DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Vision of the institute

- To provide the society with Centre of Learning in Technical Education and Research that motivates the students to evolve into dynamic professionals.

Mission of the institute

- 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 centre 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

Department of CSE VISION:

- To empower Computer Science Engineers as technologically adept, innovative, self-motive and socially responsible professionals by providing multi-dimensional education.

Department of CSE MISSION:

- **To lay a strong foundation of programming knowledge by concentrating on fundamental concepts of Computer Science and Engineering.**
- **To develop flair for logical thinking and innovative methods to produce software solutions.**
- **To strengthen employability and entrepreneurship skills.**
- **To produce socially responsible software professionals with ethical values.**

PROGRAM EDUCATIONAL OBECTIVES:

PEO1: LEARN AND INTEGRATE: Graduates shall be proficient in solving computational problems by applying multidisciplinary knowledge.

PEO2: THINK AND CREATE: Graduates shall be capable of developing software based systems.

PEO3: COMMUNICATE: Graduates shall acquire efficient communication and leadership skills.

PEO4: PRACTICE CITIZENSHIP: Graduates shall attain professional and ethical attributes.

PROGRAM OUTCOMES (PO):

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 modeling 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.

PROGRAM SPECIFIC OUTCOMES:

PSO1: Design and development of software applications by using data mining techniques.

PSO2: Enrichment of graduates with global certifications to produce reliable software solutions.

ACADEMIC REGULATIONS

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 asSCET**) 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 courses	25-30%
Interdisciplinary courses 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 theB.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 8^{th}semesterthere 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 addition Seminar, Technical Paper and Mini Project at the end of 7^{th} semester. (Mini Project, Technical paper and Seminar is for 50 marks each Main Project during 8^{th} Sem for 200 marks) are evaluated.

(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 as 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 break for a minimum of 4 weeks after the 6th semester and 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 evaluation committee comprising Head of the Department and two faculty of the department including the project Supervisor for 50 Marks. A minimum of 50% 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 text for 20 marks and objective text 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 total syllabus of the concerned subjects. In end 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 four questions 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 a 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% of first best + 20% of second).

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

(xi) **Main Project:**The project work carried out by the students during 8th semester is evaluated for internal assessment and external examination.

a) Internal Assessment: Internal Assessment will be carried out by Projects 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) Supervisor and 3) External member selected from the panel of examiners.

(xii) Total marks to be awarded for Project work is 200, of which 60 marks will be for Internal

Evaluation and 140 marks for External examination through presentation / viva - voice by / of the student. The internal evaluation will be on the basis of two seminars on the topic of the project.

(xiii) The comprehensive viva will be conducted for 50 marks in 8^{th} Semester. The comprehensive viva will be conducted evaluated in 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 acquired a minimum of 75% of attendance in aggregate of all the subjects.

(ii) Condonation of 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 is totally at the discretion of the College Academic Committee.

(iii) A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable. They may seek re-admission for that semester as and when offered consecutively 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 their end examination of that particular semester and their registration for examination will be cancelled.

(vi) A stipulated fee will be payable by the student towards attendance condonation.

(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 ($>65^0$) and recommended by the concerned authority condonation fees in 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 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.

(iii) A student will be promoted from 4^{th} Semester to 5^{th} Semester, if he/she fulfills the academic requirements of 50% of the credits up to 4^{th} Semester from all the examinations (Regular and supplementary) whether or not the candidate takes the examinations.

(iv) A student will be promoted from 6^{th} to 7^{th} Semester, only if he/she fulfills the academic requirements of 50% 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 the students to give a fair chance to appear in the subject if any failed.

(vi) Candidate who fails in 8^{th} Semester can 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.

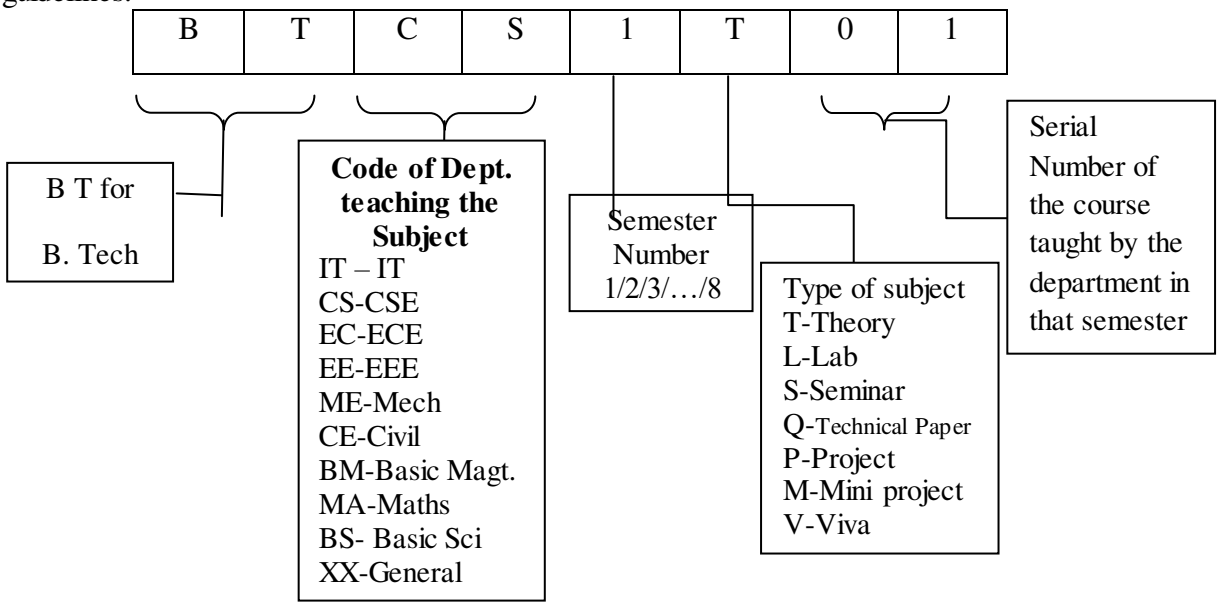
(ii) Registered and successfully completed all the components prescribed in the programme of study to which he/she is admitted.

(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.

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

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 is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

$$CGPA = \frac{\sum C_i G_i}{\sum C_i}$$

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.

Percentage of Marks Scored	Letter Grade	Grade 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.

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 maximum stipulated period cannot be relaxed under any circumstance.

13. ADVANCED SUPPLEMENTARY EXAMINATIONS:

Candidate who fails the subjects in 8^{th} Semester can appear for Advanced Supplementary Examinations.

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

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

(ii) Students, who fail 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:** (6^{th} Semester to 7^{th} Semester): A student shall be promoted from 6^{th} Semester to 7^{th} Semester only if he/she fulfills the academic requirements of 50% credits up to 6^{th} Semester.

15. 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.

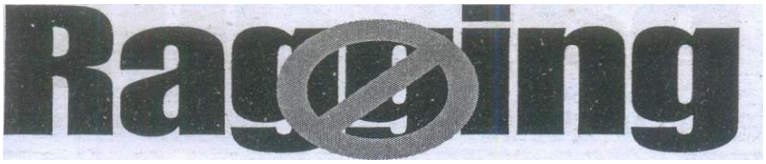
16. MALPRACTICES:

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.

17. 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.

SWARNANDHRACOLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NAAC with 'A' Grade (3.32/4.00 CGPA)
Approved by A.I.C.T.E, New Delhi, Permanently Affiliated to J N T U K, KAKINADA
Seetharampuram, NARSAPUR – 534 280, W.G.Dist., Andhra Pradesh
Tel.: 08814 – 240599



Prohibition of ragging in educational institutions Act 26 of 1997 Salient Features

Ragging within or outside any educational institution is prohibited.

Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

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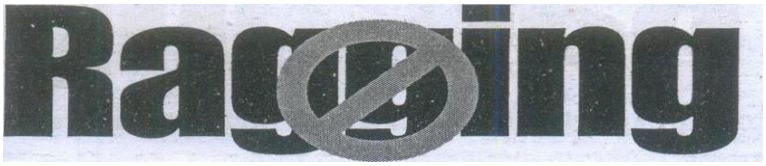
	Imprisonment upto		**Fine upto**
Teasing, Embarrassing and Humiliation	6 Months	+	Rs.1, 000/-
+ Assaulting or Using Criminal Force or Criminal	1 Year		Rs.2, 000/-
+ Wrongfully restraining or confining or causing	2 Years		Rs.5000/-
+ Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years		Rs.10, 000/-
Causing death or abetting suicide	10 Years	+	Rs. 50,000/-



ABSOLUTELY NO TO RAGGING:

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Card and show them when demanded.
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

COMPUTER SCIENCE & ENGINEERING
COURSE STRUCTURE – UG

B.Tech. **SEMESTER I**

S. No.	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTBS1T01	English-I	3	1	-	3	30	70	100
2	BTMA1T01	Differential Equations	3	1	-	3	30	70	100
3	BTEE1T01	Basic Electrical and Electronics	3	1	-	3	30	70	100
4	BTBS1T03	Engineering Physics	3	1	-	3	30	70	100
5	BTME1T01	Engineering Drawing	1	-	3	3	30	70	100
6	BTCS1T01	C-Programming	3	1	-	3	30	70	100
7	BTBS1L01	English Communication Skills Lab-I	-	-	3	2	25	50	75
8	BTBS1L03	Engineering Physics Lab	-	-	3	2	25	50	75
9	BTCS1L01	C-Programming Lab	-	-	3	2	25	50	75
		Total				**24**	255	570	825

B.Tech. **SEMESTER II**

S. No.	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTBS2T01	English-II	3	1	-	3	30	70	100
2	BTMA2T01	Linear Algebra & Vector Calculus	3	1	-	3	30	70	100
3	BTMA2T02	Numerical Methods & Integral Transforms	3	1	-	3	30	70	100
4	BTBS2T02	Engineering Chemistry	3	1		3	30	70	100
5	BTBS2T04	Environmental Studies	3	1	-	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	BTBS2L02	Engineering Chemistry Lab	-	-	3	2	25	50	75
9	BTCS2L01	OOPS Through C++ Lab	-	-	3	2	25	50	75
		Total				**24**	255	570	825

COMPUTER SCIENCE & ENGINEERING
COURSE STRUCTURE – UG

B.Tech. **SEMESTER III**

S.No	Course Code	Course Name	L	T	P	C	I	E	Total
1	BTCS3T01	Data Structures	3	1	-	3	30	70	100
2	BTCS3T02	Operating Systems	3	1	-	3	30	70	100
3	BTCS3T03	OOPS with JAVA	3	1	-	3	30	70	100
4	BTEC3T05	Digital Logic Design	3	1	-	3	30	70	100
5	BTMA3T01	Discrete Mathematics	3	1	-	3	30	70	100
6	BTBM3T02	Principles of Economics & Management	3	1	-	3	30	70	100
7	BTBS3L01	Soft Skills /Aptitude Lab-1	-	-	3	1	25	-	25
8	BTCS3L01	Data Structures Lab	-	-	3	2	25	50	75
9	BTCS3L02	Operating Systems Lab	-	-	3	2	25	50	75
		Total				23	225	520	775

B.Tech. **SEMESTER IV**

S. No.	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTCS4T01	Data Base Management Systems	3	1	-	3	30	70	100
2	BTCS4T02	Unix	3	1	-	3	30	70	100
3	BTCS4T03	Design Analysis and Algorithms	3	1	-	3	30	70	100
4	BTCS4T04	Formal language automata theory	3	1		3	30	70	100
5	BTMA4T01	Probability & Statistics	3	1	-	3	30	70	100
6	BTCS4T05	Computer Organization	3	1	-	3	30	70	100
7	BTBS4L01	Soft Skills /Aptitude Lab-2	-	-	3	1	25	-	25
8	BTCS4L01	Unix Lab	-	-	3	2	25	50	75
9	BTCS4L02	DBMS Lab	-	-	3	2	25	50	75
		Total				**23**	255	520	775

