles - Functional areas of Management. Human Resource Management: Definition, Significance and Functions - PM Vs HRM – Recruitment, Selection, Training and Development -Job Analysis - Role and position of HR department – Performance Appraisal.

UNIT-IV:

MARKETING MANAGEMENT :

Needs- Wants - Products - Market- Marketing- Production Concept, Product Concept, Sales Concept, Marketing Concept, Societal Marketing Concept-Organizing the Marketing Department - Marketing Mix: Product, Price, Place, Promotion (in brief) Production Management: Concept of production management-Types of Production processes- Plant Location & Layout, Statistical Quality Control.

UNIT-V:

FINANCIAL MANAGEMENT:

Financial Statements – Contents of Trading Account, Profit and Loss Account – Balance Sheet (Theory only) - Analysis of Financial statements : Ratio analysis (simple problems) - Concept of Finance - Objectives of Finance-Wealth Maximization Vs. Profit Maximization - Functions of Finance - Role of financial manager - Organization of finance function.

UNIT-VI:

Forms of Business Organizations- Sole Proprietorship, Partnership, Joint Stock Company - Private limited and Public limited Companies, Public enterprises and their types, Business Cycles.Entrepreneurship- Entrepreneur – Qualities of good entrepreneur - Entrepreneurial Functions, Entrepreneurial Development: Objectives, Training, Benefits - Phases of Installing a Project.

TEXT BOOKS:

1. P.G.Ramanujam, B.V.R.Naidu & PVR Sastry, Management Science, Himalaya Publishing House, Mumbai.
2. A.R. Aryasri, Managerial Economics and Financial Analysis, Tata Mc Graw- Hill, New Delhi.

REFERENCES:

M.Y.Khan & P.K.Jain, Financial Management, TATA McGraw-Hill, New Delhi.

1. Koontz O Donnel, Management, TATA McGraw-Hill, New Delhi.
3. K. Aswathappa, Production Mangement, Himalaya Publishing House, Mumbai.
4. P.Subba Rao, Human Resource Management, Himalaya Publishing House, Mumbai.
5. Philip Kotler, Marketing Management, Pearson Prentice Hall, New Delhi.
6. Vasant Desai, Entreprenuership, Himalaya Publishing House, Mumbai.
7. Varshini &Maheswari, Managerial Economics, SChand & Co, New Delhi.

SEMESTER-III	L	T	P	C
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BTEE3T04: ELECTRICAL TECHNOLOGY				

UNIT-I

DC GENERATORS:

Operation and construction of DC generators – EMF equation – types of generators – magnetization and load characteristics of DC generators. UNIT-II: DC MOTORS Principle of operation and construction of DC Motors – types of DC Motors – characteristics of DC Motors– basic starting methods for DC shunt motor – losses and efficiency – Swinburne's test – speed control of DC shunt motor – flux and Armature voltage control methods.

UNIT-III:

TRANSFORMERS

Prionciple of operation of single phase transformer – types – constructional features – phasor diagram on no-load and load – equivalent circuit, losses and efficiency of transformer – regulation of transformer – OC and SC tests – predetermination of efficiency and regulation.

UNIT-IV

INDUCTION MACHINE:

Principle of operation and construction of three-phase induction motors – slip ring and squirrel cage motors – slip-torque characteristics – efficiency calculation – starting methods.

UNIT-V

SYNCHRONOUS MACHINES:

Principle of operation and construction of synchronous generator - EMF equation - Principle of operation of synchronous motor – methods of starting.

UNIT-VI

SPECIAL MACHINES:

Principle of operation and construction – single phase induction motor – shaded pole motors – capacitor motors and AC servomotor.

TEXT BOOKS

1. V.K.Mehta , "Principles of Electrical Machines" S Chand publishers
2. P .S. Bimbra ,"Electrical machinery" Khanna publication
3. J .B. Gupta ,"Theory and performance of electrical machines" S.K. Kataria publishers

REFERENCE BOOKS

1. Rajendhra Prasad ,"Fundamentals of electrical engineering" PHI publishers
2. Nagsarkar ,"Basic electrical engineering" Phi publishers

SEMESTER-III	L	T	P	C
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BTEC3L01: ELECTRONIC DEVICES AND CIRCUITS LAB				

PART A: (Only for Viva Voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 6 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Lowpower JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Soldering practice – Simple Circuits using active and passive components.
4. Single layer and Multi layer PCBs (Identification and Utility).
5. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   1. Study and Operation of CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Frequency measurment using Lissajous Figures
2. PN Junction diode characteristics A. Forward bias B. Reverse bias.(cutin voltage & Resistance calculations)
3. Zener diode characteristics and Zener as a regulator
4. Transistor CB characteristics (Input and Output) & h Parameter calculations
5. Transistor CE characteristics (Input and Output) & h Parameter calculations
6. Rectifier without filters (Full wave & Half wave)
7. Rectifier with filters (Full wave & Half wave)
8. FET characteristics
9. SCR Charecteristics.
10. UJT Characteristics
11. CE Amplifier.
12. CC Amplifier (Emitter Follower)

SEMESTER-III	L	T	P	C
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BTEE3L03: ELECTRICAL ENGINEERING LAB				

LIST OF EXPERIMENTS

1. Find the resonant frequency, bandwidth and quality factor in series and parallel R-L-C Circuits.
2. Verify maximum power transfer theorem on D.C and on A.C with resistive and Reactive loads.
3. Verify the Thevinin's and Norton's theorem for the given circuits.
4. Find the impedance (Z) and Admittance (Y) parameters of given network.
5. Determine magnetisation characteristics of DC shunt generator and find its critical field resistance.
6. Determine the efficiency of a D.C Shunt motor by using Swineburn's test.
7. Conduct the brake test on a DC Shunt machine.
8. Conduct the OC and SC test on single phase transformer and find the regulation and efficiency.
9. Conduct a brake test on 3-Phase squirrel cage induction motor and to observe the performance characteristics.
10. Find the regulation of 3-phase alternator by synchronous impedance method.

SEMESTER-III	L	T	P	C
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BTBS3L01: SOFTSKILLS/ APTITUDE LAB – I				

TASK-I

Usage of noun, pronoun, adjective (Comparative Forms), Verb, Adjectives, Adverb, Tenses, Articlesand Preposition - Change of Voice - Change of Speech - Synonyms & Antonym s - One WordSubstitution - Using the Same Word as Different Parts of Speech - Odd Man Out - Spelling &Punctuation (Editing)

TASK-II

Analogies - Sentence Formation - Sentence Completion - Sentence Correction - idioms & Phrases - Jumbled Sentences, Letter Drafting (Formal Letters) - Reading Comprehension (Level 1) – ContextualUsage - Foreign Language Words used in English

TASK-III

Reading Comprehension Level 2 (Paraphrasing Poems) - Letter Drafting - Newspaper and Book Review Writing - Skimming and Scanning -Interpretation of Pictorial Representations. PRACTICES:Sentence Completion - Sentence Correction - Jumbled Sentences - Using the Same Word as Different Parts of Speech - Editing

TASK-IV

Self-Introduction - Situational Dialogues / Role Play - Oral Presentations- Describing Objects / Situations / People, Information Transfer - Picture Talk - News Paper and BookReview. Prepared -'Just A Minute' Sessions (JAM)

REFERENCES:

1. Instructional Manual- Prepared by Faculty.

SEMESTER-IV	L	T	P	C
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BTEC4T01: ELECTRONIC CIRCUIT ANALYSIS				

UNIT I

Single stage Amplifiers: Simplified Common Emitter hybrid model, simplified calculations for the common collector configuration and common base amplifier, Common emitter amplifier with emitter resistance, Emitter follower, Miller's Theorem and dual of Millers theorem,FET small signal model, Low frequency common source and common drain amplifiers, FET as Voltage Variable Resistor, Biasing the FET

UNIT- II

Feedback Amplifiers and Oscillators:: Classification of Amplifiers, Feedback concept, Transfer Gain with feedback, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output Resistances, Method of Analysis of Feedback Amplifiers, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis. Condition for oscillations. RC-phase shift oscillators with Transistor and FET with necessary derivation for frequency of oscillation, Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of oscillators, Negative Resistance in Oscillator

UNIT III

Multistage Amplifier : Cascading Transistor Amplifiers, Choice of Transistor configuration in Cascade amplifier, High input Resistance Transistor Circuits – Darlington pair, Cascode amplifier, Frequency response and analysis of RC Coupling, Direct coupling and Transformer coupling, Difference amplifier Two Stage RC Coupled JFET amplifiers (in Common Source (CS) configuration).

UNIT IV

High Frequency Transistor and FET Circuits : Transistor at High Frequencies, Hybrid- π Common Emitter transistor model, Hybrid π conductance, Hybrid π capacitances, Validity of hybrid π model, Variation of Hybrid Parameters, CE short circuit gain, Current gain with resistive load, Single stage CE transistor amplifier response, Gain Bandwidth product, Emitter follower at High frequencies.FET: Common Source amplifier at Higher Frequencies, and Common Drain Amplifier at High frequencies

UNIT V

Power Amplifiers: Class A large signal Amplifiers, Second harmonic Distortions, Higher order harmonic Distortion, Transformer Coupled Audio power amplifier, Efficiency, Push-pull amplifiers, Class B Amplifiers, Class AB operation, Efficiency of Class B Amplifier, Complementary Symmetry push pull amplifier, Class D amplifier, Class S amplifier, MOSFET power amplifier, Thermal stability and Heat sink

UNIT VI

Tuned Amplifiers and Voltage Regulators: Introduction, Q-Factor, Small Signal Tuned Amplifier– Capacitance single tuned amplifier, Double Tuned Amplifiers, Effect of Cascading Single tuned amplifiers on Band width, Effect of Cascading Double tuned amplifiers on Band width, Staggered tuned amplifiers, Stability of tuned amplifiers. Voltage regulation – Line Regulation, Load Regulation, Types of Regulators, Series voltage regulator , shunt regulators, Overload Voltage protection.

TEXTBOOKS:

1. Integrated Electronics – J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.
2. Electronic Devices and Circuits - Salivahanan, N.Suressh Kumar, A. Vallavaraj, TATA McGraw Hill, Second Edition
3. Electronic Circuit Analysis-B.V.Rao, K.R.Rajeswari.P.C.R.Pantulu.K.B.R.Murthy,Pearson Publications.

REFERENCES:

1. Microelectronic Circuits-sedraA.Sand K.C.Smith, Oxford University press, Sixth Edition.
2. Electronic Circuit Analasis and Design-Donalad A.Neaman, Mc Graw Hill.
3. Electronic Circuits-I-Ravish R Sing-peason publications.
4. Electronics Devices and Circuit Theory-Robert L.Boylestad and Louis Nashelsky.
5. Electronic Circuits Principles and Applications-R.D.S.Samuel,B.Sujatha
6. Electronic Circuits Analysis-K.LalKishore,BS Publications, 2004.
7. Electronic Circuit Analysis-A.P.Godse, U.A.Bakshi.
8. Electronics Devices and Circuits-G.K.Mithal.