COMPUTER SCIENCE & ENGINEERING
COURSE STRUCTURE – UG

B.Tech. **SEMESTER V**

S. No.	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTCS5T01	Software Engineering	3	1	-	3	30	70	100
2	BTCS5T02	Cloud Computing	3	1	-	3	30	70	100
3	BTEC5T07	Microprocessor & Its Applications	3	1		3	30	70	100
4	BTCS5T03	Computer Graphics	3	1	-	3	30	70	100
5	BTCS5T04	Computer Networks	3	1	-	3	30	70	100
6	BTCS5L01	Cloud Computing Lab	-	-	3	2	25	50	75
7	BTCS5L02	Computer Networks Lab	-	-	3	2	25	50	75
8	BTEC5L03	Microprocessor Lab	-	-	3	2	25	50	75
9	BTCS5S01	Seminar	-	-	3	2	25	25	50
		Total				**23**	250	525	775

B.Tech. **SEMESTER VI**

S. No.	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTCS6T01	Web Technologies	3	1	-	3	30	70	100
2	BTCS6T02	Object Oriented Analysis Design	3	1	-	3	30	70	100
3	BTCS6T03	Data Mining and Data Warehousing	3	1	-	3	30	70	100
4	BTCS6T04	Cryptography and Network Security	3	1	-	3	30	70	100
5		**Elective-1**	3	1	-	3	30	70	100
6	BTCS6Q01	Technical Paper	-	-	3	2	25	25	50
7	BTCS6L01	Data Mining and Data Warehousing Lab	-	-	3	2	25	50	75
8	BTCS6L02	Web Technologies Lab	-	-	3	2	25	50	75
9	BTCS6L03	Object Oriented Analysis Design lab	-	-	3	2	25	50	75
		Total				23	250	525	775

COMPUTER SCIENCE & ENGINEERING
COURSE STRUCTURE – UG

B.Tech. **VII SEMESTER**

S. No	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTCS7T01	Mobile Application Development	3	1	-	3	30	70	100
2	BTCS7T02	Software Testing	3	1	-	3	30	70	100
3	BTCS7T03	Open Source Software	3	1	-	3	30	70	100
4	BTCS7T04	Big Data	3	1	-	3	30	70	100
5		**Elective-2**	3	1	-	3	30	70	100
6	BTBM8T01	Professional Ethics and Intellectual Property Rights	3	1	-	-	Mandatory		
7	BTCS7L01	Mobile Application Development Lab	-	-	3	2	25	50	75
8	BTCS7L02	Software Testing Lab	-	-	3	2	25	50	75
9	BTCS7M01	Mini Project	-	-	3	2	25	25	50
		Total				**21**	225	475	700

B.Tech. **VIII SEMESTER**

S. No.	Course Code	Course Title	L	T	P	C	I	E	Total
1	BTCS8T01	Information Retrieval Systems	3	1	-	3	30	70	100
2		**Elective-3**	3	1	-	3	30	70	100
3		**Elective-4**	3	1	-	3	30	70	100
4	BTCS8S01	Seminar	-	-	3	2	25	25	50
5	BTCS8V01	Comprehensive Viva Voce		-	3	2	50	-	50
6	BTCS8P01	Main Project		-	3	6	60	140	200
		Total				**19**	225	375	600

ELECTIVE SUBJECTS

Elective-I		
1	BTCS6TE1	Advanced Data structures
2	BTCS6TE2	Distributed Databases
3	BTCS6TE3	Advanced Computer Architecture
Elective-II		
1	BTCS7TE1	Wireless Sensor Networks
2	BTCS7TE2	Information Storage Management
3	BTCS7TE3	Distributed Systems
Elective-III		
1	BTCS8TE1	Image processing
2	BTCS8TE2	Bio informatics
3	BTCS8TE3	Computer vision
Elective-IV		
1	BTCS8TE4	Pattern Recognition
2	BTCS8TE5	Soft Computing
3	BTCS8TE6	Machine Learning

SEMESTER -I	L	T	P	C
	3	1	-	3
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 astudent.

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 adeveloped 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 andlogically.

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 mysteriousnature 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 adifferent 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 themeof 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 thelearner understand humorous texts and use of words for irony.

Text Book :

"English Essentials" by RavindraPublications

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 practicalapplications.

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 thecommon 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 worthwhilethrough social service.

4. Vijay Bhatkar

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

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
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 e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, $xV(x)$. 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

Reference :

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

SEMESTER -I	L	T	P	C
	3	1	-	3

BASIC ELECTRICAL & ELECTRONICS

UNIT-I:

BASIC CONCEPTS, LAWS AND PRINCIPLES

Introduction – Atomic Structure and Electric Charge – Conductors, Insulators, and Semiconductors – Electric Field and Magnetic Field – Electric Current, Resistance, Potential, and Potential Difference – Ohm's Law – Work, Power and Energy – Electromagnetism and Electromagnetic Induction – Induced EMF – Inductance of a Coil – Electrical Circuit Elements (Resistor, Inductor, and Capacitor) – Voltage & Current Sources.

UNIT -II:

AC FUNDAMENTALS

Generation of Alternating Voltage – Concept of Average Value and Root Mean Square Value of an Alternating Quantity – Behavior of R, L, and C in AC Circuits – Power in AC Circuits – AC Series & Parallel Circuits.

Three-Phase Circuits: Generation of Three Phase Voltages–Three-Phase Winding Connections (Yand Connections) – Measurement of Three-phase Power.

UNIT-III:

MEASUREMENT AND MEASURING INSTRUMENTS

Introduction – Analog and Digital Instruments – Passive and Active Instruments – Static Characteristics – Linear and Non-linear Systems – Dynamic Characteristics – Classification of the Instrument System – Measurement Error – Indicating type Instruments – Measurement of Power, Measurement of Energy – Instrument Transformers – Megger & Measurement of Insulation Resistance – Multi-meter and Measurement of Resistance

UNIT-IV:

SEMI CONDUCTOR DEVICES

Introduction –Binding Forces between Atoms in Semiconductor Materials – Extrinsic Semiconductors – Semiconductor Diodes – Zener Diode – Bipolar Junction Transistors – Field Effect Transistors – MOSFET – Silicon-controlled Rectifier – DIAC – TRIAC.

UNIT -V:

DIGITAL ELECTRONICS

Introduction – Number Systems – Octal Number Systems – Hexadecimal Number System – Logic Gates – Boolean Algebra – De Morgan's Theorem – Combinational Circuits – Simplification of Boolean Expressions using De Morgan's Theorem – Universal Gates.

UNIT – VI:

BASICS OF COMMUNICATION

Introduction – Elements of Communication Systems – Basic Electronic Communication – Bandwidth and its Significance – Types of Modulation – Comparison of Amplitude Modulation and Frequency Modulation – Demodulation -Basics of Microwave and Satellite Communication – Television Systems – Mobile Communication.

Text Book (s):

1. Basic Electrical and Electronics Engineering – S. K. Bhattacharya, Pearson Publications.
2. Basic Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria & Sons Publications.

References:

1. Engineering Circuit Analysis – William H. Hayt& Jack E. Kemmerly, Tata McGraw-Hill Company, 7th Edition.
2. A Course in Electrical and Electronic Measurements and Instrumentation – A. K. Sawhney, Dhanpat Rai & Co.
3. Electronic Devices and Circuit Theory – Robert L. Boylestad & Louis Nashelsky, Prentice-Hall of India, 6th Edition.
4. Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria & Sons Publications.
5. Engineering Basics: Electrical, Electronics and Computer Engineering – Thyagarajan T., New Age International, 3rd edition (2007).

SEMESTER -I	L	T	P	C
	3	1	-	3
ENGINEERING PHYSICS				

UNIT -I:

CRYSTALLOGRAPHY AND X-RAY DIFFRACTION

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 andTime 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 – Fermi energy.

BAND THEORY OF SOLIDS: Bloch theorem (qualitative)–Kronig–Penney model–Origin of energyband 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 Stimulatedemission 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 andacceptance 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:

A Text Book of Engineering Physics by M. N. Avadhanulu & P. G. Kshirasagar (S. Chand publications)

1. 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 -I	L	T	P	C
	3	1	-	3
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:

The C Programming Language	Kernighan &Ritchie	PHI
Programming in C: A Practical Approach	Ajay Mittal	Pearson
Programming in ANSI C	E Balagurusamy	TMH

Reference:

Understanding and using C Pointers	Richard Reese	Oreilly

SEMESTER -I	L	T	P	C
	3	1	-	3
ENGINEERING DRAWING				

UNIT – I:

INTRODUCTION: Engineering Drawing and Plane Curves, Use of Drawing Instruments andConventions.

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 ofPoints, **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 theReference 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 inclinedto 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, IsometricProjections 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.

References:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishers.

2. Engineering Drawing by K. Venugopal., NEW AGE Publications.

SEMESTER -I	L	T	P	C
	-	-	3	2
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-I:

A. Greeting and Introductions

B. Pure Vowels

UNIT-II:

A. Asking for information and Requests

B. Diphthongs

UNIT-III:

A. Invitations

B. Consonants

UNIT-IV:

A. Commands and Instructions

B. Accent and Rhythm

UNIT-V:

Suggestions and Opinions

B. Intonation

Text Book: 'Strengthen your Communication Skills' Part-A by Maruthi Publications

Reference Books:

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

SEMESTER -I	L	T	P	C
	-	-	3	2
ENGINEERING PHYSICS LAB				

List of Experiments:

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
4. Melde's Apparatus.
5. Determination Frequency of A.C supply by using Sonometer
6. Determination of wavelength using Laser.
7. Determination of Numerical Aperture of an Optical Fiber.
8. Determination of the Planck's constant using Photo-Cell.
9. Study the variation of Magnetic Field along the axis of a solenoid coil using Stewart - Gee's Apparatus.
10. Determination of the Time Constant for a C-R Circuit.
11. Determination of the Band Gap of a Semiconductor using a p-n junction diode.
12. Study of Characteristic curves (I/V) of a Zener diode to determine its Breakdown voltage.
13. Determination of Thermoelectric coefficient of a Thermistor by using its Characteristic curve.

MANUAL:

1. Engineering Physics Lab Manual Prepared by Physics Faculty.

SEMESTER -I	L	T	P	C
	-	-	3	2
COMPUTER 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	1	-	3
ENGLISH – II				

DETAILED TEXT-II :

Sure Outcomes: English for Engineers and Technologists

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 ofmaking 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 asnanotechnology.

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 anydevelopment.

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 theirpersonal 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 hisown 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 innuclear energy and relevance of space programmes

OUTCOME: The learner will realize that development is impossible without scientificresearch

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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 andtry his hand at it.

Text Book :"Trail Blazers" by Orient Black Swan Pvt. Ltd. Publishers

SEMESTER -II	L	T	P	C
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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, 42nd Edition, Khanna Publishers

2. B.V. RAMANA, Higher Engineering Mathematics, Tata McGraw Hill

Reference:

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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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-V I:

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 HimalayaPublishing House.

References:

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

2. S. S. Sastri (PHI), Introductory Methods of Numerical Analysis.

SEMESTER -II	L	T	P	C
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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 -II	L	T	P	C
	3	1	-	3
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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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 problemsMineral resources: Use and exploitation, environmental effects of extracting and using mineral resourcesFood resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinityEnergy 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 andindustrial 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.

References:

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 -II	L	T	P	C
	-	-	3	2
ENGLISH COMMUNICATION SKILLS LAB – II				

Suggested Lab Manuals:

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

ADVANCED COMMUNICATION SKILLS

UNIT 6 Body Language

UNIT 7 Dialogues

UNIT 8 Interviews and Telephonic Interviews

UNIT 9 Group Discussions

UNIT 10 Presentation Skills

UNIT 11 Debates

Text Book:

'Strengthen your Communication Skills' Part-B by Maruthi Publications

Reference Books:

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

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ENGINEERING CHEMISTRY LAB				

List of Experiments

Student has to do Any Ten Experiments of the Following

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

MANUAL:

1. Engineering Chemistry Lab Manual Prepared by Chemistry Faculty.

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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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DATA STRUCTURES(BTCS3T01)				

COURSE OBJECTIVES:

1 To impart the basic concepts of data structures and algorithms

2 To understand concepts about searching and sorting techniques

3 To Understand basic concepts about stacks,queues,lists,trees and graphs

4 To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

COURSE OUTCOMES:

1 Aability to analyze algorithms and aalgorithm correctness.

2 Aability to summarize searching and sorting techniques

3 Aability to describe stack,queue and linked list operation.

4 Aability to have knowledge of treeand graphs concepts.

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

Reference Books:

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

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OPERATING SYSTEMS (BTCS3T02)				

COURSE OBJECTIVES:

1 To understand the fundamental concepts and techniques of Operating Systems.

2 To study the concepts in process management and concurrency control mechanisims

3 to understand the concepts in memory managements and deadlocks

4 to study on file management and storage structres

COURSE OUTCOMES:

1 an ability to understand basic concepts of operating system.

2 an ability to describe process management ,scheduling and concurrency control mechanisims.

3 an ability to analyze memory management and deadlocks.

4 an ability to compare various file systems and its operating systems exmples.

UNIT-I:

Introduction: What IS OS; History of Operating Systems, Operating System Concepts, Operating Systems Structure, System Calls.

UNIT-II:

Processes: Introduction to Processes, process control block, process states, Threads, Process Scheduling **Concurrency**: Process synchronization, Synchronization, Inter Processor Communication, Classical IPC Problems, Semaphores, Monitors.

UNIT-III:

Memory Management: Memory Management without Swapping or Paging, Paging, Swapping, Segmentation, Virtual Memory, Page Replacement Algorithms, Modeling paging algorithms, Demand Paging, Design issues for paging systems, Segmentation

UNIT-IV:

File Systems And Input/output : Files, Directories, File system implementation, Security, Protection mechanism, Principles of I/O Software, Disk Management.

UNIT-V:

Mass Storage Structure- Overview of mass-storage structure, Disk Structure, Disk Scheduling, Swap-Space management, RAID structure, Stable storageImplementation..

UNIT-VI:

Deadlocks: System Model, Resources, Deadlock Characterization, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention, Other Issues

Case Study: Unix: Fundamental Concepts in Unix, MS–DOS: Fundamental Concepts In MS- DOS

Text Books:

1.Operating Systems by Abraham Silberstaz Peter B Galvin, Greg Gagne 7 th edition, John Wiley.

2.Modern Operating Systems by Andrew S. Tanenbaum

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OBJECT ORIENTED PROGRAMMING THROUGH JAVA(BTCS3T03)				

COURSE OBJECTIVES:

1 Concepts of object oriented programming in java are needed.

2 To provide sufficient knowledge about developing real world projects with object oriented oncept.

COURSE OUTCOMES:

1 Ability to describe the concepts of object-oriented programming.

2 Ability to handle interfaces, class hierarchies and exceptions in programs.

3 Ability to construct appropriate diagrams and textual descriptions to communicate the static structure and dynamic behavior of an object oriented solution

4 Ability to design and develop Object Oriented systems

UNIT-I:

Introduction to OOPS

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.**Java :** History – Java features – Java Environment – JDK1.7 – API.

Introduction to Java: Types of java program – Creating and Executing a Java program – Java Tokens: Keywords, Character set, Identifiers, Literals, Separator – Java Virtual Machine (JVM) – Command Line Arguments – Comments in Java program.

UNIT-II:

Java Basics

Java Basics: Constants – Variables – Data types - Scope of variables – Type casting – Operators: Arithmetic - Logical – Bit wise operator – Increment and Decrement – Relational – Assignment – Conditional – Special operator – Expressions – Evaluation of Expressions. **Decision making and Branching:** Simple if statement – if – else statement – Nesting if – else – else if Ladder – switch statement – Decision making and Looping: while loop – do – while loop - for loop – break — continue Statement.- – Simple programs. **Arrays:** One Dimensional Array – Creating an array – Array processing

– Multidimensional Array. **Class and objects:** Defining a class – Methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members – Nesting of Methods – this keyword – Command line input – Simple programs.**Strings:** String Array – String Methods – String Buffer Class – Simple programs

UNIT-III:

Inheritance and Interfaces

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. Interfaces: Multiple Inheritance - Defining interface – Extending interface - Implementing Interface - Accessing interface variables – Simple programs. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

UNIT-IV:

Packages and Applets

Packages: Java API Packages – System Packages – Naming Conventions – Creating & Accessing a Package – Adding Class to a Package – Hiding Classes – Programs. **Applets:** Introduction – Applet Life cycle – Creating & Executing an Applet.

UNIT-V:

Exception handling and Multithreading:

Exception Handling: Limitations of Error handling – Advantages of Exception Handling - Types of Errors – Basics of Exception Handling – try blocks – throwing an exception – catching an exception – finally statement. **Multithreading:** Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization – Implementing runnable interface – Thread Scheduling.

UNIT-VI:

AWT Components and Swings

AWT Components and Even Handlers: Abstract window tool kit – Event Handlers –Event Dlegation Model- Event Listeners – AWT Controls and Event Handling: Labels – TextComponent – ActionEvent – Buttons – CheckBoxes – ItemEvent - Choice – Scrollbars – Layout Managers- Input Events – Menus – Programs.

Swings:

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields.

Text Books:

1. Java: The complete reference, 7/e, Herbert schildt, TMH.
2. Java: How to Program, 8/e, Dietal, Dietal, PHI

References:

1. Learn Object Oriented Programming using Java, N. B Venkateswarlu, E V Prasad, S. Chand
2. Programming in Java2, Dr K SomaSundaram, JAICO Publishing house
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.

SEMESTER-III	L	T	P	C
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DIGITAL LOGIC DESIGN(BTEC3T05)				

COURSE OBJECTIVES:

1 To Work with a variety of number systems and numeric representations, including signed and unsigned binary, hexadecimal, 2's complement.

2 To introduce the methods for simplifying Boolean expressions. To introduce basic postulates of Boolean algebra and show the correlation between Boolean expression.

3 To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.

COURSE OUTCOMES:

1 Ability to understand the principles of digital circuits

2 Ability to learn the hardware concepts in a digital system

3 Ability to knowledge of the logic behind the operation of counters

4 Ability to analyse the internal design of integrated circuits

UNIT-I:

Digital Design and Binary Numbers:

Binary Arithmetic, Negative Numbers and their Arithmetic, Floating point representation, Binary Codes, Cyclic Codes, Error Detecting and Correcting Codes, Hamming Codes.

UNIT-II:

Minterm and Maxterm Realization of Boolean Functions, Gate-level minimization: The map method up to four variable, don't care conditions, SOP and POS simplification, NAND and NOR implementation, Quine Mc- Cluskey Method (Tabular method).

UNIT-III:

Combinational Logic:

Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Code Converters, Parity Generators and Checkers, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

UNIT-IV:

Memory and Programmable Logic Devices:

Semiconductor Memories, RAM, ROM, PLA, PAL, Memory System design.

UNIT-V:

Synchronous Sequential Logic:

Sequential Circuits, Storage Elements: Latches, Flip Flops, Analysis of Clocked Sequential circuits, state reduction and assignments, design procedure.

UNIT-VI:

Registers and Counters: Shift Registers, Ripple Counter, Synchronous Counter, Other Counters.

Text book:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", Pearson Education.

References:

1. A.K .Singh, "Foundation of Digital Electronics and Logic design",New Age international.

2. M. Rafiquzzaman, "Fundamentals of Digital Logic and Microcomputer Design", Wiley Dreantech Publication.

3. C.H Roth,Jr., "Fundamentals of Logic Design", ,Jaico Publishing.

SEMESTER-III	L	T	P	C
	3	1	-	3
DISCRETE MATHEMATICS (BTMA3T01)				

COURSE OBJECTIVES:

1. Enable the students to understand and create mathematical arguments and solving them with logical skills.

2. Enable the students to learn Number Theory, Which is applied in data security and Networking.

3.Enable the students to learn Set Theory, Graph Relations, functions which are used in cryptography and data structures, basic concepts of Graph Theory

COURSE OUTCOMES:

1.Ability to apply logic and Mathematical reasoning in practical applications like computer programming

2. Ability to employ Number Theory concepts in cryptography and security

3.Ability to differentiate set theory concepts in designing efficient Algorithms both in space and time. and Graph Theory concepts

4.Ability to solve various methods of solving Recurrence relations

UNIT-I:

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence, implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof.

UNIT-II:

Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free &bound variables, universe of discourse, inference theory of predicate calculus

UNIT-III:

Set theory &Relations: Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram.

Functions: composition of functions, Inverse Function, Principle of Inclusion-Exclusion, Pigeonhole Principles and its application.

UNIT-IV:

Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT-V:

Graph Theory: Basic Concepts, Representation of Graph, Subgraphs, Multigraphs, Euler Paths, Euler circuits and Graph Isomorphism and its related Problems.

UNIT-VI:

Graph Theory and Applications: Hamiltonian graphs, Chromatic Numbers, Spanning Trees, minimal Spanning Trees, BFS, DFS, Kruskals Algorithm, Prim's Algorithm's Binary trees, Planar Graphs.

Textbooks:

1. Discrete Mathematical Structures with Applications to computer science J.P Trembley, R. Manohar, TMH

2. Discrete Mathematical for computer Scientists &Mathematicians "J.L.Molt, A.Kandel,

T.P.Baker,PHI

References:

1. Discrete Mathematics and its Applications, Kennth .H. Rosen, 5^{th}ed, T MGraw-Hilled,2006.

2. Discrete Mathematical Structures, Kolman, Busby, Ross, 6^{th}ed.,PHI,2009

3. Discrete Mathematics with Combinatorics and Graph T9heory, Santha, Cengage Learning, 200

SEMESTER-III	L	T	P	C
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PRINCIPLES OF ECONOMICS&MANAGEMENT (BTBM3T02)				

COURSE OBJECTIVES:

1 To impart the basic concepts of Economics and Accounting

2 To know marketing structures, public & private organizations, to understand the accounting .

COURSE OUTCOMES:

1 Ability to understand knowledge in economics & demand concepts and forecosting

2 Ability to define the production and cost analysis

3 Ability to differentiate cost concepts and variables

4 Ability to Analyse market structure & pricing strategies and Assess financial Accounting

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 determinationin Perfect Competition, Monopoly, Monopolistic Competition, Oligopoly **-** Pricing methods - Break –Even Analysis (simple problems).

UNIT-III:

Introduction to Management: Concept - Functions of Management - ScientificManagement-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.