SEMESTER-IV	L	T	P	C
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BTEC4T02: ESSENTIALS OF ANALOG COMMUNICATIONS				

UNIT I

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

UNIT II

SSB MODULATION AND VESTIGIAL-SIDEBAND MODULATION:

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

UNIT III

ANGLE MODULATION:

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

UNIT IV

NOISE:

Noise in Analog communication System, Noise in DSB& SSB System, Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis

UNIT V

AN INTRODUCTION TO RADIO TRANSMITTERS AND RECEIVERS:

Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter. Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT VI

ANALOG PULSE MODULATION: Time Division Multiplexing, Types Analog pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, TDM Vs FDM

TEXT BOOKS:

1. Principles of Communication Systems – H Taub. & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES:

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Edition.
2. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006
3. Electronic Communication System – George Kennedy and Bernard Davis, TMH 2004.
4. Communication Systems – R.P. Singh, SP Sapre, TMH, 2007, 2nd Edition.

SEMESTER-IV	L	T	P	C
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BTEC4T03: ELECTROMAGNETIC WAVES & TRANSMISSION LINES				

UNIT I

Electrostatics: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Energy Density,. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Related Problems. Magneto Statics : Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy. Related Problems.

UNIT II

MAXWELL'S EQUATIONS (TIME VARYING FIELDS):

Faraday's Law, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces. Related Problems.

UNIT III

EM WAVE CHARACTERISTICS - I:

Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations between E & H. Sinusoidal Variations. Wave Propagation in Lossless and Conducting Media. Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Related Problems.

UNIT IV

EM WAVE CHARACTERISTICS – II:

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

UNIT V

TRANSMISSION LINES - I :

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

UNIT VI

TRANSMISSION LINES – II:

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; λ/4, λ/2, λ/8 Lines – Impedance Transformations. Smith Chart – Configuration and Applications, Single and Double Stub Matching. Related Problems.

TEXT BOOKS:

1: Elements of Electromagnetics -Matthew N.O.Sadiku

2: Electromagnetic Waves and Radiating Systems -E.C.Jorden and K.G.Balmain

REFERENCES:

1: Engineering Electromagnetics - Willium H.Hayt Jr. and John A.Buck

2: Electromagnetic Field Theory and Transmission Lines-G.S.N.Raju

3: Transmission Lines and Networks-Umesh Sinha

SEMESTER-IV	L	T	P	C
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BTEE4T02: CONTROL SYSTEMS				

UNIT I

Mathematical Modeling of Control Systems: Introduction, Open Loop and Closed Loop control systems and their differences, Classification of control systems, Feedback characteristics, Transfer function of linear systems. Differential equations of electrical networks, Translational and Rotational mechanical systems, Transfer function of DC Servo motor, Transfer function of AC Servo motor, Synchro transmitter and Receiver, Block diagram algebra and Problems, Signal flow graph – Reduction using Mason's gain formula with Problems

UNIT II

TIME RESPONSE ANALYSIS:

Standard test signals, Time response of first order systems, Time response of second order systems, Time domain specifications, Steady state errors and error constants, Effects of PI, PD and PID controllers, Problems

UNIT III

STABILITY AND ROOT LOCUS TECHNIQUE:

The concept of stability, Location of poles on s-plane for stability, Routh's stability criterion and problems, Limitations of Routh's stability, The Root locus concept, Construction of root loci and simple problems

UNIT IV

FREQUENCY RESPONSE ANALYSIS:

Introduction, Frequency domain specifications, Bode diagrams and Procedure for magnitude and phase plot of Bode plot, Problems on Bode plot, Stability analysis from Polar plots and problems, Nyquist stability criterion and problems

UNIT V

COMPENSATION TECHNIQUES:

Lag and Lead compensators, Lag-Lead compensators, Design of compensators using Bode plots

UNIT VI

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:

Concepts of state, state variables and state model, State space representation of transfer function, Diagonalization – Solving the Time invariant state equations, State transition Matrix and its Properties, Concept of Controllability and Observability

TEXT BOOKS

1. Modern control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2. Automatic control systems, BenjamanC.Kuo, Prentice Hall of India, 2nd Edition.

REFERENCES:

1. Control Systems, ManikDhanesh N, Cengage publications.
2. Control Systems principles and design, M. Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition.
3. Control Systems Engineering, S.Palani, Tata McGraw Hill Publications.
4. Control Systems by A. NagoorKani, RBA Publications.

SEMESTER-IV	L	T	P	C
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BTEC4T04: PULSE AND DIGITAL CIRCUITS				

UNIT I

LINEAR WAVE SHAPING:

High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, double differentiation, attenuators, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT II

NON – LINEAR WAVE SHAPING :

Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT III

SWITCHING CHARACTERISTICS OF DEVICES & SAMPLING GATES:

Switching Characteristics of Devices: Diode and Transistor as switches, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.Sampling gates; Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Four-diode sampling gates; Applications of sampling gates.

UNIT IV

MULTIVIBRATORS: ANALYSIS & DESIGN OF BISTABLE MULTIVIBRATORS:

Fixed bias& self biased transistor binary, Commutating capacitors, Triggering in binary, Schmitt trigger circuit, Applications.

UNIT V

MULTIVIBRATORS(CONTD.):

Analysis & design of Monostable Multivibrator: Collector-coupled and Emitter-coupled Monostable multivibrators, Triggering in monostable multi;

Analysis & design of Astable multivibrator (Collector coupled and Emitter-coupled) using transistors.

UNIT VI

Time Base Generators

General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

TEXT BOOKS:

1. Pulse Digital and Switching Waveforms-J.Millimana&H.Taub
2. Solid State Pulse Circuits-David A.Bell

REFERENCES:

1. Pulse and Digital Circuits –A.Anand Kumar.
2. Wave Generation and Shaping –L.Straus.
3. Pulse Digital Circuits and Computer Fundamentals-B.N.Yoganarasimhan.

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SEMESTER-IV	L	T	P	C
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BTEC4T05: SWITCHING THEORY & LOGIC DESIGN				

UNIT I

Review of Number systems: Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1's complement and r's complement of unsigned numbers subtraction, problem solving. Signed binary numbers, different forms, problem solving for subtraction. 4-bit codes: BCD, EXCESS 3, alphanumeric codes, 9's complement, 2421, etc.,

UNIT II

Logic operation, error detection and correction codes: Basic logic operations NOT, OR, AND, Boolean theorems, Complement and dual of logical expressions, NAND and NOR Gates, EX-OR, EX-NOR Gates, standard SOP and POS, Minimisation of logic functions using theorems, Generation of self dual functions. Gray code, error detection and error correction codes, parity checking even parity, odd parity, Hamming code, multi leveled AND-NOR Realisations. Two level NAND-NAND and NOR-NOR realizations. Degenerative forms and multi level realizations.

UNIT III

Minimisation of switching functions: Minimisation of switching functions using K-Map up to 6-variables, Tabular minimization, minimal SOP and POS Realisation. Problem solving using K-map such as code converters binary multiplier etc.,

UNIT IV

Combinational logic circuits: Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary adder, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit Excess3 adder circuit, look-a-head adder circuit. Design of decoder, Demultiplexer, higher order demultiplexing, encoder, multiplexer, higher order multiplexer, realization of Boolean functions using decoders and multiplexers, priority encoder, different code converter using full adders.

UNIT V

Sequential circuits I: Classification of sequential circuits (synchronous and asynchronous): basic flip-flops, truth tables and excitation tables (NAND -RS latch, NOR- RS latch, RS flip-flop. JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals).Conversion of flip-flop to flip-flop. Design of ripple counters, design of synchronous counters, Johnson counters, ring counters. Design of registers, Buffer register, control buffer register, shift register, bi-directional shift register, universal shift register.

UNIT VI

Sequential circuits II: Finite state machine, capabilities and limitations, analysis of clocked sequential circuits, design procedures, reduction of state tables and state assignment. Realization of circuits using various flip-flops. Meelay to Moore conversion and vice-versa.

TEXT BOOKS:

1. Switching Theory and Logic Design by Hill and Peterson, Mc-Graw hill MH edition.
2. Switching Theory and Logic Design by A. Anand Kumar.
3. Digital Design by Mano, 2nd edition, PHI.

REFERENCES:

1. Modern Digital Electronics by R.P. Jain.
2. Switching Theory and Logic Design by –AP Godse, Technical publications.

SEMESTER-IV	L	T	P	C
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BTEC4L01: ELECTRONIC CIRCUIT DESIGN & TESTING LAB				

To design & implement various electronic circuits such as amplifiers and oscillators. Design and Simulation in Simulation Laboratory using Multisim or PSPICE or Equivalent Simulation software and Testing in the Hardware Laboratory.

LIST OF EXPERIMENTS: (Minimum 10 Experiments to be conducted)

1. CE Amplifier
2. Darlington Pair Amplifier
3. Two stage R-C coupled Amplifier.
4. Feedback amplifier (Current Series).
5. Feedback amplifier (Voltage Series).
6. Feedback amplifier (Current Shunt).
7. Feedback amplifier (Voltage Shunt)
8. FET amplifier (Common Source)
9. RC Pase shift/Wein bridge Oscillator
10. Hartley/Colpitt's Oscillator
11. Bootstrapped Emitter Follower
12. Class A Power Amplifier (Transformer less)
13. Transformer Coupled Class A Power amplifier
14. Class B Complementary Symmetry Amplifier
15. Complementary symmetry Class B Push-pull Amplifier
16. Shunt Voltage Regulator
17. Series Voltage Regulator
18. Single Tuned Voltage Amplifier

Note: Any TEN of the above experiments are to be conducted.

SEMESTER-IV	L	T	P	C
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BTEC4L02: ANALOG COMMUNICATIONS LAB				

LIST OF EXPERIMENTS

Twelve experiments to be done: (a. Hardware, b. MATLAB Simulink)

1. Amplitude Modulation and Demodulation
2. AM - DSBSC Modulation and Demodulation
3. Spectrum Analysis of Modulated signal using Spectrum Analyzer.
4. Diode Detector Characteristics
5. Pre-emphasis and De-emphasis
6. Frequency Modulation and Demodulation
7. SSB system.
8. Sampling Theorem
9. Pulse Amplitude Modulation and Demodulation
10. Pulse Width Modulation and Demodulation
11. Pulse Position Modulation and Demodulation
12. Phase Locked Loop

Equipment Required for Laboratories:

1. RPS -0 –30 V
2. CRO -0 –20 M Hz.
3. Function Generators -0 – 1 M Hz
4. RF Generators -0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Analog Communication
7. Components
8. Spectrum Analyzer -60 M Hz.

Software Required:

1. Computer systems with latest specifications
2. Connected in LAN (optional)
3. Operating system (windows XP)
4. Simulations software (MATLAB-Simulink)

SEMESTER-IV	L	T	P	C
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BTEC4L02: SOFT SKILLS/ APTITUDE LAB - II				

Reading comprehension:

Reading Passage – 1 (1 hour): The first and only Indian-American to reach space.