Reference Books:

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

2. 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
	-	-	3	1
SOFTSKILLS/APTITUDE LAB – I (BTBS3L01)				

Reading comprehension:

Reading Passage – 1 (1 hour): **Artificial Intelligence**

Reading Passage – 2 (1 hour): **Atmosphere**

Reading Passage – 3 (1 hour): **Modern Life**

Reading Passage –4 (1 hour): **Father of the Olympic Games**

Speaking Sklls :

Task-1**- Self Introduction :** (1 hour)

Task-2- **Presentation skills** :(1 hour)

Task-3- **Group Discussion** : (1 hour)

Task-4- **Review of a Cinema** : (1 hour)

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

Task-6- **Role Play** :1 hour)

Writing Skills :

Task-1- **Letter writing** - Formal (1 hour)

Task-2- **Resume writing** : (1 hour)

Task-3- **Parallel writing** : (1 hour)

Task-4- **Story generating** : (1 hour)

Task-5-**Text Building** : (1 hour)

Task-6-**Diary writing** : (1 hour)

Verbal Reasoning:

Task-1**- Detection of errors** (1 hour)

Task-2- **Sentence corrections** (1 hour)

Task-3- **Insertions of apt words from the givenconfusionable words**

Task-4-**Scrambled words**(1 hour)

Task-5- **Dialogue completion**(1 hour) 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)

Speed Mathematics:

Think Without Ink(TWI) Approach - Speed Maths: Squaring of Numbers - Multiplication of Numbers - Finding Square Roots - Finding Cube Roots - Solving Simultaneous Equations Faster – NumberSystem: HCF, LCM - Decimals - Percentages - Averages - Powers and Roots - Sudoku (level 1) -Series Completion (Numbers, Alphabets, Pictures) - Odd Man Out - Puzzles

Verbal Reasoning:

Analogies - Alphabet Test - Theme Detection - Family Tree - Blood Relations (Identifyingrelationships among group of people) - Coding & Decoding - Situation Reaction Test – Statement& Conclusions

Reference Books:

Instructional Manual- Prepared by Faculty.

1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.

2. Abhijit Guha, "Quantitative Aptitude", TMH, 3rd edition

SEMESTER-III	L	T	P	C
	-	-	3	2
DATA STRUCTURES USING JAVA LAB(BTCS3L01)				

Course Objectives:

1. To assess how the choice of data structures and algorithmdesignmethods impacts the performance of programs.
2. To choose the appropriate data structure and algorithmdesignmethod for a specifiedapplication.
3. To write programs using procedure-oriented designprinciples.
4. To solve problems using data structures such as linear
5. lists,stacks,queues,hashtables,binarytrees,heaps,binarysearchtrees, and graphs and writing programs for these solutions.

Course Outcomes:

1. Able to write well-structured procedure-oriented programs of upto1000 lines of code.
2. Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and Quicksort.
3. To implement the Stack ADT using both array based and linked – list based data structures.
4. To implement the Queue ADT using both array based circular queue and linked-list based implementations.
5. Able to implement binary search trees.

Student has to do Any Ten Exercise of the Following

Exercise 1:

a) Write a JAVA program to display default value of all primitive data types of JAVA.

b) Write a JAVA program that displays the roots of a quadratic equation ax2 +bx +C =0. Calculate the discriminate D and basing on the value of D, describe the nature of roots.

c) Write a JAVA Program to display the Fibonacci sequence.

Exercise 2:

a) Write recursive and non recursive JAVA program for calculation of Factorial of an integer

b) Write recursive and non recursive JAVA Program for calculation of GCD (n, m)

Exercise 3:

a) Write a JAVA Program that use both recursive and non recursive functions to perform Linear search for a Key value in a given list.

b) Write a JAVA Program that use both recursive and non recursive functions to perform Binary search for a Key value in a given list.

c) Write a JAVA Program that use both recursive and non recursive functions to perform Fibonacci search for a Key value in a given list.

Exercise 4:

a) Write a JAVA Program that implement Bubble sort, to sort a given list of integers in ascending order

b) Write a JAVA Program that implement Quick sort, to sort a given list of integers in ascending order

c) Write a JAVA Program that implement Insertion sort, to sort a given list of integers in ascending order.

Exercise 5:

a) Write a JAVA Program that implement radix sort, to sort a given list of integers in ascending order

b) Write a JAVA Program that implement merge sort, to sort a given list of integers in ascending order.

Exercise 6:

a) Write a JAVA Program that implement stack (its operations) using arrays.

b) Write a JAVA Program that implement stack (its operations) using Linked list

Exercise 7:

a) Write a JAVA Program that implement Queue (its operations) using arrays.

b) Write a JAVA Program that implement Queue (its operations) using linked lists

Exercise 8:

Write a JAVA Program to implement Priority Queues using arrays.

Exercise 9:

Write a JAVA Program to implement Circular Queues using arrays.

Exercise 10:

a) Write a JAVA Program that uses functions to create a singly linked list.

b) Write a JAVA Program that uses functions to' perform insertion operation on a singly linked list.

c) Write a JAVA Program that uses functions to perform deletion operation on a singly linked list.

Exercise 11:

a) Write a JAVA Program Adding two large integers which are represented in linked list fashion.

b) Write a JAVA Program to reverse elements of a single linked list.

Exercise 12:

a) Write a JAVA Program to Create a Binary Tree of integers.

b) Write a recursive JAVA Program for Traversing a binary, tree in preorder, in order and post order.

c) Write a non recursive JAVA Program for Traversing a binary tree in preorder, in order and post order.

Exercise 13:

a) Write a JAVA Program to Create a BST.

b) Write a JAVA Program to insert a node into a BST.

c) Write a JAVA Program to delete a node from a BST.

SEMESTER-III	L	T	P	C
	-	-	3	2
OPERATING SYSTEMS LAB (BTCS3L02)				

Course Outcomes:

1. An ability to understand concepts of operating system.
2. An ability to describe process management ,scheduling and concurrency control mechanisms.
3. An ability to analyze Page Replacements and deadlocks.
4. An ability to compare various file systems and its operating systems examples.

List of Programs:

1. Simulate First Come First Serve CPU scheduling algorithm.
2. Simulate Shortest Job First CPU scheduling algorithm.
3. Simulate Priority CPU scheduling algorithm.
4. Simulate Round Robin CPU scheduling algorithm.
5. Simulate Sequential file allocation strategy.
6. Simulate Linked file allocation strategy.
7. Simulate Indexed file allocation strategy.
8. Simulate First In First Out page replacement algorithm.
9. Simulate Least Recently used page replacement algorithm.
10. Simulate Optimal page replacement algorithm.
11. Write Programs to simulate free space management.
12. Simulate Bankers Algorithm for Dead Lock Avoidance.

SEMESTER-IV	L	T	P	C
	3	1	-	3
DATABASE MANAGEMENT SYSTEMS(BTCS4T01)				

COURSEOBJECTIVES:

1. To understand the fundamental concepts, historical perspectives, current trends, structures, operations and functions of different components of Databases.
2. To understand the concepts provided by Relational Algebra, Relational Calculus and SQL and able to specify queries on any database using them.
3. To recognize the importance of database analysis and design in the implementation of any database application.
4. To understand how to perform the normalization process of relations before implementation.
5. To describe the role of transaction processing in a database system
6. To understand various concurrency control mechanisms for a database system.
7. To describe the roles of recovery and security in a database system

COURSEOUTCOMES:

1. An understanding of basic concepts and current trends of different database systems.
2. An ability to write relational algebra and Relational calculus expressions.
3. An ability to use Standard Query Language and its various versions
4. An ability to design and develop a database that is in specified normal form and transaction processing.
5. An ability to use different concurrency control techniques while implementing real time applications and the importance of backup and recovery techniques.
6. An ability to build Database systems that can handle real world problems.

UNIT-I:

History of DBMS, Where can be used?, File vs. DBMS, Advantages of DBMS, Describing Storing Data in DBMS,Structure of aDBMS, Database Languages for DDL and DML, Database users and Administrator, Transaction Management,Query Processor.

UNIT-II:

Database Design and ER Diagrams, How it works of Design Models?, Attributes and Entity Sets, Relationships and Relationship sets, Additional Features of ER Models, Conceptual Design with ER Models, Conceptual Design for Large Enterprise, Introduction to UML.

UNIT-III:

Relational Model, Constraints and Types, Querying in Relational Data, Logical Database Design, Views and its operations, Form of Basic SQL Query, Nested Queries, Correlated Nested Queries, Set Comparison Operators, Aggregate Operators, Logical Connectivity Operators, Joins and Types.

UNIT-IV:

Schema Refinement-Problems Caused by Redundancy-Decompositions-Problem Related to Decomposition, Normalizations and Types, Overview of Transaction, Transaction State, implementation of Atomicity and Durability, Concurrent Execution, Serializability, Recoverability.

UNIT –V:

Lock based Concurrency Control, Concurrency Control without Locking-Optimistic Concurrency Control, Time stamp based Concurrency Control, Crash Recovery-Introduction to ARIES, Write a Head Log Protocol, Check Point, Recovery from a System Crash.

UNIT-VI:

Data on External Storage, File Organization and Types, Indexing and Types, Comparison of File Organizations and Indexing, Indexes and Performance Tuning, B+Trees: A Dynamic Index Structures.

Text Books:

1. Database Management Systems- Raghurama Krishnan, Johannes Gehrke, Tata McGraw-Hill., 3rd Edition.

2. Database System Concepts, Silberschatz, Korth, McGraw hill, V edition.

References:

1. Database System Design, Implementation and Management, Peter Rob & Carlos Coronel 7th Edition.

2. Fundamentals of Database Systems, Elmastri Navrate Pearson Education.

3. Introduction to Database Systems, C.J.Date Pearson Education.

SEMESTER-IV	L	T	P	C
	3	1	-	3

UNIX PROGRAMMING (BTCS4T02)

COURSE OBJECTIVES:

1.To provide a fair knowledge of Unix concepts

2.To gain sharp skills in Unix Shell programming

COURSE OUTCOMES:

1. Ability to define fundamental knowledge and concepts of UNIX Operating System
2. Abilityto summerise the concepts of UNIX shell as a beginner user
3. Ability analyze about text processing utilities like grep, sed and awk in UNIX
4. Ability to distinguish about programming features of UNIX shells sh and csh and process management , system operation of UNIX

UNIT-I:

Introduction to unix file system, short history, why is unix so successful?, Unix vs Linux, Standards, System Architecture, Shell types, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities, detailed commands to be covered are cat, tail, head , sort, nl, uniq, grep, egrep,fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.

UNIT-II:

Problem solving approaches in Unix: Using single commands, using compound. Commands, shell scripts, Java Programs, building own command library of programs.How to working with the shell - What is a shell, shell responsibilities, pipes and Input Redirection, output redirection, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT-III:

Unix file structure, directories, files, low level file access, usage of open, create, read, write, close, lseek, stat, fstat,ioctl, umask, dup and dup2, the standard i/o (fopen, fopen, fclose,fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir,rewinddir, seekdir, telldir).

UNIT-IV:

Process and Signals : What is process, process structure, starting new process, Waiting for a process, zombie process, process control, process identifiers, fork, Vfork, exit, wait, exec, Signal functions, unreliable signals, interrupted system Calls, kill and raise functions, alarm, pause functions, abort, system, sleep functions.

UNIT – V:

Data Management:Management of memory (malloc, free, realloc, calloc), File Locking (creating lock files, Locking regions, use of read/write locking, competing locks, other commands, deadlocks)

UNIT – VI:

Inter-Process communication : Pipe, Process Pipes, the pipe call, parent-child process, named pipes: FIFOs, Semaphores, message queues and shared memory and applications of IPC.

Text books:

1. Unix the ultimate guide, Sumitabha Das, TMH.
2. Unix Network Programming, W.R.Stevens Pearson/PHI.

References:

1. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.
2. Unix system programming using C++, T.Chan, PHI.
3. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
4. Unix Internals The New Frontiers, U.Vahalia, Pearson Education.
5. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.

SEMESTER-IV	L	T	P	C
	3	1	-	3
DESIGN AND ANALYSIS OF ALGORITHMS(BTCS4T03)				

COURSE OBJECTIVES:

1. To develop an understanding about basic algorithms and different problem solving strategies
2. To improve creativeness and the confidence to solve non-conventional problems and expertise for analyzing existing solutions
3. To design and implementation of various basic data structure

COURSE OUTCOMES:

1. Ability to evluate complexity of algorithm
2. Ability to understand divide and conquer techniques of algorithm design
3. Ability to distinguish greedy and dynamic programming in algorithm design
4. Ability to analyze how backtracking and branch and bound technique can be used in algorithms.

UNIT I :

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

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT II :

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

Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III :

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

UNIT IV :

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT V :

Branch and Bound: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT VI :

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NPComplete classes, Cook's theorem.

Text Books :

1. Fundamentals of Computer Algorithms, Ellis Horowitz,Satraj Sahni and Rajasekharam, University Press.
2. The Algorithm Design Manual, 2nd edition, Steven S.Skiena, Springer.
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd.

References :

1. Introduction to Design and Analysis of Algorithms , Anany Levitin, PEA
2. Design and Analysis of algorithms, Parag Himanshu Dave, Himansu Balachandra Dave, Pearson Education.
3. Introduction to Design and Analysis of Algorithms A Strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
4. Design and Analysis of Algorithms, Aho, Ullman and Hopcroft, Pearson Education.

SEMESTER-IV	L	T	P	C
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FORMAL LANGUAGESANDAUTOMATA THEORY(BTCS4T04)				

COURSE OBJECTIVES:

1. To impart the basic concepts of theory of automata, languages and computation.
2. To develop understanding about machines for sequential computation, formal languages and grammars, and classification of feasible and intractable problems.

COURSE OUTCOMES:

1.Ability to prove the equivalence of languages described by finite state machines and regular expressions.
2.Ability to construct push down automata and the equivalent context free grammars.
3.Ability to understand how to use Turing Machines to represent computable functions.
4.Ability to define classes P, NP, the notions of polynomial time reduction.

UNIT-I:

Finite Automata and Regular Expressions: Basic Concepts of Finite State Systems, Deterministic and Non-Deterministic Finite Automata, Finite Automata withe-moves, Regular Expressions, Minimization of Finite Automata, Mealy and Moore Machines, Two-Way Finite Automate.

UNIT-II:

Regular sets & Regular Grammars: Basic Definitions of Formal Languages and Grammars, Regular Sets and Regular Grammars, Closure Properties of Regular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for Regular Sets, My hill-Nerode Theorem, Minimization of Finite Automata.

UNIT-III:

Context Free Grammars and Languages: Context Free Grammars and Languages, Derivation Trees, Simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, closure properties of CFL's, Decision Algorithm for CFL.

UNIT-IV:

Push down Automata and Deterministic CFL: Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

UNIT-V:

Universal Turing Machines and Un decidability: Design and Techniques for Construction of Turing Machines, Un decidability of PCP.

UNIT-VI:

ChomskyHierarchy, Regular Grammars, Unrestricted Grammars, ContextSensitive languages, Relationshipbetween classesof languages.

Textbooks:

1.Introduction toAutomata Theory,Languages& ComputationByJ.E.Hopcraft &Jeffery D.Ulman – Narosa Publishing Company.

References:

1. Theory of Computer ScienceByMishra&Chandra Sekharan, PHI.

2. An Introduction To Formal Languages and Automata,3e By Peter Linz – Narosa Publishing House.

SEMESTER-IV	L	T	P	C
	3	1	-	3
PROBABILITY &STATISTICS(BTMA4T01)				

COURSEOBJECTIVES:

1. To provide knowledge on fundamental concepts of Probabilityandstatistics from engineering prospective, emphasizingapplications,more precisely, on basic probability distributions and densities,joint distributions and theirapplications.
2. To provide knowledge on Sampling distributions,Inferencesconcerning means, and variances which enables tomakepredictions related to thedata.
3. To provide skills in applying the basic principles ofstatisticalinference to practicalproblems.

COURSEOUTCOMES:

1. Understand and apply the concepts of Probability and Statisticstosolve a range of different problems, and understandtheirapplications in a variety of engineeringsituations.
2.Define Probability distributions and densities, understand andsolveproblems related to thesedistributions.
3.Calculate probabilities related to joint distributions and applythemin understanding samplingdistributions.
4. Test Statistical hypotheses concerning means, variancesandproportions.

UNIT-I:

Probability: Sample spaces and events-probability –the axioms of probability-some elementary theorems – conditional probability – Baye's theorem.

UNIT-II:

Random variables: Introduction – random variables – discrete & continues and their applications Distributions – Distributions Functions.

UNIT-III:

Distributions: Discrete Distribution – binomial & Poisson distributions with their applications. Continuous distributions – normal and exponential distributions with their applications

UNIT-IV:

Sampling distributions: Population and samples –sampling distributions of mean for large and small samples (with known and un-knows variance) – Proportion sums and differences of means – sampling distributions of variance - point and interval estimators for means and proportions.

UNIT-V:

Tests of Hypothesis: Introduction – Types I and II type II errors – Maximum error-One tail, two-tail tests-Tests concerning one mean and proportion, two means-proportions and their differences using Z-test, Student's t-test-F-test and Chi-square test.

UNIT-VI:

Curve Fitting: Method of least squares -Fitting a straight line, Second degree parabola -exponential curve-power curves.

Textbooks:

1. Probability, statistics and random processes by Mr. K. Murugesan and Mr. P. Gurusamy
2. Higher Engineering Mathematics by Dr. B.S.Grewal

References:

1. Probability and Statistics for Engineers, By Miller & Freund's

SEMESTER-IV	L	T	P	C
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COMPUTER ORGANIZATION(BTCS4T05)				

COURSE OBJECTIVES:

1 To impart the basic knowledge of computer system including the analysis and design of components of the system.

2 To understand the register transfer language, micro operations and design of basic components of the system.

3 To outline the description of different parameters of a memory system, organization and mapping of various types of memories.

COURSE OUTCOMES:

1 Graduates will have fundamental knowledge about structure of computers.

2 Graduates will be able to choose appropriate addressing modes and instructions for writing programs.

3 Graduates will understand the need for using Peripheral devices for efficient operation of system.

4 Graduates will gain basic ability to analyze Micro operations such as Arithmetic micro operations, Shift micro operations and Logic micro operations.

UNIT-I:

Basic Structure of Computers:

Basics of computer, Von Neumann Architecture, Generation of Computer, Types of Compute, 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.

SEMESTER-IV	L	T	P	C
	-	-	3	1
SOFTSKILLS/APTITUDE LAB – II (BTBS4L01)				

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 programme of 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 generatingwith picture sequence** : (1 hour)

Task-5-**Text Buildingwith topic sentence**: (1 hour)

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

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

Task-2- **Sentence corrections** (1 hour)

Task-3- **Sentence completion with apt words from the given Confusionable words (1hour)**

Task-4-**Scrambled words** (1 hour)

Task-5- **Dialogue Completion** (1 hour)

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

References:

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-IV	L	T	P	C
	-	-	3	2
UNIX PROGRAMMING LAB(BTCS4L01)				

CourseObjectives:

1. Understand the use of UNIXcommands.
2. Writeshellscriptsforsolvingproblems.
3. Understand the file management inUNIX.
4. Understand the process management inUNIX.
5. Understand and use IPC mechanisms like pipes, sockets,sharedmemory, andsemaphores.

CourseOutcomes:

1. Anabilitytousecommandsforsolvingproblems.
2. Anabilitytowriteshellscriptsforsolvingproblemsthatcan'tbesolving by simplecommands.
3. Anabilitytousesystemcallsforprocessmanagement.
4. An ability to manipulate the filesystem.
5. An ability to use signals inUNIX and use inter process communication inUNIX.

List of Programs:

1. Write a shell script tp generate a multiplication table.
2. Write a shell script that copies multiple files to a directory.
3. Write a shell script which counts the number of lines and words present in a given file.
4. Write a shell script which displays the list of all files in the given directory.
5. Write a shell script(small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two division options: one returns the quotient and the other returns reminder.

The script requires 3 arguments: The operation to be used and two integer numbers.

The options are add(-a), subtract(-s), multiply(-m), quotient(-c) and reminder(-r).

6. Write a shell script to reverse the rows and columns of a matrix.
7. Write a C program that counts the number of blanks in a text file.

a) using standard I/O b) using system calls.

8. Implement in C the following Unix commands using system calls.

a) cat b) ls c) mv

9. Write a program that takes one or more file/directory names as command line input and reports the following information on the file:

a) File type. b) Number of links. c) Time of last access. d) Read, Write and Execute permissions.

10. Write a C program that illustrates how to execute two commands concurrently with a command pipe.

11. Write a C program that illustrates the creation of child process using fork system call.

12. Write a C program that displays the real time of a day every 60 seconds.

13. Write a C program that illustrates file locking using semaphores.

14. Write a C program that illustrates the following.

a) Creating a message queue.

b) Writing to a message queue.

c) Reading from a message queue.

SEMESTER-IV	L	T	P	C
	-	-	3	2
DBMS LAB(BTCS4L02)				

COURSEOBJECTIVES:

1. To understand the concept of Database system and ClientServerArchitecture.
2. To understand and develop the concepts of Relational DataModel,Security andIntegrity.
3. TounderstandandexecutedifferentSQLqueriesandPL/SQLprograms.
4. To understand the concept of Transaction Control andDataControllanguage.

COURSEOUTCOMES:

1. An ability to define, manipulate and control data usingStructured Query Language(SQL).
2. An ability to enforce Database Integrity Constraints (primary& foreign keys; null, unique & checkconstraints).
3. An ability to develop applications using various featuresofPL/SQL like Database Function, Stored Procedure,Package,Triggers.
4. An ability to develop Database system to handle the realworld problem.

List of Programs:

1. DDL and DML Commands.

2. I) Simple-complex conditions (AND, OR, NOT)
II). Partial Matching operators (LIKE, %, _, *, ?)
III) ASC-DESC ordering combinations.

3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING Clause

4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date).

5. Multi-table queries(JOIN OPERATIONS)

i. Simple joins (no INNER JOIN)

ii. Inner-joins (two and more (different) tables)

iii. Inner-recursive-joins (joining to itself)

v. Outer-joins (restrictions as part of the WHERE and ON clauses)

6. Nested queries

i.) In, Not Inii). Exists, Not Exists

7. Creation of simple PL/SQL program which includes declaration section, executable section and exception Handling section.

8. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERECURRENT of clause and CURSOR variables.

9. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers andINSTEAD OF Triggers.

Text books:

1. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition

2. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc-Graw Hill.SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

SEMESTER-V	L	T	P	C
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SOFTWARE ENGINEERING(BTCS5T01)				

COURSE OBJECTIVES:

1. To make the students learn about the basic concepts onsoftwareengineering methods and practices and theirappropriateapplication in softwareindustry.
2. To develop an understanding of software process modelsandSoftware Development LifeCycle.
3. To provide an idea on software testingtechniques.
4. To teach an understanding role of the different aspects ofSoftwareProjectManagement.
5. To develop an approach on ethical and professional issuesthoseare important for software ProjectManagement.

COURSE OUTCOMES:

1. Capabilities to identify, formulate, and solve softwareengineeringproblems.
2. Beabletoelicit,analyzeandspecifysoftwarerequirementswithvarious stakeholders of a software developmentproject.
3. Ability to participate in design, development, deploymentandmaintenance of a medium scale software developmentproject.
4. Ability to evaluate the impact of potential solutions tosoftwareengineeringproblemsinaglobalsociety,usingtheknowledgeofmodels, tools, andtechniques.

UNIT-I :

Introduction to Software Engineering : The evolving role of software, Attributes of good software, Changing Nature of Software, Software myths.