Reading Passage – 2 (1 hour): The Moral Basis of Vegetarianism

Reading Passage – 3 (1 hour): Health programmeof the Chinese Government

Reading Passage –4 (1 hour): Remedy to ease

inflation Speaking Skills : Task-1- Self Introduction : (1 hour)

Task-2- Presentation skills :(1 hour)

Task-3- Group Discussion : (1 hour)

Task-4- Review of a book : (1 hour)

Task-5-Just A Minute : (1 hour)

Task-6- Role Play :1 hour)

Writing Skills : Task-1- Letter writing - Informal (1 hour) Task-2-

Resume writing : (1 hour) Task-3-

Paragraph writing : (1 hour)

Task-4- Story generating with picture sequence :

(1 hour) Task-5-Text Building with topic sentence:

(1 hour) Task-6- Essay writing (1 hour)

Verbal Reasoning : Task-1- Detection of errors (1 hour)

Task-2-Sentence corrections (1hour)

Task-3- Sentence completion with apt words from the given

Confusionable words (1hour)

Task-4-Scrambled words (1 hour)

Task-5- Dialogue Completion (1hour)

Task-6-Analogies (1 hour)

Task-7-Root words(1 hour)

Task-8-Synonyms(1 hour)

Task-9-Antonyms(1 hour)

Task-10- Odd one out (1hour)

Quantitative Aptitude- Part-I

Problem on Ages - Percentages - Profit and Loss - Simple & Compound Interest - Averages - Ratio, Proportion

Quantitative Aptitude – Part 2

Speed, Time & Work and Distance - Pipes and Cisterns - Mixtures and Allegations - Races - Problem on Trains - Boats and Streams

Practice : Puzzles, Sudoku, Series Completion, Problem on Numbers

REFERENCE BOOKS:

1. Instructional Manual- Prepared by Faculty.
2. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
3. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition

SEMESTER-V	L	T	P	C
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BTEC5T01: ANTENNAS & WAVE PROPAGATION				

UNIT I

ANTENNA FUNDAMENTALS:

Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna. Antenna Parameters - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beam widths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution , Antenna Apertures, Aperture Efficiency, Effective Height. Related Problems.

UNIT II

THIN LINEAR WIRE ANTENNAS:

Retarded Potentials, Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole, Evaluation of Field Components: Power Radiated, Radiation Resistance, Beam widths, Directivity, Effective Area and Effective Height. fields and patterns of Thin Linear Center-fed Antennas of different lengths, Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics(Reciprocity and Maximum power transfer theorems), Loop Antennas: Small Loops - Directivity and radiation resistance for small loops, Related Problems.

UNIT III

ANTENNA ARRAYS:

2 element arrays – different cases, Principle of Pattern Multiplication,N element Uniform Linear Arrays – Broadside, End fire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Binomial Arrays. Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Related Problems.

UNIT IV

NON-RESONANT RADIATORS:

Introduction, Travelling wave radiators – basic concepts, Long wire antennas– field strength calculations and patterns, Microstrip antennas-introduction, features, advantages and limitations, Rectangular patch antennas Geometry and parameters. Broadband Antennas: Helical Antenna – Significance, Geometry, basic properties; Design considerations for

monomial helical antennas in Axial Mode and Normal Modes(Qualitative treatment), Related Problems.

UNIT V

VHF, UHF AND MICROWAVE ANTENNAS:

Reflector Antennas: Flat Sheet and Corner Reflectors. Paraboloidal Reflectors– Geometry, characteristics, f/d Ratio, Spill Over, Back Lobes, Aperture Blocking, Types of feeds: Off-set Feeds and Cassegrain Feeds. Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications. Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements, Related Problems.

UNIT VI

WAVE PROPAGATION:

Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, wave tilt, Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance – Calculations for flat and spherical earth cases, Space Wave Propagation – Mechanism, LOS and Radio Horizon, Field Strength, Fundamental Equation for Free-Space Propagation. Troposphere Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, M-curves and Duct Propagation, Related Problems.

TEXT BOOKS:

1. Antennas for all applications –John D.Kraus and Ronald J.Marhefka, 3rd Edition 20
2. Electromagnetic Waves and Radiating systems-E.C.Jordan and K.G.Balmain PHI, 2nd Edition,2000

REFERENCES :

1. Antennas and wave propagation-K.D.Prasad, Satya Prakashan,Tech India Publications, New Delhi, 2001.
2. Antennas and wave propagation- G.S.N.Raju, Pearson Education, South Asia.
3. Electronic and Radio Engineering-F.E.Terman, McGraw-Hill, 4th Edition, 1955.

SEMESTER-V	L	T	P	C
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BTEC5T02: DIGITAL COMMUNICATIONS				

UNIT – I

PULSE DIGITAL MODULATION:

Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM), Delta modulation, its draw backs, Adaptive Delta modulation, comparison of PCM and DM Systems, noise in PCM and DM systems.

UNIT – II

DIGITAL MODULATION:

Introduction, ASK, FSK, PSK, DPSK, QPSK, M-ary PSK, FSK, QAM, Similarity of BFSK and BPSK, Signal space representation and comparisons of all digital modulation techniques.

UNIT – III

DATA TRANSMISSION:

Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BFSK,BPSK, QPSK.

UNIT – IV

INFORMATION THEORY:

Discrete messages, concept of amount of information and its properties. Average information (Entropy) and its properties. Information rate, Mutual information and its properties.

SOURCE CODING:

Introductions, Advantages, Shannon's theorem, Shannon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog channels, capacity of a gaussian channel, bandwidth–S/N trade off.

UNIT – V

LINEAR BLOCK CODES:

Matrix description of Linear Block codes, Error detection and correction capabilities of Linear block codes, single error correcting Hamming codes, Binary cyclic codes, Algebraic structure of cyclic codes, encoding, syndrome calculation, error detection and error correction.

UNIT – VI

CONVOLUTIONAL CODES:

Encoding of convolutional codes, time domain approach, transform domain approach. Graphical approach: code tree, trellis and state diagram, maximum likelihood decoding of convolutional codes, Viterbi decoding of convolutional codes.

TEXT BOOKS:

1. Digital communications - Simon Haykin, John Wiley, 2005.
2. Principles of Communication Systems - H. Taub and D. Schilling, TMH, 3rd Edn. 2003.
3. Digital communication-R.S.Chittode, Technical Publications.

REFERENCES:

1. Digital and Analog Communication Systems - K.Sam Shanmugam John Wiley, 2005,1st Edn.
2. Digital Communications - John Proakis TMH, 5th ed., 1983.
3. Communication Systems - Analog & Digital, R.Singh and S.Sapre TMH, 2nd ed., 2004.
4. Modern Analog and Digital Communication- B.P.Lathi ,Oxford reprint, 3rd edition, 2004.

SEMESTER-V	L	T	P	C
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BTEC5T03: DIGITAL IC APPLICATIONS				

UNIT I

CMOS LOGIC:

Introduction to logic families, CMOS logic, CMOS steady state electrical behaviour, CMOS dynamic electrical behaviour, CMOS logic families.

UNIT II

BIPOLAR LOGIC AND INTERFACING:

Diode Logic, Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT III

COMBINATIONAL LOGIC DESIGN:

Three state devices, comparators, Simple Floating-Point Encoder, Cascading Comparators, Dual Priority Encoder, Design considerations of the above combinational logic circuits with relevant Digital ICs. SEQUENTIAL LOGIC DESIGN I: Counters, Design of Counters using Digital ICs, Counter applications, Synchronous design methodology, Impediments to synchronous design, Design considerations of the above sequential logic circuits with relevant Digital ICs.

UNIT IV

SEQUENTIAL LOGIC DESIGN-II:

MSI Registers, Shift Registers, Modes of Operation of Shift Registers, Universal Shift Registers, MSI Shift Registers, Ring Counter, Johnson Counter, Basic sequential logic Design steps, Design of Modulus N Synchronous Counters, Design considerations of the above sequential logic circuits with relevant Digital ICs.

UNIT V

INTRODUCTION TO PLDs:

PLAs, PALs ,Implementation approaches in VLSI design- full custom design,Semi custom design, Gate arrays, standard cells,CPLDs ,FPGAs.

UNIT-VI

MEMORIES: ROM:

Internal structure, 2D-Decoding, Commercial ROM types, timing and applications,. Static RAM: Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS, Dynamic RAM: Internal structure, timing, synchronous DRAMs, Familiarity with Component Data Sheets-Cypress CY6116, CY7C1006, Specifications.

TEXT BOOKS:

1. Digital Design Principles & Practices By John F. Wakerly, PHI Publications,Third Edition., 2005.
2. Digital IC Applications By Atul P.Godse and Deepali A.Godse, Technical Publications, Pune, 2005.

REFERENCES:

1. Digital Integrated Circuits-A Design Perspective By Jan M.Rabaey, Anantha Chandrakasan, Borivoje Nikolic, Pearson Education, 2005.
2. Introduction to Logic Design – Alan B. Marcovitz,TMH, 2nd Edition,2005.
3. Digital Logic and Computer Design By Mano, Pearson Education.

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BTEC5T04: LINEAR IC APPLICATIONS				

UNIT I

INTEGRATED CIRCUITS 1:

Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II

INTEGRATED CIRCUITS 2:

Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT III

LINEAR AND NON-LINEAR APPLICATIONS OF OP- AMPS:

Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. on- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT IV

ACTIVE FILTERS:

Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters.

Band pass, Band reject and All pass filters.

UNIT V

TIMERS & PHASE LOCKED LOOPS:

Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators. Applications of VCO (566).

UNIT VI

D to A & A to D CONVERTERS, ANALOG MULTIPLIERS AND MODULATORS:

Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, Specifications AD 574 (12 bit ADC). Four Quadrant multiplier, balanced modulator, IC1496, Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

TEXT BOOKS :

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 1987.

REFERENCES :

1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.

2. Linear integrated circuits by S.Salivahana, VSK Bhaskaran TMH, 2008.

3. Operational Amplifiers & Linear ICs – David A Bell , Oxford Uni. Press,3rd Edition.

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BTEC5T05:ELECTRONIC MEASUREMENTS & INSTRUMENTATION				

UNIT I

PERFORMANCE CHARACTERISTICS OF INSTRUMENTS:

static and dynamic characteristics,errors in measurement, AC & DC voltmeters, AC & DC ammeters.

UNIT II

SIGNAL GENERATORS AND WAVE ANALYZERS:

Function generator, Pulse generator,random noise generator, sweep generator, wave analyzers, harmonic distortion analyzer, spectrum analyzer.

UNIT III

OSCILLOSCOPES – I:

CRT features, vertical amplifier, horizontal deflection system, sweep circuit, trigger circuit, delay line, sync selector circuit, simple CRO, measurement of amplitude and frequency.

UNIT IV

OSCILLOSCOPES - 2:

Dual beam CRO, dual trace CRO, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency and phase measurement, active and passive CRO probes and frequency counter.

UNIT V

AC AND DC BRIDGES: – Maxwell's bridge, Anderson bridge, Schearing bridge, Wheatstone bridge, Wien bridge, Q-meter.

UNIT VI:

TRANSDUCERS AND MEASUREMENTS:

Temperature measurement – thermocouples, thermisters, pressure measurement – diaphragms, capacitive pressure transducers, bellows, bourdon tube. Mass measurement – load cells. Accelerometers. Displacement transducers – the resistive potentiometer, LVDT, variable capacitive transducer, variable inductive transducer, strain gauges, piezoelectric transducers.

TEXT BOOKS:

1. Electronic Instrumentation ,Second Edition-H.S Kalsi, Tata McGraw Hill-2004
2. Modern Electronic Instrumentation and Measurement Techniques - A.D Helfrick and W.D Cooper, PHI, 5th Edition, 2002.