A Generic view of process : Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), process assessment.

UNIT-II :

Process models : The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT-III :

Requirements engineering process : Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models : Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT-IV :

Design Engineering : Design process and Design quality, Design concepts, the design model.

Object-Oriented Design : Objects and object classes, An Object-Oriented design process, Design evolution.

UNIT-V :

Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

UNIT-VI :

Testing Strategies :A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Metrics for Process and Products : Software Measurement, Metrics for software quality.

Text books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 7th edition.McGrawHill International Edition.

2. Software Engineering- Sommerville, 7th edition, Pearson education.

References:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers

2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.

3. Systems Analysis and Design- Shely Cashman Rosenblatt,Thomson Publications.

4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

SEMESTER-V	L	T	P	C
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CLOUD COMPUTING(BTCS5T02)				

COURSEOBJECT

1. Tounderstandbasicknowledgerequiredtorunapplicationsonlatest platforms like Google, Microsoft, Amazon andOpen stack.
2. To understand and use of Cloud computing technologiesandCloud StorageSystems.
3. To develop skills required to make use of Cloud Computing atWork.
4. To develop the skills and collaborative tools required incloud computing and other development and manufacturingdepartments.

COURSEOUTCOMES:

1. Able To understand and use platforms like Google,Microsoft,Amazon andOpenstack.
2. AbletoapplytechniquesofusingCloudcomputingtechnologiesand Cloud StorageSystems.
3. Can develop skills required to make use of Cloud Computing atWork.
4. Can apply collaborative technology atworkplace.

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, Virtual Network, 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.

Text Book:

1. Cloud Computing, by Dr M.N RAO, Prentice Hall Learning Ltd, 2015.

Reference:

1. Cloud Computing Bible, by Barrie Sosinsky, Wiley Publishing , 2011.

2.Cloud Computing Black Book, by Kailash Jayaswal , Jagannath Kallakurchi , Donald J. Houde , Deven Shah; KoGent Publications, 2014.

3.Cloud Computing: Principles and Paradigms, by Rajkumar Buyya , James Broberg , Andrzej Goscinski , by John Wiley & Sons, 2011.

4.Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, by Michael Miller, QUE Publications, 2009.

SEMESTER-V	L	T	P	C
	3	1	-	3
MICROPROCESSOR & ITS APPLICATIONS(BTEC5T07)				

COURSE OBJECTIVES:

1. To impart the basic concepts of microprocessors and interfacing.
2. To give an understanding about the assembly level programming.
3. To introduce microcontrollers & advanced processors.

COURSE OUTCOMES:

1. Ability to recall details about various microprocessors/microcontrollers architecture
2. Ability to interface various pheripherals to microprocessors/microcontrollers.
3. Ability to write assembly language programs.
4. Ability to build basic systems using microprocessor/microcontroller.

UNIT-I:

Introduction and 8085 microprocessor:

Introduction to Microprocessors and Microcomputers, Family of Intel processors. 8085 microprocessor – Features, Architecture, Register organization, Timing diagrams.

UNIT-II:

8086 Microprocessor:Features, Architecture, Memory organization, Pin diagram, Minimum mode and Maximum mode of opearations.

UNIT-III:

8086 Programming:Addressing modes, Instruction set, Assembler directives, Procedures and Macros, Assembly language programming, Example programs.

UNIT-IV:

Interfacing:

8255 PPI, Interfacing with 8086 – ADC, DAC, DC motor and stepper motor.

UNIT-V:

8051 Microcontroller:

Microprocessor Vs Microcontroller, 8051 – Features, Architecture, Pin diagram, Ports, Memory organization.

UNIT-V:

ARM processors – introduction to 16/32 bit processors, ARM architecture and organization, Thumb programming model, thumb instruction set and development tools.

Text books:

1.Microprocessor Architecture, Programming, and Applications with the 8085 Ramesh S. Gaonkar, 4th Edition, Penram International, 1999

2. Advanced microprocessor & Peripherals – A K Ray and K M Bhurchand TMH, 2000

SEMESTER-V	L	T	P	C
	3	1	-	3
COMPUTER GRAPHICS(BTCS5T03)				

COURSE OBJECTIVES:

1. Describe the functions and operations of display hardwareandassociateddevices.
2. To study algorithms for drawing 2Dprimitives.
3. Describe and implement geometric transformations of 2Dobjects.
4. Describe and implement geometric transformations of 3Dobjects.
5. Understand the design of graphical userinterfaces.
6. Use the methods of enlarging visible portion of drawingwithviewing and clippingtechniques.

COURSEOUTCOMES:

1. Ability to understand the functions and operations ofdisplayhardware and associateddevices.
2. Abilitytodrawlines,circles,ellipsesandpolygonshapes.
3. Ability to design 2D& 3Dtransformations.
4. Develop the simple graphics animationapplications.

UNIT I :

Introduction: Application of Computer Graphics, raster scan systems, random scan systems

Output primitives : Points and lines, line drawing algorithms(DDA and Bresenham's Line algorithms), mid-point circle algorithms.

Filled area primitives: Scan line polygon fill algorithm, Inside and outside tests, boundary-fill algorithm.

UNIT II:

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transformations.

2-D viewing: The viewing pipeline, window to view-port coordinate transformation, Cohen-Sutherland line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT III:

3-D object representation : Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curves and surfaces, B-Spline curves and surfaces.

UNIT IV:

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3D Viewing pipeline, clipping, projections(Parallel and Perspective).

UNIT V:.

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

UNIT VI:

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

Text Books:

1. Computer Graphics *C* version, Donald Hearn, M.Pauline Baker, Pearson

References:

1.Computer Graphics Principles & practice, 2/e, Foley, VanDam, Feiner, Hughes, Pearson

2.Computer Graphics, Steven Harrington, TMH

3. Procedural elements for Computer Graphics, David F Rogers, 2/e, TMH.

SEMESTER-V	L	T	P	C
	3	1	-	3
COMPUTER NETWORKS(BTCS5T04)				

COURSE OBJECTIVES:

1.Studyvarious Network referrence models such as ISO/OSI,TCP/IP

2.Understand the theoryof various multiplexing techniques

3.study and analyze various data link layer protocols

4.Introduction to various transport and application layer protocols

COURSE OUTCOMES:

1.An ability to differientiate network referrence models such as OSI,TCP/IP and ATM

2. An ability to classify various Data Link Layer Protocols such as elementary,sliding window,HDLC,PPP

3.An ability to distinguish various MAC sub Layer Protocols and Its Applications(i.e IEEE Standards)

4.An ability to understand various transport and application protocols.

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-V	L	T	P	C
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CLOUD COMPUTING LAB SYLLABUS (BTCS5L01)

COURSE OUTCOMES:

1. Understanding the systems, protocols and mechanisms to support cloud computing
2. Develop applications for cloud computing
3. Understanding the hardware necessary for cloud computing
4. Design and implement a novel cloud computing application

LIST OF PROGRAMS:

1. Study on cloud Google App engine and its installations.
2. Write a program to display "Hello World" using Goggle App Engine.
3. Write a program to receive "Greetings" using Goggle App Engine.
4. Write a program to Handling Email Servlet using Goggle App Engine.
5. Write a program to confirm Friend Servlet using Goggle App Engine.
6. Write a program to Handling URL Servlet using Goggle App Engine.
7. Write a program to create and read employee data in cloud using Goggle App Engine.
8. Write a program to delete and update employee data in cloud using Goggle App Engine.
9. Write a program to display customer Servlet using Goggle App Engine.
10. Write a program to display Items Servlet using Goggle App Engine.

SEMESTER-V	L	T	P	C
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COMPUTER NETWORKS LAB(BTCS5L02)				

Objective:

To Study and simulation of various data link layer and network layer concepts

Outcomes:

1. An ability to understand the simulation of various data link layer farming methods such as character stuffing and bit stuffing and error detection codes
2. Ability to implement shortest path network routing algorithms
3. Ability to analyze various network layer routing algorithms
4. An ability to implement RSA security algorithm

List of Programs:

1.Implement the data link layer farming methods such as character, character stuffing and bit stuffing.

2.Implement on a data set of characters the three CRC polynomials -CRC 12, CRC 16 and CRC CCIP.

3.Implement Dijkstra's algorithm to compute the shortest path thru a graph.

4.Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm

5.Take an example subnet of hosts. Obtain broadcast tree for it.

6. Take an example subnet Implement Hierarchical Routing Algorithm.

7.Using RSA algorithm encrypts a text data and Decrypt the same

SEMESTER-V	L	T	P	C
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MICROPROCESSOR LAB(BTEC5L03)				

Course Outcomes:

1. An ability to understand MASM /TASM.
2. An ability to develop microprocessor based programs forvariousproblems.
3. An ability to interface microprocessor to external deviceslikekeyboard, DAC, Steppermotor.

List of Programs:

I. Microprocessor 8086:

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, and String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing 8086:

1. Interfacing DAC to generate various waveforms using 8255
2. Interfacing Stepper motor using 8255

III. Microcontroller 8051

1. Introduction to Embedded C and Keil IDE.
2. Reading and Writing parallel ports
3. Interfacing Switches and LEDs/Display

Equipment required for Laboratories:

1. 8086 µP Kits
2. 8051 Micro Controller kits
3. Interfaces/peripheral subsystems

i) 8255 PPI

ii) Stepper motor

iii) DAC

Software Tools:TASM/MASMKeil IDE

SEMESTER-VI	L	T	P	C
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WEB TECHNOLOGIES(BTCS6T01)				

COURSE OBJECTIVES:

1. Describes the fundamentals of html tags and javascript for web designing.
2. Acquire background knowledge on xml data storage.
3. Understands the basic knowledge of web servers with building servlets and jsp web applications.
4. Understands knowledge about database connectivity for web applications.

COURSE OUTCOMES:

1. An ability to distinguish various static web pages and dynamic web pages using html,xml and javascript.
2. An ability to review on xml data storage.
3. An ability to work on web servers with servlets and jsp web applications.
4. An ability to design webapplications by using database connectivity.

UNIT-I: HTML

Introduction to html**,** structure of a html page, HTMLbasic tags, formatting tags, Lists, Tables, Images, image mapping ,links, forms, Frames, Cascading style sheets(T1)

UNIT-II:Java script

Introduction to java script, advantages, differences between java and java script data types, Objects in Java Script, java script events, form validation using Dynamic HTML. (T1)

UNIT-III: XML

Introduction to XML and its advantages on web, XML-Document type Definition,XML schemas, Document object model, XSLT, DOM and SAX. (T1)

UNIT-IV: Web Servers and Servlets

Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, The Servlet API, The javax.servlet Package, Reading Servlet parameters and Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues. (T2)

UNIT-V: Introduction to JSP

The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC. **JSP Application Development:** Generating Dynamic Content Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data between JSP pages.(T2)

UNIT-VI: Database Access

Database Programming using JDBC, Studying Javax.sql.* package,Accessing a Database from a JSP Page, Application – Specific Database Actions. (T2)

Text Books:

1.Web Technologies – Black Book,Kogent Learning solutions Inc sol. Dreamtech press. (Units- 1,2,3,).

2. The complete Reference Java 2, 7th Edition by Patrick Naughton and Herbert Schildt. TMH (Units-4,5,6,)

3. Java Server Pages –Hans Bergsten, SPD O'Reilly.

4. An Introduction to Web Design + Programming, Wang, Katila, CENGAGE.

References:

1. Web Technologies, Uttam K Roy – Oxford.

2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.

3. An Introduction to web Design and Programming –Wang-Thomson.

4. Beginning Web Programming-Jon Duckett WROX.

SEMESTER-VI	L	T	P	C
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OBJECT ORIENTED ANALYSIS DESIGN(BTCS6T02)				

COURSE OBJECTIVES:

1. To understand the advantages of Object-Orientedmethodologiesover traditionalmethods.
2. To apply the process of object-oriented analysis and designtosoftwaredevelopment.
3. To improve software designs and to see how software objectscanbe altered to build software systems that are more robust andlessexpensive.
4. Toemphasizethemostpracticalanalysisanddesignmethods,including the application of problem domain analysis, UMLmodelsanddiagrams.
5. Providing students with the necessary knowledge and skillstodecompose a system using object-oriented CASEtools.

COURSEOUTCOMES:

1. Ability to expose the importance of object-orientedsystemsanalysis and design in solving complexproblems.
2. Ability to create a project plan, analyzing design models bymakingengineering designtrade-offs.
3. CapabilitytodevelopandconstructUMLmodelstobuildanewsystem by using principles of OOprogramming.
4. Adapt to changing requirements with iterative techniquesandcomponent-baseddesign.

UNIT-I:

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

.**UNIT-II:**

:Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling:

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT III :

Class & Object Diagrams: Terms, concepts , modeling techniques for Class & Object Diagrams.

UNIT-IV:

Basic Behavioral Modeling I: Interactions, Interaction diagrams.

Basic Behavioral Modeling - II: Use cases, Use case Diagrams, Activity Diagrams. Advanced Behavioral Modeling: Event s and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-V:

Architectural Modeling : Component, Deployment, Component diagrams and Deployment diagrams.

UNIT-VI:

Case Study:The Unified Library application.

Text Books:

1. The Unified Modeling Language User Guide, Grady Booch, JamesRumbaugh, Ivar Jacobson, Pearson Education.

2. UML 2 Toolkit, Hans - Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY - Dreamtech India Pvt. Ltd.

SEMESTER-VI	L	T	P	C
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DATA MININGAND DATA WAREHOUSING(BTCS6T03)				

COURSE OBJECTIVES:

Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

COURSE OUTCOMES:

1. Understand why there is a need for data warehouse in addition to traditional operational database systems;
2. Identify components in typical data warehouse architectures;
3. Design a data warehouse and understand the process required to construct one;
4. Solve real data mining problems by using the right tools to find interesting patterns

UNIT-I:

Introduction : What Motivated Data Mining? Why Is It Important, Data Mining—On What Kind of Data, DataMining Functionalities—What Kinds of Patterns Can Be Mined? Are All of the Patterns Interesting? Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major Issues in Data Mining. **(Han & Kamber)**

UNIT-II:

Data Pre-processing : Why Pre-process the Data? Descriptive Data Summarization, Data Cleaning, Data Integrationand Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation. **(Han & Kamber)**

UNIT-III:

Data Warehouse and OLAP Technology: An Overview : What Is a Data Warehouse? A Multidimensional DataModel, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.**(Han & Kamber)**

UNIT-IV:

Classification : Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction:Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

Model Over fitting: Due to presence of noise, due to lack of representation samples, evaluating the performance ofclassifier: holdout method, random sub sampling, cross-validation, bootstrap. **(Tan & Vipin)**

UNIT –V:

Association Analysis: Basic Concepts and Algorithms : Introduction, Frequent Item Set generation, Rulegeneration, compact representation of frequent item sets, FP-Growth Algorithm. **(Tan & Vipin)**

UNIT-VI:

Cluster Analysis: Basic Concepts and Algorithms : What Is Cluster Analysis? Different Types of Clustering,Different Types of Clusters, K-means, The Basic K-means Algorithm, K-means: Additional Issues, Bisecting K-means, K-means and Different Types of Clusters, Strengths and Weaknesses, K-means as an Optimization Problem, Agglomerative Hierarchical Clustering, Basic Agglomerative Hierarchical Clustering Algorithm, Specific Techniques, DBSCAN, Traditional Density: Center-Based Approach, The DBSCAN Algorithm, Strengths and Weaknesses. **(Tan & Vipin)**

Text Books :

1. Introduction to Data Mining : Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.

Reference Books :

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining : Introductory and Advanced topics : Dunham, Pearson.
3. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
4. Data Mining Techniques, Arun K Pujari, Universities Press.

SEMESTER-VI	L	T	P	C
	3	1	-	3
CRYPTOGRAPHY AND NETWORK SECURITY(BTCS6T04)				

COURSE OBJECTIVES:

1. To impart an essential study of computer security issues
2. To develop basic knowledge on cryptography
3. To study of various security mechanisms
4. To illustrate how network security and message Authentication codes

COURSE OUTCOMES:

1. Ability to have basic **knowledge** of different types of Security attacks
2. Ability to **analyze** and compare different securitymechanisms and services
3. Ability to **distinguish** different modern encryption Algorithms
4. Ability to **use** the basic knowledge in different Authentication Mechanisms
5. Ability to**justify** latest techniques used in different Security aspects (e.g. network security, web securityetc.)

UNIT-I:

Introduction: Security Attacks, Security Services, Security Mechanisms, and a Model for Network Security, Basics of Cryptography - Symmetric Cipher Model, Substitution Techniques, and Transportation Techniques.

UNIT-II:

Secret Key Cryptography: Data Encryption Standard(DES), Strength of DES, Block Cipher Design Principles and Modes of Operations, Triple DES, Blowfish, AES.

UNIT-III:

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, the Chinese Remainder Theorem, Discrete Logarithms.

UNIT-IV:

Public Key Cryptography: Principles of Public Key Cryptosystems, RSA Algorithm, Diffie-Hellman Key Exchange, Introduction to Elliptic Curve Cryptography.

UNIT-V:

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Secure Hash Algorithm, Message Authentication Codes - Message Authentication Requirements and Functions, HMAC, Digital signatures, Digital Signature Schemes, Authentication Protocols, Digital Signature Standards.

UNIT-VI:

IP Security: Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining security Associations, Internet Key Exchange, Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Electronic Payment.

System Security: Intruders, Intrusion Detection, Password Management, Malicious Software - Types, Viruses, Virus Countermeasures, Worms, Firewalls - Characteristics, Types of Firewalls.

Text Books:

1. Cryptography and Network Security: Principles and Practice, 5th Edition, William Stallings, Pearson Education, 2011.

2. Network Security and Cryptography, Bernard Menezes, Cengage Learning, 2011.

3. Cryptography and Network, 2nd Edition, Behrouz A. Fourouzan and Debdeep Mukhopadhyay, McGraw-Hill, 2010.

References:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)

2. Principles of Information Security, Whitman, Thomson.

3. Introduction to Cryptography, Buchmann, Springer.

ELECTIVE 1

SEMESTER-VI	L	T	P	C
	3	1	-	3
ADVANCED DATA STRUCTURES(BTCS6TE1)				

COURSE OBJECTIVES:

1. To improve the logical ability
2. To design and implementation of various basic and advanced data structures Algorithms.
3. To develop application-using data structures.
4. To impart the basic concepts of advanced data structures

COURSE OUTCOMES:

1. Ability to analyze algorithms and to determine algorithm correctness.
2. Ability to understand and distinguish the conceptual and applicative differences in trees and graphs.
3. ability to examine and implement learned algorithm design techniques and data structures to solve problems

UNIT-I:

Dictionaries : Sets, Dictionaries, Hash Tables, Open Hashing, Closed Hashing (Rehashing Methods), Hashing Functions(Division Method, Multiplication Method, Universal Hashing), Skip Lists, Analysis of Skip Lists. (Reference 1)

UNIT II:

Balanced Trees : AVL Trees: Maximum Height of an AVL Tree, Insertions and Deletions. 2-3 Trees :Insertion, Deletion.

UNIT III:

Priority Queues :

Binary Heaps : Implementation of Insert and Delete min, Creating Heap.

Binomial Queues : Binomial Queue Operations, Binomial Amortized Analysis, Lazy Binomial Queues

UNIT IV:

Graph algorithms : Minimum-Cost Spanning Trees-Prim's Algorithm, Kruskal's AlgorithmShortest Path Algorithms: Dijkstra's Algorithm, All Pairs Shortest Paths Problem: Floyd's Algorithm, Warshall's Algorithm,

UNIT V:

Sorting Methods : Order Statistics: Lower Bound on Complexity for Sorting Methods: Lower Bound on Worst Case Complexity, Lower Bound on Average Case Complexity, Heap Sort, Quick Sort, Radix Sorting, Merge Sort.

UNIT VI:

Pattern matching and Tries : Pattern matching algorithms- the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithmTries: Definitions and concepts of digital search tree, Binary tree.

Text Books :

1. Data Structures, A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage.
2. Fundamentals of DATA STRUCTURES in C: 2nd ed, , Horowitz , Sahani, Anderson-freed, Universities Press
3. Data structures and Algorithm Analysis in C, 2nd edition, Mark Allen Weiss, Pearson

Reference Books:

1. Web :http://lcm.csa.iisc.ernet.in/dsa/dsa.html
2. http://utubersity.com/?page_id=878
3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures
4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
5. File Structures :An Object oriented approach with C++, 3rd ed, Michel J Folk, Greg Riccardi, Bill Zoellick
6. C and Data Structures: A Snap Shot oriented Treatise with Live examples from Science and Engineering, NB Venkateswarlu & EV Prasad, S Chand, 2010.

ELECTIVE 1

SEMESTER-VI	L	T	P	C
	3	1	-	3
DISTRIBUTED DATABASES(BTCS6TE2)				

COURSE OUTCOMES:

1. Get familiar with the currently available models, technologies for and approaches to building distributed database systems and services;

2. Have developed practical skills in the use of these models and approaches to be able to select and apply the appropriate methods for a particular case.

3.Be able to apply learned skills to solving practical database related tasks.

UNIT – I:

Features of Distributed versus Centralized Databases, Principles Of Distributed Databases , Levels Of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT-II:

Translation of Global Queries to Fragment Queries, Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries. Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

UNIT-III:

The Management of Distributed Transactions, A Framework for Transaction Management , Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

UNIT-IV:

Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT-V:

Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT-VI:

Cache Consistency Object Management, , Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution , Transaction Management, Transaction Management in Object DBMSs , Transactions as Objects.

Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues.

Text books :

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

Reference:

1. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez – Pearson Education.

ELECTIVE 1

SEMESTER-VI	L	T	P	C
	3	1	-	3
ADVANCED COMPUTER ARCHITECTURE(BTCS6TE3)				

COURSE OBJECTIVES:

1 know the classes of computers, and new trends and developments in computer architecture

2 Students will be able to understand memory accessing techniques in pipelined processors

3 Students will be able to understand different Instruction set architectures like RISC and CISC

4 be familiar how to solve cache coherence problem through various protocols which is directory based protocols and snoopy bus protocols

5 Students will be able to understand Flynn's classification of computers

COURSE OUTCOMES:

1 Ability to **Explain** the classes of computers, and new trends and developments in computer architecture

2 Ability to **differentiate** Linear and Non Linear processors

3 Ability to **model** to make networks using computers which is called multi computer and multi-processor architectures

4 Ability to **Identify** Flynn's taxonomy

UNIT-I:

Parallel Computer: The state of computing- Computer Development Milestones, Elements of Modern Computers, Evolution of Computer Architecture, System Attributes to performance; Multiprocessors and Multicomputers-Shared Memory Multiprocessors, Distributed Memory Multiprocessors, A Taxonomy of MIMD Computers; Multivector and SIMD Computers-Vector Super computers, SIMD Supercomputers.