REFERENCES:

1 Electronic Instrumentation & Measurements – David A Bell, PHI, 2nd Edition, 2003.

2 Electronics Test Instruments, Analog and Digital Measurements –Robert A.Witte , Pearson Education , 2nd Edition,2004

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BTCS5T06: COMPUTER ORGANIZATION & ARCHITECTURE				

UNIT - I

BASIC STRUCTURE OF COMPUTERS:

Basics of computer, Von Neumann Architecture, Generation of Computer, Types of Computers, Functional unit, Basic Operational Concepts and Bus Structures.

UNIT -II

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS:

Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and control, Instruction Cycle, Memory – Reference, Input – Output and Interrupt Instructions. Design of basic computer, Design of Accumulator logic.

UNIT – III

CENTRAL PROCESSING UNIT:

General Register Organization, STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer.Micro Programmed Control: Control Memory, Address sequencing, micro program example, design of control unit.

UNIT - IV

COMPUTER ARITHMETIC:

Addition and Subtraction, multiplication algorithms, Division Algorithms.

Floating point arithmetic operations. Decimal Arithmetic unit, Decimal arithmetic operations.

UNIT - V

INPUT- OUTPUT ORGANIZATION:

Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access.

THE MEMORY SYSTEM: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory and Virtual Memory.

UNIT - VI

PARALLEL PROCESSING AND VECTOR PROCESSING:

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

TEXT BOOKS

1. Computer System Organization, M.Moris Mano, 3rd Edition, Pearson / PHI
2. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
3. Computer Organization, a quantitative approach, John L.Hennessy and David A.Patterson, Fourth Edition Elsevier

REFERENCES:

1. Computer Organization and Architecture - William Stallings Sixth Edition, Pearson / PHI
2. Structured Computer Organization - Andrew s. Tanenbaum, 4th Edition, PHI/ Pearson.
3. Fundamentals of Computer Organization and Design, - Sivaraama Dandamudi, Springer Int. Edition.

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BTEC5L01: DIGITAL COMMUNICATIONS LAB				

List of Experiments

1. Time Division Multiplexing.
2. Pulse Code Modulation.
3. Differential Pulse Code Modulation.
4. Delta Modulation.
5. Frequency Shift Keying.
6. Phase Shift Keying.
7. Differential Phase Shift Keying.
8. Companding.
9. Source code - Encoding and Decoding.
10. Linear Block Code - Encoding and Decoding.
11. Cyclic Code - Encoding and Decoding.
12. Convolutional Code – Encoding and Decoding.

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. FunctionGenerators - 0– 1 M Hz
4. RF Generators - 0 – 1000M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

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BTEC5L01: LINEAR IC APPLICATIONS LAB				

Minimum Ten Experiments to be conducted: (five from each part A & B)

Part - A (Pulse & Digital Circuits)

1. Linear wave shaping (Diff. Time Constants, Differentiator, Integrator)
2. Non Linear wave shaping – Clippers and Clampers
3. Logic gates with discrete components (Using Diodes and Transistors)
4. Bistable Multivibrator
5. Astable Multivibrator. (Voltage to Frequency convertor)
6. Monostable Multivibrator.
7. Schmitt Trigger.
8. UJT Relaxation Oscillator.
9. Bootstrap sweep circuit.
10. Sampling Gates.

Part - B (IC Applications)

1. OP AMP Applications – Adder, Subtractor and Comparator Circuits.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF and HPF (first order)
4. Function Generator using OP AMPs.
5. IC 555 Timer – Monostable and Astable Operation Circuit.
6. IC 566 – VCO Applications.
7. Voltage Regulator using IC 723.
8. 4 bit DAC using OP AMP.
9. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
10. Three Terminal Voltage Regulators – 7805, 7809, 7912.

Equipment Required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. IC Trainer Kits (Optional)
6. Bread Boards
7. Components: - IC741, IC555, IC566, IC723, 7805, 7809, 7912 and other essential components.

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BTEC6T01: DIGITAL SIGNAL PROCESSING				

UNIT I

INTRODUCTION: INTRODUCTION TO DIGITAL SIGNAL PROCESSING:

Discrete time signals & sequences, Decimation, interpolation, sampling rate conversion, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

UNIT II

DISCRETE FOURIER SERIES:

Properties of Discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Computation of DFT , Properties of DFT, linear convolution of sequences using DFT, Relation between Z-transform andDFS

UNIT III

FAST FOURIER TRANSFORMS:

Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT

UNIT IV

Z TRANSFORMS AND REALIZATION OF DIGITAL FILTERS:

Concept of Z-Transform of a discrete sequence. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms, Applications of Z-transforms, System function, solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems,

UNIT V

IIR DIGITAL FILTERS:

Analog filter approximations - Butter worth and Chebyshev, Design of

IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations

UNIT VI

FIR DIGITAL FILTERS:

Characteristics of FIR Digital Filters, frequency response.

Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique,

Comparison of IIR & FIR filters.

TEXT BOOKS:

1. Digital Signal Processing ,Principles, Algorithms and Applications: John G. Proakis, Dimitris G.Manolakis, Pearson education/PHI. 2007.
2. Discrete time signal processing- A.V.Oppenhiem and R.W.Schaffer. PHI

REFERENCES:

1. Digital Signal Processing: Andreas Antoniou ,TATA McGraw Hill,2006.
2. Digital Signal Processing: Ashok Ambardar, Satya Prasad,Cenage Learning.
3. Digital signal processing- A.V.Oppenhiem and R.W.Schaffer. PHI 2006.

SEMESTER-VI	L	T	P	C
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BTEC6T02: MICROPROCESSORS & MICROCONTROLLERS				

UNIT-I

INTRODUCTION TO 8/16 BIT PROCESSORS:

Register organization of 8085/8086, Architecture and signal description of 8085/8086, Physical memory organization, General bus operation, I/O addressing capability, Special purpose activities.

UNIT-II

Minimum mode and maximum mode of 8086 and timing, Addressing modes of 8086, Instruction set of 8086, Assembler directives and operators. Addressing modes of 8086, Instruction set of 8086, Assembler directives and operators, programming with assembler, Assembly language programs.

UNIT-III

BASIC PERIPHERALS AND INTERFACING WITH 8086:

Semiconductor memory interfacing, RAM interfacing, Interfacing I/O ports, 8255 modes of operation, Interfacing to D/A and A/D converters, Stepper motor interfacing, Control of high power devices using 8255.

UNIT-IV:

SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES:

Interrupts and interrupt service routines Interrupt cycle of 8086, non-maskable interrupt, maskable interrupts, interrupt programming.8259 – PIC, 8279 – keyboard and display controller, 8251 – USART, 8237 – DMA controller.

UNIT-V:

INTRODUCTION TO DSP PROCESSORS:

Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Architecture of TMS 320C5X- Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary register, Index Registrar, Auxiliary Register Compare Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, Some flags in the status registers, On-chip registers, On-chip peripherals.

UNIT-VI:

MICROCONTROLLERS 8051:

Introduction to microcontrollers, 8051 microcontroller, 8051 pin description, connections, I/O ports, Memory organization, MCS51 addressing modes, Instructions, assembly language programming tools.

PIC: Overview and features, PIC 16c6x/7x, interrupts in PIC 16c61/71, PIC 16F8xx flash controllers I/O ports and timers.

TEXT BOOKS:

1. Advanced Microprocessors And Peripherals by A .K .Ray, K.M.Bhurchandi,Tata McGraw Hill Publishers, 2006.
2. Digital Signal Processors – Architecture , Programming & Applications, B.Venkataramani, M.Bhaskar,TATA Mc Graw Hill,2002
3. Microcontrollers by Ajay V Deshmukh, TATA McGraw Hill publications 2012. Microcontrollers(Architecture, Programming, Interfacing and System Design-2nd (Edition) Raj kamal, Pearson Publication 2012.

REFERENCE BOOKS:

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd edition.
2. Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286,80386, 80486, and Pentium processors. Architecture, programming and interfacing".
3. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", 2nd edition, TMH.
4. 8051 Micro Controllers -Kenneth J. Ayala, Penram International/ Thomson,1995.

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BTEC6T03: MICROWAVE ENGINEERING				

UNIT I

Introduction, Microwave Spectrum and Bands, Applications of Microwaves.

GUIDED WAVES:

Waves between parallel plates of perfect conductors–Transverse electric and transverse magnetic waves – characteristics of TE and TM Waves – Transverse Electromagnetic waves – Velocities of propagation –uniform plane waves between parallel plates – Attenuation of TE and TM waves in parallel plate guides – Wave impedances.

RECTANGULAR WAVEGUIDES:

Transverse Magnetic Waves in Rectangular Wave guides – Transverse Electric Waves in Rectangular Waveguides – Field Expressions in both cases characteristics of TE and TM Waves – Cutoff wavelength and phase velocity, group velocity, guided wave length, free space wave length– Impossibility of TEM waves in waveguides – Dominant mode in rectangular waveguide – Attenuation of TE and TM modes in rectangular waveguides – Wave impedances for TE and TM cases – Excitation of modes.

CIRCULAR WAVE GUIDES:

Bessel functions – Solution of field equations in cylindrical coordinates – TM and TE waves in circular guides–Field Expressions in both cases- wave impedances and characteristic impedance – Dominant mode in circular waveguide – Excitation of modes.

UNIT – II

CAVITY RESONATORS:

Rectangular cavity resonators, Derivation of Field expressions, Q factor of a Rectangular Cavity resonator. Circular cavity resonators, Derivation of Field expressions, Q factor of a Circular Cavity resonator. Types of Coupling, Coupling Coefficient, Re-entrant Cavities, different types, diagrams, related expressions.

MICROSTRIP LINES: Introduction, Characteristic Impedance of Microstrip lines, Effective Dielectric Constant, Losses in Microstrip lines, related expressions, Quality factor of Microstrip lines.

UNIT – III

WAVEGUIDE COMPONENTS:

Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – 2 Hole, Bethe Hole types. Scattering Matrix– Significance, Formulation and Properties. S Matrix Calculations for E plane and H plane Tees, Magic Tee, and Directional Coupler. Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities– Waveguide irises, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types, Ferrites– Composition and Characteristics, Faraday Rotation; Ferrite Components – Gyrator, Isolator, Circulator. Circulator and Isolator.

UNIT - IV

MICROWAVE TUBES:

Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications.

KLYSTRON TUBES: Two Cavity Klystrons – Structure, Velocity Modulation Process and Applegate Diagram, Bunching Process– Expressions for o/p Power and Efficiency. Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/p Characteristics.

HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process, Axial Electric Field, Convection Current, Propagation Constants, Gain Considerations.

M-TYPE TUBES : Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron: Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, o/p characteristics, Frequency Pulling and Frequency Pushing, Strapping.

UNIT - V

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications.

Transferred Electron Devices: Introduction, Gunn Diode – Principle, Two Valley Model Theory, RWH Theory, Characteristics, Modes of Operation. Avalanche Transit Time Devices: Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics, related expressions, Problems.

UNIT - VI

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Measurement of Attenuation, Frequency, VSWR, Cavity Q, Impedance, Power.

TEXT BOOKS

1.Microwave Engineering" – GSN Raju, IK International Publishers, New Delhi.

2. Microwave & Radar Engineering – G.Sasibhushana Rao, Pearson Education.

REFERENCES

1. K.D Prasad, "Antennas and Wave Propagation", Satya Prakashan Publishers

2. Microwave Circuits and Passive Devices – M.L. Sisodia & G.S. Raghuvanshi, Wiley Eastern Ltd.,New Age International Publishers Ltd.,1995.

3. M.Kulkarni, "Micro Wave and Radar Engineering", Umesh Publications

4. Microwave Devices and Circuits – Samuel Y.Liao, PHI 3rd Edition,1994.

SEMESTER-VI	L	T	P	C
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BTEC6T04: BASICS OF VLSI & SUBSYTEM DESIGN				

UNIT I

INTRODUCTION:

Introduction to IC Technology, the IC Era. MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action. IC production process, MOS and CMOS Fabrication process, BiCMOS Technology, Comparison between CMOS and Bipolar technologies.

UNIT II

BASIC ELECTRICAL PROPERTIES OF MOS AND BICMOS CIRCUITS :

Ids-Vds relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans-conductance and Output Conductance, MOS transistor Figure of Merit, The pass transistor, Then MOS Inverter, Determination of pull-up to pull-down Ratio of NMOS Inverter driven by another NMOS inverter and for an NMOS inverter driven through one or more pass transistors. Alternative forms of pull-up, The CMOS Inverter, MOS transistor circuit model, Bi-CMOS Inverter, Latch-up in CMOS circuits and BiCMOS Latch-up Susceptibility

UNIT III

MOS AND BI - CMOS CIRCUIT DESIGN PROCESSES:

MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, Layout Diagrams of NAND and NOR gates and CMOS inverter, Symbolic Diagrams-Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, Some area capacitance calculations, The Delay Unit, Inverter Delays, Driving large capacitive loads, propagation delays, Wiring capacitances, Fan-in and fan-out characteristics, Choice of layers,

UNIT-IV

SCALING OF MOS CIRCUITS:

Scaling Models and Scaling Factors, Scaling Factors for Device Parameters, over view on Limitations Of Scaling, Introduction To Switch Logic And Gate Logic different logic complex gates

UNIT-V

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN:

Introduction to programmable logic devices(PLDs), Programmable logic array (PLA), programmable array logic (PAL), Implementation approaches in VLSI Design- Full custom design, semicustom design, gate arrays, standard cells, complex programmable logic devices (CPLDs), Field programmable gate arrays (FPGAs), Design Issues.

UNIT-VI

DIGITAL DESING USING HDL:

Digital system design process, VLSI Circuit design process, hardware simulation, hardware synthesis, history of VHDL, VHDL requirements, levels of abstraction elements of VHDL, packages, libraries and bindings, objects and classes, variable assignments, sequential statements, usage of subprograms, comparison of vhdl and verilog hdl . VLSI Design flow

TEXTBOOKS:

1. Essentials of VLSI Circuits and Systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, and Sholeh Eshraghian, PHI, 2005 Edition.
2. VLSI Designing - K.Lal Kishore and V.S.V.Prabhakar, I.K.International Publishing House Private Limited, 2009 First Edition
3. VHDL Primer - J.Bhaskar Prentice Hall Of India Publications.
4. VLSI Design – Black Book By Dr.K.V.K.K.Prasad, Kattula Shyamala, Kogent Learning Solutions Inc.2012 Edition.

REFERENCES:

1. VLSI Design - Debaprasad Das, Oxford University Press, 2010
2. VLSI Design - A.Albert Raj & T.Latha, PHI Learing Private Limited, 2010.
3. Principles of VLSI & CMOS Integrated Circuits - Richa Jain & Amrita Rai, S.Chand & company limited, First Edition, 2012

SEMESTER-VI	L	T	P	C
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BTCS6T06: COMPUTER NETWORKS				

UNIT - I

INTRODUCTION :

OSI, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies, WAN, LAN, MAN.

UNIT-II

PHYSICAL LAYER :

Transmission media copper, twisted pair wireless, switching and encoding , Narrow band, broad band ISDN and ATM.

UNIT-III

DATA LINK LAYER :

Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Data link layer in HDLC, Internet, ATM.

UNIT-IV

MEDIUM ACCESS SUB LAYER :

A LOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANS. Bridges

UNIT-V

NETWORK LAYER :

Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

UNIT - VI

TRANSPORT LAYER :

Transport Services, Connection management, TCP and UDP protocols; Application Layer - Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS :

1. Computer Networks - Andrew S Tanenbaum,4th Edition. Pearson Education/PHI
2. Data Communications and Networking - Behrouz A. Forouzan.Third Edition TMH.

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition, Pearson Education
2. Understanding communications and Networks,3rd Edition, W.A.Shay, Thomson

SEMESTER-VI	L	T	P	C
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ELECTIVE - I BTEC6TE1:	AUDIO & VIDEO ENGINEERING			

UNIT I

FUNDAMENTALS OF AUDIO-VIDEO RECORDING AND PLAYBACK TECHNIQUES:

Methods of sound recording reproduction, optical recording, CD recording, CD & DVD player, MP3 player, MPEG player, audio standards.

UNIT II

FUNDAMENTALS OF STUDIO ACOUSTICS AND ADVANCEMENTS IN AUDIO TECHNOLOGY:

Studio acoustics & reverberation, acoustic chambers, P.A. system for auditorium, Cordless microphone system, special types of speakers & microphones, satellite radio.

UNIT III

ELEMENTS OF A TELEVISION SYSTEM PICTURE AND SOUND TRANSMISSION AND RECEPTION:

CIR-B standards ,aspect ratio, horizontal and vertical resolution, video bandwidth and interlaced scanning , composite video, signal, H &V sync details, VSB transmission and channel bandwidth: Modulation of picture and sound signals, positive and negative modulation.

UNIT-IV

COLOUR SIGNAL TRANSMISSION AND RECEPTION:

TV camera tubes ,Composite color signals, compatibility considerations, frequency interleaving process, Low level IF modulated color TV transmitter block diagram & Color TV receiver , color mixing theory, luminance, hue and saturation, color difference signals, chromaticity diagram , color signal transmission- bandwidth and modulation of color difference signals, coders and decoders of NTSC , PAL – D & SECAM, Color Picture Tubes, picture tubes purity & convergence, automatic degaussing

UNIT-V

DIGITAL TELEVISION:

Introduction to Digital T.V., Principle of Digital T.V., Digital T.V. signals & parameters, Digital T.V. Receiver, MPEG2, JPEG H & G audio & video standards, Digital T.V. Recording/Broadcasting Technique. High definition TV Component coding ,MAC signals ,MAC encoding format scanning frequencies D2-MAC Packet Signal, Duo binary Coding ,HDTV Standards & compatibility ,colorimetric characteristics & parameters of HDTV systems.

UNIT-VI

ADVANCED TV SYSTEMS:

LCD TV System :LCD Technology , LCD Matrix types & operations , LCD screen for TV LCD color Receiver, Plasma TV System : Plasma & conduction of charge Plasma TV screen ,Signal processing in Plasma TV, Plasma color Receiver, Satellite TV, DTH Receiver System ,CCTV, CATV, working of block converter,: IR Remote control

TEXTBOOKS:

1.Modern Television Practice – Principles, Technology and Service– R.R. Gulati, New Age International Publication, Edition III, 2006

2. Basic Television and Video Systems – B. Grob and C.E. Herndon, McGraw Hill, 1999.

3. Audio-Video Engineering – R.C.Jaiswal.

REFERENCES :

1 Monochrome and Color TV – R.R. Gulati, New Age International Publication,2002.

2 Color Television Theory and Practice– S.P. Bali, TMH, 1994.

3 Television and Video Engineering - A.M. Dhake, 2nd Edition.

SEMESTER-VI	L	T	P	C
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ELECTIVE – I BTCS6TE5: DATA STRUCTURES				

UNIT I

Preliminaries of algorithm, Algorithm analysis and complexity, Data structure- Definition, types of data structures.

Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi, Tail recursion.

Searching Techniques: List Searches using Linear Search, Binary Search, Fibonacci Search

UNIT II

SORTING TECHNIQUES:

Basic concepts, Sorting by: insertion (Insertion sort), selection (heap sort), exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) Algorithms.

UNIT III

STACKS AND QUEUES:

Stacks: Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions.

Queues: Basic Queue Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack, Applications of Queues- Round, Robin Algorithm, Circular Queues, Priority Queues.

UNIT IV

LINKED LISTS: Introduction, single linked list, representation of a linked list in memory, Operations on a Single linked list, Reversing a single linked list, Advantages and disadvantages of single linked list, circular linked list, Double linked list.

UNIT V

Trees: Properties, Representation of Binary, Trees using arrays and linked lists, operations on a Binary Tree, Binary Tree Traversals (recursive), Creation of binary tree from in, pre and post order traversals. Advanced concepts of Trees: Tree Travels using stack (non recursive), Threaded Binary Trees. Binary search, tree, Basic concepts, BST operations: insertion, deletion.

UNIT VI

GRAPHS:

Basic concepts, Representations of Graphs: using Linked list and adjacency matrix, Graph algorithms.Graph Traversals (BFS & DFS), app1ications: Dijkstra's shortest path, Transitive closure, Minimum Spanning Tree using Prim's Algorithm, Warshall's Algorithm(Algorithemic Concepts Only, No Programs required).

TEXT BOOKS:

1. Data Structure with C, Seymour Lipschutz, TMH
2. Data Structures using C. Reema Tharej , Oxford
3. Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage
4. Data structures and algorithm analysis in C, 2

REFERENCES:

1. Data Structures and Algorithms, 2008, G. A. V. Pai, TMH
2. Classic Data Structures, 2/e, Debasis , Sarnanta,PHI,2009
3. Fundamentals of Data Structure in C, 2le,' Horowitz, Sahni, Anderson Freed, University Press

SEMESTER-VI	L	T	P	C
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ELECTIVE – I	**BTCS6TE5:**	POWER SUPPLIES		

UNIT - I

POWER SEMICONDUCTOR DEVICES:

Construction, Principle of operation, Characteristics and applications of Power Transistor & Thyristor. Characteristics of GTO, DIAC, MCT, TRIAC, Power MOSFET and IGBT; Two-Transistor Model of Thyristor,Thyristor Commutation methods

UNIT - II SCR: Construction and characteristics, specification and ratings, pulse transformer, optical isolators, methods of turn on, triggering circuits for SCR: R, RC, UJT relaxation oscillator.

UNIT- III Rating extension by series and parallel connections, string efficiency. Protection of SCR-Protection against over voltage, over current, dv/dt, di/dt, Gate protection.

UNIT- IV CONVERTERS-I:

Single Phase half & full wave converters with RL & RLE load, Single phase dual converters, Three phase half wave converters. Three phase full converters with RL load, Three phase dual converters.

UNIT – V

CONVERTERS-II:

Single and three-phase semi converters with RL & RLE load. Power factor improvement-Extinction angle control, symmetrical angle control, pulse width modulation control and sinusoidal pulse width modulation control Inversion operation. Effect of load and source impedances.

UNIT - VI

DC-DC CONVERTERS:

Step Up/Down Copper, Control strategies, Chopper Configurations, Analysis of type A Chopper Voltage, current and load commutated chopper. Multiphase Chopper.

TEXT BOOKS

1. M. D. Singh and K. B. Khanchandani: Power Electronics 2/e, MGH.,2008

2. M. H. Rashid: Power Electronics, Circuits Devices and Applications, Pearson.,2011

REFERENCES

1. V. R. Moorthi: Power Electronics-Devices, Circuits and Industrial Applications, Oxford,2005.

2. Theodore Wildi: Electrical Machines, Drives and Power Systems, Pearson.,2007

3. P. S. Bimbhra: Power Electronics, Khanna Publishers,2012.

SEMESTER-VI	L	T	P	C
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BTEC6L01: HDL LAB				

The students are required to design and draw the internal structure of the following Digital Integrated Circuits and to develop VHDL source code. Perform Simulation using relevant Simulator and analyze the obtained simulation results using necessary Synthesizer. Further, it is required to verify the logical operations of the Digital ICs (Hardware) in the Laboratory.

1. Realization of Logic Gates
2. 3 to 8 Decoder - 74138
3. 8x1 Multiplexer - 74151 and 2x4 De-multiplexer - 74155
4. 4-Bit comparator - 7485
5. 8 & 12 Bit comparator using 7485
6. D Flip-Flop - 7474
7. Decade counter - 7490
8. Universal Shift Registers – 74195
9. 4-bit Ring Counter using T-Flip-flops
10. RAM (16x4) - 74189(Read and Write operations)
11. Stack and Queue implementation using RAM
12. ALU Design

1. Xilinx ISE Software
2. Digital ICs
3. Personal Computers
4 Necessary Hardware Kit

SEMESTER-VI	L	T	P	C
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BTEC6L02: MICROPROCESSORS & MICROCONTROLLERS LAB				

PART-I: MICROPROCESSORS 8086

1. Arithmetic ooperation – Multi byte Addition and Subtraction, Multiplication and Division-Singned and unsigned Arithmetic operations,ASCII- Arithmetic operation.
2. Logical operations- Shift and Rotate- Converting packed BCD to unpacked BCD,BCD to ASCII conversion.
3. string operation and Insturction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting , Length of the string , String comparision.
4. DOS/BIOS programming; Reading keyboard(Buffered with and without echo)- Display characters

PART-II: INTERFACING

1. Serial communication implementation
2. 8255 – Generate different waver forms Sine, Square, Triangular and Ramp, etc
3. 8259- Interrupt controller – Generate an interrupt using 8259 timer.
4. 8279 – Keybiard Display – Write a program to display a string of characters.
5. Reading and Writing on a parallel port using Microcontroller
6. Timer in different modes using Microcontroller

PART-III: INTERFACING WITH MICROCONTROLLER

Write a C program to interface 8051 chop to Interfacing and Hex Keyboard interfdce to 8051

1. Simple Calculator using 6 digit seven segment display and Hex Keyboard interface to 8051.
2. Alphanumeric LCD panel and Hex keypad input interface to 8051
3. External ADC and Temperature control interface to 8051

SEMESTER-VI	L	T	P	C
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BTEC6Q01: TECHNICAL PAPER				

SEMESTER-VI	L	T	P	C
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BTEC6H01: HOBBY PROJECT				

SEMESTER-VII	L	T	P	C
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BTEC7T01: EMI/EMC				

UNIT-I

NATURAL AND NUCLEAR SOURCES OF EMI/ EMC:

Introduction, Electromagnetic environment, History, Concepts, Practical experiences and concerns, frequency spectrum conservations. An overview of EMI / EMC, Natural and Nuclear sources of EMI.

UNIT-II

EMI FROM APPARATUS, CIRCUITS AND OPEN AREA TEST SITES:

Electromagnetic emissions, noise from relays and switches, non-linearities in circuits, passive inter modulation, cross talk in transmission lines, transients in power supply lines, electromagnetic interference (EMI), Open area test sites and measurements.

UNIT-III

RADIATED AND CONDUCTED INTERFERENCE MEASUREMENTS:

Anechoic chamber, TEM cell, GH TEM cell, characterization of conduction currents / voltages, conducted EM noise in power lines, conducted EMI from equipments, Immunity to conducted EMI detectors and measurements.

UNIT-IV

ESD, GROUNDING, SHIELDING, BONDING AND EMI FILTERS:

Principles and types of groundings, shielding and bonding, characterization of filters, power line filter designed, ESD, Electrical fast transients / bursts, electrical surges.

UNIT-V: Cables, connectors, components: Introduction, EMI suppression cables, EMC connectors, EMC gaskets, Isolation transformers, opto- isolators, Transient and Surge Suppression devices.

UNIT-VI

EMC STANDARDS – NATIONAL / INTERNATIONAL:

Introduction, Standards for EMI and EMC, MIL-standards, IEEE/ANSI standards, CISPR/IEC standards, FCC regulations, Euro norms, British standards, EMI / EMC standards in Japan, conclusions.

TEXTBOOKS :

1. Engineering Electromagnetic Compatibility by Dr. V.P. Kodali, IEEE Publication, Printed in India by S. Chand & co. Ltd., New Delhi, 2000.
2. Electromagnetic Interference and Compatibility IMPACT series, IIT - Delhi, Modules 1-9.

REFERENCES :

1. Introduction to Electromagnetic Compatibility, NY, John Wiley, 1992, By C.R. Pal.

SEMESTER-VII	L	T	P	C
	3	1	-	3
BTEC7T02: DIGITAL IMAGE PROCESSING				

UNIT I

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relation ship between pixels. Imaging Geometry.

UNIT II

Image Transforms 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT III

Image enhancement Point processing. Histogram processing . Spatial filtering. Enhancement in frequency domain, Image smoothing, Image sharpening.

UNIT IV

Colour image processing : Psedo colour image processing, full colour image processing.

UNIT V

Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT VI

Image segmentation Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

TEXT BOOK :

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Education, 2002.

REFERENCES :

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

SEMESTER-VII	L	T	P	C
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BTEC7T03: OPTICAL COMMUNICATIONS				

UNIT-I

OVERVIEW OF OPTICAL FIBER COMMUNICATION:

Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides-Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, V-number, Mode coupling, Step Index fibers, Graded Index fibers.

UNIT-II

SINGLE MODE FIBERS:

Cut off wavelength, Mode Field Diameter, Effective Refractive Index. . Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.Information capacity determination, Group delay,Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening.

UNIT-III

FIBER SPLICING:

Splicing techniques, splicing single mode fibers.Fiber alignment and joint loss-Multimode fiber joints, single mode fiber joints. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss. . Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT-IV

OPTICAL SOURCES:

LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, resonant frequencies. Reliability of LED&ILD.

UNIT-IV

OPTICAL DETECTORS:

Physical principles of PIN and APD,, Detector, response time,Temperature,effect on Avalanche gain, Comparison of Photo detectors.,Optical, receiveroperation-Fundamental receiver operation, Digital, signal, transmission, error, sources,Receiver configuration, Digital receiver performance,, Probability of error, Quantum limit,Analog receivers.

UNIT-V

OPTICAL SYSTEM DESIGN: Considerations, Component choice, multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode andSingle mode fibers, Rise time budget with examples. Transmission, distance, Line coding, in Optical, links, WDM, Necessity, Principles, Types of WDM,, Measurement

of Attenuation and Dispersion, Eye pattern.,

TEXT BOOKS:

1. Optical Fiber Communications – Gerd Keiser, McGraw-Hill International Ed., 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

REFERENCES:

1. Fiber Optic Communications – D.K. Mynbaev, Gupta and Scheiner, Pearson Ed. 2005
2. Text Book on Optical Fiber Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal, John Wiley, 3rd Edition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

SEMESTER-VII	L	T	P	C
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BTEC7T04: TELECOMMUNICATION SWITCHING SYSTEMS				

UNIT – I

TELECOMMUNICATION SWITCHING SYSTEMS:

Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching, Electronic space division switching, Time division switching, Combination switching.

UNIT – II

TELEPHONE NETWORKS AND SIGNALING TECHNIQUES:

Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans, In channel signaling, common channel signaling, Network traffic load and parameters, grade of service and blocking probability.

UNIT – III

DATA COMMUNICATION NETWORKS:

Introduction, network architecture, layered network architecture, Data Communication Protocols, Data communication hardware circuits, Public switched data networks, connection oriented & connection less service.

UNIT-IV

COMPUTER NETWORKS:

OSI reference model, LAN, WAN, MAN & Internet, Circuit Switching, packet switching, Message switching and virtual circuit switching concepts, repeaters, Bridges, Routers and gate ways.

UNIT – V

INTEGRATED SERVICES DIGITAL NETWORK (ISDN):

Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture,signaling, numbering, addressing, BISDN.

UNIT – VI

DSL TECHNOLOGY:

ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS,

SONET- Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

TEXT BOOKS

1. Telecommunication switching system and networks - Thyagarajan Viswanathan, PHI, 2000.

REFERENCES

1. Advanced electronic communications systems - Wayne Tomasi, PHI, 2004.
2. Data communication and networking—BEHROUZ A FOROUZAN, 4th Edition, Tata McGraw Hill.

SEMESTER-VII	L	T	P	C
	3	1	-	3
ELECTIVE II BTEC7TE1: SOFTWARE DEFINED RADIO				

UNIT I

SDR concepts & history, Benefits of SDR, SDR Forum, Ideal SDR architecture, SDR Based End - to-End Communication, Worldwide frequency band plans, Aim and requirements of the SCA.

UNIT II

Architecture Overview, Functional View, Networking Overview, Core Framework, Real Time Operating Systems, Common Object Request Broker Architecture (CORBA), SCA and JTRS Compliance.

UNIT III

Radio Frequency design, Baseband Signal Processing, Radios with intelligence, Smart antennas, Adaptive techniques, Phased array antennas, Applying SDR principles to antenna systems, Smart antenna architectures.

UNIT IV

Low Cost SDR Platform, Requirements and system architecture, Convergence between military And commercial systems, The Future For Software Defined Radio, Cognitive Radio.

UNIT V

SOFTWARE RADIO PLATFORMS:

GNU radio- Python introduction, developing GNU Radio, signal Processing blocks, scheduler, Basic GR development flow, case study- any application, Open Source SCA implementations-Embedded, All other software radio framework- Microsoft Research software radio, Frontend for Software radio- Sound card front ends, Universal Software radio peripherals (USRP), SDR front end for Navigation applications, Network based front ends

UNIT VI

DEVELOPMENT TOOLS AND FLOW:

Requirement capture, System simulation, Firmware development: Electronics System level design, Block based system design, and Final Implementation, Software development: Real-time versus Non Real-time software, Optimization, and Automatic Code generation.

TEXT BOOKS:

1. Dillinger, Madani, Alonistioti (Eds.): Software Defined Radio, Architectures, Systems and Functions, Wiley 2003
2. Reed: Software Radio, Pearson
3. Software Defined Radio for 3G, 2002, by Paul Burns.
4. Tafazolli (Ed.): Technologies for the Wireless Future, Wiley 2005.

REFERENCES:

1. Bard, Kovarik: Software Defined Radio, The Software Communications Architecture, Wiley 2007
2. Eugene Grayver, Implementing Software Defined Radio, Springer
3. Cory Clark, Software Defined Radio: With GNU Radio and USRP, McGraw-Hill Companies, Incorporated, 29-Nov-2008

SEMESTER-VII	L	T	P	C
	3	1	-	3
ELECTIVE II BTEC7TE2:CPLD & FPGA ARCHITECTURES &APPLICATIONS				

UNIT-I

Introduction to Programmable Logic Devices Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/ Generic Array Logic; Complex Programmable Logic Devices Architecture of Xilinx Cool Runner XCR3064XL CPLD, CPLD Implementation of a Parallel Adder with Accumulation.

UNIT-II,

Architecture of Xilinx Cool, Runner XCR3064XL CPLD, CPLD Implementation of a Parallel Adder with Accumulation.Field Programmable Gate Arrays Organization of FPGAs, FPGA,

UNIT –III

Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs, Dedicated Specialized Components of FPGAs, and Applications of FPGAs.

UNIT-IV:

SRAM Programmable FPGAs Introduction, Programming Technology, Device Architecture. The Xilinx XC2000, XC3000, and XC4000 Architectures.

UNIT –V:

Anti-Fuse, Programmed, FPGAs Introduction, Programming, Technology, Device Architecture, The ActelACT1, ACT2 and ACT3 Architectures.

UNIT –VI:

Design Applications General Design Issues, Counter Examples, A Fast,Video Controller, APosition Tracker for a Robot Manipulator, A Fast DMA Controller, Designing Counters with ACT devices, designing Adders and Accumulators with the ACT Architecture.

TEXT BOOKS:

1. Field Programmable Gate Array Technology - Stephen M. Trimberger, Springer International Edition.
2. Digital Systems Design - Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.

REFERENCES:

1. Field Programmable Gate Arrays - John V. Oldfield, Richard C. Dorf, Wiley India.
2. Digital Design Using Field Programmable Gate Arrays - Pak K. Chan/ Samiha Mourad, Pearson Low Price Edition.
3. Digital Systems Design with FPGAs and CPLDs - Ian Grout, Elsevier, Newnes.
4. FPGA based System Design - Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.

ELECTIVE – II

SEMESTER-VII	L	T	P	C
	3	1	-	3
BTCS7TE7: OPERATING SYSTEMS				

UNIT-I:

Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, protection and security, distributed systems, special purpose systems, operating systems structures and systems calls, operating systems generation.

UNIT-II:

Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

UNIT-III:

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples

UNIT-IV:

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

Virtual Memory Management: Virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

UNIT-V:

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT-VI:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin,Gagne 7th Edition, John Wiley.Swarnandhra College of Engineering & Technology (Autonomous), Seetharampuram, Narsapur-534280

REFERENCES:

1. http://nptel.iitm.ac.in/courses/webcourses-contents//IISc-BANG/Operating%20Systems/New_ Index1.html
2. Modern Operating Systems, Andrew S Tanenbaum,3rd Edition,PHI.

ELECTIVE – III

SEMESTER-VII	L	T	P	C
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BTEC7TE3: CELLULAR & MOBILE COMMUNICATIONS				

UNIT I

INTRODUCTION : Evolution of Mobile Communications, Mobile Radio Systems around the world, First, Second, Third Generation Wireless Networks, Wireless Local Loop(WLL), Wireless LANs, Bluetooth, Personal Area Networks(PANs),Examples of Wireless Communication Systems, A Simplified Reference Model, Applications.

UNIT II

ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT III

THE CELLULAR CONCEPT : Introduction, Frequency reuse, Handoff strategies, Interference and System Capacity: Co- Channel Interference, Channel Planning, Adjacent Channel Interference, Power control for reducing interference, Trunking and Grade of Service, Cell Splitting, Sectoring, Repeaters for Range extension, A microcell zone concept.

CELL SIZE ANTENNAS AND MOBILE ANTENNAS: Characteristics, Antennas at Cell site, Mobile Antennas.

UNIT IV

MOBILE RADIO PROPAGATION : Introduction, Free space propagation model, The three basic propagation models-Reflection, Diffraction and Scattering, Two-ray model, Outdoor propagation models, Indoor propagation models, Signal Peneration into building, Small scale multipath Propagation, Parameters of Mobile multipath channels, Types of small scale fading.

UNIT V

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT VI

DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, multiple access scheme, TDMA, CDMA.

TEXTBOOKS :

1. Mobile Cellular Communication by Gottapu Sasibhushana Rao, Pearson International, 2012.

2. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.

REFERENCES:

1. Mobile Communications-Jochen Schiller, Pearson education, 2nd Edn, 2004.
2. Wireless Communications: Principles and Practice-Theodore. S. Rapport, Pearson education, 2nd Edn, 2002.
3. Mobile Cellular Telecommunications-W.C.Y.Lee, Tata McGraw Hill, 2nd Edn, 2006.
4. Wireless and Mobile Communications-Lee, McGraw Hill, 3rd Edition, 2006.
5. Wireless Communications and Networks-William Stallings, Pearson Education, 2004.

ELECTIVE – III

SEMESTER-VII	L	T	P	C
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BTEC7TE4: SATELLITE COMMUNICATIONS				

UNIT I

INTRODUCTION : Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

UNIT II

ORBITAL MECHANICS AND LAUNCHERS: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

UNIT III

SATELLITE SUBSYSTEMS: Attitude and Orbit Control System, Telemetry, Tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite Antenna Equipment Reliability and Space Qualification.

UNIT IV

SATELLITE LINK DESIGN: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

UNIT V

MULTIPLE ACCESS: Frequency division multiple access (FDMA) Intermediation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception.

UNIT VI

EARTH STATION TECHNOLOGY: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods. low earth orbit and geo-stationary satellite systems: Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs.

TEXT BOOKS:

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt 2nd Wiley Edition 2003
2. Satellite Communication - D.C Agarwal. Khanna Publications 5th Edition

REFERENCES :

1. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud. 2nd Edition Pearson Publications,2003.
2. Satellite Communications: Design Principles – M. Richharia BS publications
   2nd Edition,2003.
3. Fundamentals of Satellite Communications – K.N. Raja Rao,PHI 2004

ELECTIVE – III

SEMESTER-VII	L	T	P	C
	3	1	-	3
BTEC7TE5: EMBEDDED SYSTEMS				

UNIT I

INTRODUCTION: Embedded System-Definition, Embedded System versus General computing systems, History of Embedded Systems, Classification of Embedded Systems, Major application areas of Embedded Systems, purpose of Embedded Systems, The typical Embedded System-core of the Embedded System, memory, sensors and actuators, communication interface, Embedded firmware, other system components, PCB and passive components.

UNIT II

EMBEDDED SYSTEMS-CHARACTERISTICS AND QUALITY ATTRIBUTES: Characteristics of Embedded System, quality attributes of Embedded System, Application - specific Embedded System-

washing Machine, Domain-specific examples of Embedded System-Automotive.

UNIT III

EMBEDDED HARDWARE DESIGN: Analog and digital electronic components, I/O types and examples, Serial communication devices, Parallel device ports, Wireless devices, Timers and counting devices, Watchdog timer, Real time clock, VLSI and Integrated circuit design, EDA Tools, Or CAD EDA tool, The PCB Layout Design.

UNIT IV

EMBEDDED FIRMWARE DESIGN: Embedded firmware design approaches, embedded firmware development languages, ISR Concept, Interrupt sources, interrupt servicing mechanism, Multiple interrupts, DMA, Device driver programming, Concept of C versus Embedded C and Complier versus Cross complier. The main software utility tool, CAD and the hardware, Translation tools-Pre-processors, Interrupts Compliers and Linkers, Debugging tools,

UNIT V

HARDWARE SOFTWARE CO-DESIGN AND TESTING: Fundamental Issues in Hardware Software Co-Design, Computational models in embedded design, Hardware software Trade – offs, Integration of Hardware and Firmware, ICE, Issues in embedded system design. Quality assurance and testing of the design, testing on host machine, simulators, Laboratory Tools.

UNIT VI

EMBEDDED SYSTEM DEVELOPMENT: The integrated development environment, Types of files generated on cross-compilation, Deassembler/Decomplier, Simulator, Emulator and Debugging, Target hardware debugging, Boundary Scan, Embedded system development process and tools.

TEXT BOOKS:

1. Introduction to Embedded Systems By Shibu.K.V-Tata McGraw Hill Education Private Limited, 2009.
2. Embedded Systems Architecture By Tammy Noergaard, Elsevier Publications, 2005.

REFERENCES:

1. Embedded Systems, Raj Kamal-Tata McGraw Hill Education Private Limited, Second Edition, 2008.
2. Embedding system building blocks By Labrosse, CMP publishers.
3. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley Publications.

SEMESTER-VII	L	T	P	C
	3	1	-	-
BTBM7T01 PROFESSIONAL ETHICS & INTELLECTUAL PROPERTY RIGHTS				

UNIT I: Engineering Ethics:Purposes for Engineering Ethics-Engineering EthicsConsensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer – Professional Ethics- Engineering and Ethics-Kohlberg's Theory – Gilligan's Argument –Heinz's Dilemma.

UNIT II: Engineering as Social Experimentation: Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Relevant Information –Engineers as Managers, Consultants, and Leaders. Engineers' Responsibility for Safety and Risk: Safety and Risk, Concept of Safety – Types of Risks – Expected Probability- Reversible Effects- Threshold Levels for Risk-Delayed v/s Immediate Risk- Safety and the Engineer – Designing for Safety – RiskBenefit Analysis-Accidents.

UNIT III : Engineers' Responsibilities and Rights: Collegiality-Techniques for Achieving Collegiality-obligations of Loyalty- professionalism–Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Ethical egoism-Collective bargaining -Confidentiality-Acceptance of Bribes/Gifts--Occupational Crimes-industrial espionage-Whistle Blowing-types of whistle blowing-when should it be attempted-preventing whistle blowing.

Unit IV: Introduction to Intellectual property:

Introduction to Intellectual Property Law - Types ofIntellectual Property -TRIPS-Infringement Copyrights:Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded byCopyright Law –Copyright Formalities and Registration.

Unit V: Patents

Introduction to Patent Law –Rights under Patent Law – Patent Requirements – Patent Application Process and Grantingof Patent – Double Patenting – Patent Searching – Patent Cooperation Treaty.

Trademarks:Introduction to Trade Mark – Trade Mark Registration Process – Trade Markmaintenance – Transfer of rights – Dilution of Ownership ofTrade Mark – Likelihood of confusion

Unit VI: Trade secrets

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation– Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition –Breach of Contract .Cyber law:Introduction to Cyber Law – Information Technology Act – Cyber Crime and

E-commerce – Data Security .

TEXTBOOKS:

1. "Engineering Ethics and Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
2. "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.
3. Deborah E.Bouchoux: "Intellectual Property". Cengagelearning , NewDelhi, BS Publications (Press)
4. PrabhuddhaGanguli: ' Intellectual Property Rights" Tata Mc-Graw –Hill, New Delhi.

REFERENCES:

1. "Professional Ethics and Human Values" by A.Alavudeen, R.KalilRahman and M.Jayakumaran- Laxmi Publications.
2. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009
3. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
4. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights",Excel Books. New Delhi.

SEMESTER-VII	L	T	P	C
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BTEC7L01 MICROWAVE & OPTICAL COMMUNICATIONS LAB				

Minimum Twelve Experiments to be conducted

Part – A (Any 7 Experiments):

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. V S WR Measurement.
6. Impedance and Frequency Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Circulator.
9. Scattering parameters of Magic

Tee. Part – B (Any 5

Experiments):

10. Characterization of LED.
11. Characterization of Laser Diode.
12. Intensity modulation of Laser output through an optical fiber.
13. Measurement of Data rate for Digital Optical link.
14. Measurement of NA.
15. Measurement of losses for Analog Optical link.

Equipment required for Laboratorries:

1. Regulated Klystron Power Supply
2. VS WR Meter -
3. Micro Ammeter - 0 – 500 μA
4. Multimeter
5. CRO
6. GUNN Power supply, Pin Moderator
7. Reflex Klystron

8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slotted line carriage
12. Probe detector
13. Wave guide shorts
14. Pyramidal Horn Antennas
15. Directional Coupler
16. E, H, Magic Tees
17. Circulators, Isolator
18. Matched Loads
19. Fiber Optic Analog Trainer based LED
20. Fiber Optic Analog Trainer based laser
21. Fiber Optic Digital Trainer
22. Fiber cables - (Plastic, Glass)

SEMESTER-VII	L	T	P	C
	-	-	3	2
BTEC7L02: DIGITAL SIGNAL PROCESSING LAB				

LIST OF EXPERIMENTS

1. To Study the architecture of DSP chips-TMS 320C 5X/6X Instructions.
2. To Verify Linear Convolution.
3. To Verify the Circular Convolution.
4. To design FIR filter(LP/HP)using Windowing Technique
   a) Using Rectangular Window
   b) Using Triangular Window
   c) Using Kaiser Window
5. To Implement IIR filter(LP/HP) on DSP Processors
6. N-point FFT Algorithm
7. MATLAB Program to generate Sum of Sinusoidal Signals.
8. MATLAB Program to find frequency response of Analog LP/HP Filters.
9. To Compute Power Density Spectrum of a Sequence.
10. To find the FFT of given 1-D Signal and Plot.

SEMESTER-VII	L	T	P	C
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BTEC7M01: MINI PROJECT				

SEMESTER-VIII	L	T	P	C
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BTEC8T01: RADAR SYSTEMS				

UNIT - I

Introduction: Nature of Radar, Maximum Unambiguous Range. Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications.Related Problems.

Radar Equation: Prediction of Range Performance, Minimum Detectable Signal,Receiver Noise and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets-sphere, cone-sphere). Transmitter power.

UNIT - II

PRF and Range Ambiguities, System Losses (Qualitative treatment). Related Problems.

CW and Frequency Modulated Radar: Doppler effect, CW Radar -Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirement, Applications of CW radar. FMCW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement Errors, Multiple Frequency CW Radar.

UNIT - III

MTI and Pulse Doppler Radar: Introduction, Principle, MTIR Radar with Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers - Filter Characteristics, Blind Speeds, Double Cancellation staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance. Non-coherent MTI, MTI versus Pulse Doppler Radar.

UNIT - IV

Tracking Rader : Tracking with Rader, Sequential Lobing, Conical Scan, Monopulse Tracking Rader, Amplitude comparison Monopulse(One and Two coordinates), Phase comparison monopulse, Tracking in range, Acquisition and scanning patterns, Comparison of trackers.

UNIT- V

Electronically Steered Phased Array Antennas, Phase Shifters, Frequency -scan Arrays, Radiation for Phased Array, architecture for Phased Arrays.

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver -response Characteristics and Derivation, Correlation detection, Detection criteria, Detector characteristics, Automatic Detection, Constant False Alarm Rate Receiver

UNIT - VI

Radar Receivers - Noise Figure and Noise Temperature. Displays - types. Duplexer - Branch type and Balanced type. Radiation Pattern. Beam Steering and Beam Width changes, Series versus Parallel Feeds. Applications, Advantages and Limitations.

TEXT BOOKS:

1. Introduction to Radar Systems- Merrill I. Skolnik, SECOND EDITION, McGraw - Hill, 1981.

2. Radar Engineering and fundamentals of Navigational Aids-G.S.N.Raju, I.K International, 2008.

REFERENCES:

1 .Introduction to Radar Systems - Merrill I. Skolnik, THIRD EDITION,Tata McGraw - Hill, 2001.

2. Radar: Principles, Technologies, Applications- Byron Edde, Pearson Education.

ELECTIVE – IV

SEMESTER-VIII	L	T	P	C
	3	1	-	3
BTEC8TE1: BIO-MEDICAL ENGINEERING				

UNIT – I :

Introduction to Biomedical Instrumentation

Age of Biomedical Engineering and development of Biomedical Instrumentation, Man Instrumentation system, components of the man Instrument system, Problems encountered in measuring a living system, Sources of Bioelectric Potentials, Muscle, Resting and action potential and propagation of Action potential, ECG, EEG, EMG, Envoked responses.

UNIT – II :

Electrodes and Transducers

Introduction and Electrode theory, Bio-potential electrodes and examples of electrodes, Basic transducer principle & Biomedical Transducers, The transducer and Transduction principle, Active Transducers, Passive Transducers, Transducers for Biomedical applications, Pulse sensors , Respiration sensors, Transducers with Digital output.

UNIT – III :

Measurements of the Cardio Vascular System

The Heart and the Cardiovascular system, Electrocardiography, Blood pressure measurement, Measurement of Blood Flow and Cardiac output, Measurement of Heard Sound, Plethysmography, Pacemakers, Defibrillators

UNIT – IV :

Measurements of the Respiratory and Nervous System

The Physiology in the Respiratory system, Tests and Instrumentation for the Mechanics of Breathing, Respiratory Therapy Equipment. Introduction to the nervous system, neural communication, neuronal firing measurements, EEG Block diagram, rhythms and EEG diagnostics

UNIT – V :

Therapeutic and Prosthetic Devices

Audiometers and Hearing Aids, Myoelectric Arm, Laparoscope, Ophthalmology instruments, Anatomy of vision & electrophysiological tests, Ophthalmoscope, tonometer for Eye Pressure Measurement, Diathermy, Clinical Laboratory Instruments, Biomaterials, Stimulators

UNIT – VI :

Diagnostic Techniques

Principles of Ultrasonic Measurement, Ultrasonic Imaging, Ultrasonic Applications of Therapeutic Uses, Ultrasonic Diagnosis, X-Ray and Radio Isotope Instrumentations, CAT scan, Emission computerized Tomography, MRI

BioTelemetry: Introduction to Biotelemetry, Physiological Parameters adaptable to Biotelemetry, System Implantable units, Telemetry for ECG measurements during exercise, Telemetry for Emergency Patient monitoring.

TEXT BOOKS :

1.”Biomedical Electronics and Instrumentation” by Omkar N.Pandey,
Rakesh Kumar, Katson books.

2.”Biomedical Instrumentation” by Cromwell, weibell, Pfeiffer, second edition, PHI publications

RFERENCES :

1.”Introduction to Bio-medical Equipment Technology”, 4th edition, Joseph J
Carr M.Brown, Pearson Publications.

2.”Handbook of Biomedical instrumentation” khandapur, MGH

ELECTIVE – IV

SEMESTER-VIII	L	T	P	C
	3	1	-	3
BTCS8TE5: CLOUD COMPUTING				

UNIT - I

Introduction to Cloud Computing: Evolution of Cloud Computing, Why Cloud, Cloud Essentials, Business & IT Perspective, Cloud Computing Definition, Benefits & Challenges of Cloud Computing, Limitations, Usage Scenarios and Applications, Business Models around Cloud, Cloud Computing Characteristics, Cloud Adoption.

UNIT - II

Cloud Models: Cloud What It Is & What It Isn't, From Collaborations to Cloud, Cloud Models, Cloud Application Architecture, Cloud Computing Architecture, Value of Cloud Computing, Cloud Infrastructure Models, Cloud Infrastructure Self Service, Scaling a Cloud Infrastructure.

UNIT - III

Cloud Services: Service Definition, Storage as a Service, Database as a Service, Information as a Service, Process as a Service, Application as a service, Management/Governance as a Service, Platform as a Service, Security as a Service, Testing as a Service, Integration as a Service, Infrastructure as a Service.

UNIT - IV

Cloud Management: Cloud Ecosystem, Cloud Business Process Management, Cloud Stack, Computing on Demand (CoD), Cloud Sourcing, Cloud Analytics, Cloud Management, Cloud Asset, Management, Resiliency, Provisioning, Cloud Governance, Charging Models, Metering and Billing.

Accessing the Clouds- Platforms, WEB Applications, WEB APIS, WB Browsers.

UNIT – V

Virtualization for Cloud: Introduction, Pros and Cons of Virtualization, Virtualization Architecture, Virtual Machine, Types of Virtual Machines, System Virtual machine, Process Virtual machine, Virtual Machine Properties, Virtualization in Cluster/Grid Context, VirtualNetwork, Types of Virtualization, Virtual Machine Monitor.

UNIT - VI

Introduction, Types of Clouds, Cloud Comparing Approaches, Aneka-integration of Private and Public Clouds: Aneka Cloud Platform introduction, Comet Cloud an Autonomic Cloud Engine, Introduction to Comet Cloud, Comet Cloud Architecture.

Cloud Collaboration: Introduction, Collaborating on Calendars, Schedules and Task Management, Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Word Processing, Collaborating on Spread Sheets.

TEXTBOOKS:

1. Cloud Computing, by Dr M.N RAO, Prentice Hall Learning Ltd, 2015.

REFERENCES:

2. Cloud Computing Bible, by Barrie Sosinsky, Wiley Publishing , 2011.
3. Cloud Computing Black Book, by Kailash Jayaswal , Jagannath Kallakurchi , Donald J. Houde , Deven Shah; KoGent Publications, 2014.
4. Cloud Computing: Principles and Paradigms, by Rajkumar Buyya , James Broberg , Andrzej Goscinski , by John Wiley & Sons, 2011.
5. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, by Michael Miller, QUE Publications, 2009.

ELECTIVE – IV

SEMESTER-VIII	L	T	P	C
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BTEC8TE2: GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)				

UNIT - I

Overview of GPS: Basic concept, system architecture, space segment, user segment, services of GPS, applications of GPS

UNIT - II

GPS Signals: Signal structure, anti spoofing (AS), selective availability, Difference between GPS and GALILEO satellite construction.

UNIT - III

GPS coordinate frames, Time references: Geodetic and Geo centric coordinate systems, ECEF coordinate world geodetic 1984 (WGS 84), GPS time.

UNIT - IV

GPS orbits and satellite position determination: GPS orbital parameters, description of receiver independent exchange format (RINEX) – Observation data and navigation message data parameters, GPS position determination.

UNIT - V

GPS Errors: GPS error sources – clock error, ionospheric error, tropospheric error, multipath, ionospheric error estimation using dual frequency GPS receiver.

UNIT - VI

GPS Aided Geo-Augmented Navigation (GAGAN) architecture, Indian Regional Navigation Satellite System. GNSS augmentation, Wide Area Augmentation System (WAAS), applications

TEXT BOOKS :

1. G S RAO, Global Navigation Satellite Systems, McGraw-Hill publications, New Delhi, 2010
2. B. Hoffman – Wellenhof, H. Liehtenegger and J. Collins, 'GPS – Theory and Practice', Springer – Wien, New York (2001).

REFERENCES :

1. James Ba – Yen Tsui, 'Fundamentals of GPS receivers – A software Approach', John Wiley & Sons,2001.

SEMESTER-VIII	L	T	P	C
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BTEC8P01: PROJECT WORK				

SEMESTER-VIII	L	T	P	C
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BTEC8V01: COMPREHENSIVE VIVA-VOCE				