UNIT-II:

Memory Hierarchy Design: Introduction- Basic Memory Hierarchy, Optimization of Cache Performance- Small and Simple First-Level Caches to Reduce Hit Time and Power, Way Prediction to Reduce Hit Time, Pipelined Cache Access to Increase Cache Bandwidth, Non blocking Caches to Increase Cache Bandwidth; Virtual Memory and Virtual Machines- Protection Via Virtual Memory, Protection via Virtual Machines . Design space of processors, Instruction-set Architectures, Characteristics of typical CISC and RISC Architecture,

UNIT III:

Hierarchical Memory Technology, Inclusion, Coherence and Locality.Linear and Nonlinear Pipeline Processors: Asynchronous and Synchronous models, Clocking and Timing control, Speedup, Efficiency and Throughput; Nonlinear pipeline processors: Reservation and Latency analysis-Problems, Collision Free Scheduling-problems, Instruction Execution Phases.

UNIT IV:

Multiprocessor and Multivector Computers- Hierarchical Bus Systems, Crossbar Switch and Multiport Memory; Multistage and Combining Networks- Routing, The Hot-Spot Problem, Applications and Drawbacks, Multistage Networks in Real Systems; Multivector Computers: Vector Processing Principles- Vector Instruction Types, Vector Access Memory Schemes, Cray Y-MP Multivector Multiprocessors- Cray Y-MP 816 System Organization, Multistage Crossbar Network in the Cray Y-MP 816.

UNIT V:

Cache Coherence and Message Passing Mechanisms- Cache Coherence problem-Two protocol approaches, Snoopy Bus Protocols, Directory based Protocols; Message Passing Mechanisms-Message-Routing Schemes, Deadlock Virtual Channels, Flow Control Strategies, Multicast Routing Algorithms.

UNIT VI:

VSIMD and MIMD Computer Organizations- Implementation models, The CM-2 Architecture; A Synchronized MIMD Machine, Control Processors and Processing Nodes, Interprocessor Communications. Trends in Parallel Systems: Forms of Parallelism- Structural Prallelism versus Instruction Level Parallelism,A Simple Parallel Computation, Parallel Algorithms, Stream Processing; Cray Line of Computer Systems;

Text Books:

1. KAI HWANG & NARESH JOTWANI, "Advanced Computer Architecture- Parallelism, Scalability, Programmability" Second Edition, Mc Graw Hill Publishing.

2. HENNESSY PATTERSON, "Computer Architecture- A Quantitative Approach" Fifth Edition, Elsevier

Reference Books:

1.Computer Architecture, Concepts and Evolutions, Garrit A Blaauw, PEA

SEMESTER-VI	L	T	P	C
	-	-	3	2
DMDW LAB (BTCS6L01)				

The objective of the lab exercises is to use data mining techniques to identifycustomer segments and to extract knowledge from various datasets using WEKA tool.

Course outcomes:

- Synthesize the data mining fundamental concepts and techniques from multiple perspectives.
- Develop skills and apply data mining tools for solving practical problems
- Advance relevant programming skills.
- Gain experience and develop research skills by reading the data mining literature.

List of Programs:

1. Demonstration of pre-processing on dataset student.arff
2. Demonstration of pre-processing on dataset labor.arff.
3. Demonstration of Association rule process on dataset contactlenses.arff using Aprior algorithm.
4. Demonstration of Association rule process on dataset weather.arff using Aprior algorithm.
5. Demonstration of classification rule process on dataset student.arff using Id3 algorithm.
6. Demonstration of classification rule process on dataset employee.arff using Id3 algorithm.
7. Demonstration of classification rule process on dataset labour.arff using Id3 algorithm.
8. Demonstration of clustering rule process on dataset iris.arff using simple K-Means.
9. Demonstration of clustering rule process on dataset student.arff using simple K-Means.

SEMESTER-VI	L	T	P	C
	-	-	3	2
WEB TECHNOLOGIES LAB(BTCS6L02)				

COURSE OVERVIEW:

Presenting information over the internet in form of web pages is the best way of reaching to all corners of world. This laboratory aims at giving knowledge about creating web pages and also about different web programming concepts, technologies.

COURSE OBJECTIVES:

1. Creation of static web pages with HTML formatting with CSS.
2. Design dynamic web pages with dialog boxes using java script.
3. Design and develop data storage on XML file.
4. Design and develop 3 tier applications and various web components and Database accessing with JDBC Concepts

COURSE OUTCOMES:

1. Ability to creation of static web pages with HTML formatting with CSS.
2. Ability to design dynamic web pages with dialog boxes using java script.
3. Ability to design and develop data storage on XML file.
4. Ability to design and develop 3 tier applications and various web components and Database accessing with JDBC Concepts

Lab Syllabus

1. To create web page with all formatting tags by using basic html structure. (Week-1)
2. Develop static web pages (using only HTML) of an online web site. The pages should resemble: www.w3schools.com. The website like the following pages. Home, Registration, Login, Profile, Products, Catalogue, Shopping cart, Payment mode, Order confirmation. (Week-2 & 3)
3. Redesign the web page page using all CSS properties (Week-4)
4. Practise on java script objects, control structures and events. (Week-5)
5. Validate the registration page using JavaScript.(Week-6)
6. Create and save an XML document, which contains 10 students information. Display the information by using html tables' valid XML file using schema. (Week-7)

7. Write a servlet code for User authentication of login form in experiment-2 and display whether the user is valid or not using http sessions. (Week-8)

8. Write JSP code to insert the details of 3 or 4 users who register with the website by using registration form. Authenticate the user name and password from the database. (Week-9)

9. Create tables for user details in the registration form and catalogue page store data in the database using JDBC Connectivity. (Week-10)

SEMESTER-VI	L	T	P	C
	-	-	3	2
OBJECT ORIENTED ANALYSIS DESIGN LAB(BTCS6L03)				

COURSE OUTCOMES:

1. Ability to construct various UML models anddiagrams

2. Ability to perform a System Analyst role and identify the functionalityof each UML model in developing object-orientedsoftware.

3. Capability to understand the importance of systems analysisanddesign in solving computer Basedproblems.

4. Ability to give software architecture for aminiprojectproblem

List of Programs:

1. To create a UML diagram of ATM APPLICATION

2. To create a UML diagram of LIBRARY MANAGEMENT SYSTEM

3. To create a UML diagram of ONLINE BOOK SHOP

4. To create a UML diagram of RAILWAY RESERVATION SYSTEM

5. To create a UML diagram of BANKING SYSTEM

6. To create a UML diagram of CREDIT CARD PROCESSING

SEMESTER-VII	L	T	P	C
	3+1	-	-	3
MOBILE APPLICATION DEVELOPMENT(BTCS7T01)				

COURSE OBJECTIVE:

1. To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSM protocol
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
4. To understand the ad hoc networks and related concepts.

COURSE OUTCOMES:

1. Able to think and develop new mobile application.
2. Able to take any new technical issue related to this new paradigm and come up with a solution(s).
3. Able to develop new ad hoc network applications and/or algorithms/protocols.
4. Able to understand & develop any existing or new protocol related to mobile environment.

UNIT I:

Introduction about J2ME: J2ME, Java Card.

Mobile Communications: Mobile Communication, Guided and Unguided media, Mobile Computing Architecture, Limitations and Novel Applications, Mobile Devices, Mobile System Networks.

UNIT II:

Mobile Devices and Systems: Cellular Networks and Frequency Reuse, Mobile Smart Phones, Smart Mobiles and Systems, Handheld Pocket Computers, Handheld Devices, Smart Systems.

UNIT III:

GSM, CDMA, 2G, 3G and 4G Communications: GSM Services and System Architecture, Radio Interface of GSM, Protocols of GSM, Localizations, Call Handling, Handover, Security, New Data Services, General Packet Radio Service, High Speed Circuit Switched Data, Code Division Multiple Access, 3G Wireless Communication Standards, OFDM, High Speed Packet Access 3G Network, Wi Max IEEE 802.16e, Broadband Wireless Access, 4G Networks.

UNIT IV:

Mobile IP Network Layer: IP and Mobile IP Network Layers,OSI layer functions,TCP/IP internet protocol, Mobile internet protocol, Packet Delivery and Handover Management, Location Management, Registration, Agent discovery and Mobile TCP,DHCP.

UNIT V:

Synchronization: Synchronization in mobile computing system, usage models for synchronization ,Domain dependent specific rules, Personal Information manager(PIM), Synchronization and conflict resolution strategies, synchronizer, mobile agent.

UNIT VI:

MOBILE AD-HOC AND WIRELESS SENSOR NETWORKS: introduction to mobile adhoc network(MANET),SECURITY IN ADHOC NETWORK,WIRELESS SENSOR NETWORKS.
Mobile wireless short range networks: WIRELESS LAN,IEEE 802.11 protocol layers, WAP architecture,WAE.

Text Books:

1. Mobile Computing, Raj Kamal, 2nd Edition, Oxford University Press, 2012.
2. Mobile Computing: Technology, Applications and Service Creation, 2nd Edition, Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, Tata McGraw Hill, 2010.
3. Mobile Computing: Theoty and Practice, Kumkum Garg, Pearson Education, 2010.

References:

1. Mobile Communications, Jochen Schiller, Pearson Education, Second Edition, 2008.
2. Wireless Communications and Networks, 2nd Edition, William Stallings, Person Education,2007.
3. Handbook of Wireless Networks and Mobile Computing, Ivan Stojmenovic, Wiley, 2007.
4. Wireless and Mobile Networks: Concepts and Protocols, Dr. Sunilkumar, et al, Wiley India

SEMESTER-VII	L	T	P	C
	3	1	-	3
SOFTWARE TESTING(BTCS7T02)				

COURSE OBJECTIVES:

1. To learn the principles, techniques and tools of software testing in order to improve the quality of software product.

2. To gain knowledge of the software testing process, various methods of testing, different levels of testing, software quality concepts, assurance & standards

3. To learn generation and execution of test plan, cases & scripts.

4. To learn manual and automatic software testing & various kinds of testing tools.

5. To discover correctness, completeness and quality of software.

6. To recognize the importance of software testing in Software Development Life Cycle.

COURSE OUTCOMES:

1. Understand what a software bug is, how serious they can be, and why they occur.

2. Test software to meet quality objectives & requirements

3. Apply testing skills to common testing tasks

4. Perform the planning and documentation of test efforts

5. Understand software quality concepts, assurance & standards

6. Use testing tools to test software in order to improve test efficiency with automation

UNIT-I:

Fundamentals of Software Testing

Introduction, Basics of Software Testing, Approaches to Testing, Testing During Development Life Cycle, Essential of Software Testing, Features of Testing, Misconceptions About Testing, Principles of Software Testing, Test Policy, Strategy, Planning, Process, Challenges in Testing, Test Team Approach, Methods, Defect Classification, Defect, Error, Mistake in Software, Defect Life Cycle, Defect Management Process, Developing Test Strategy, Developing Testing Methodologies, Testing Process, Attitude Towards Testing, Test Methodologies, Skills Required by Tester.

UNIT-II:

Methods of Testing

Software Verification and Validation, Black-Box and White-Box Testing, Static and Dynamic Testing, Black-Box Testing Techniques-Equivalence Partitioning, Data Testing, State Testing, Other Black Box Test Techniques. White-Box Testing Techniques-Data Coverage, Code Coverage, Other White Box Test Techniques.

UNIT-III:

Levels of Testing

Verification and Validation Model, Levels of Testing, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, System Testing-GUI Testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Load Testing, Installation Testing, Regression Testing, Smoke Testing, Sanity Testing, Adhoc Testing, Usability Testing, Acceptance Testing-Alpha Testing, Beta Testing, Gamma Testing.**(Special Tests)**

UNIT-IV:

Test Planning & Documentation

Test Planning-The goal of Test Planning, Test Planning Topics, Writing and Tracking Test Cases-The Goal of Test Case Planning, Test Case Planning Overview, Test Case Organization and Tracking, Reporting Bugs- Getting Your Bugs Fixed, Isolating and Reproducing Bugs, Not All Bugs Are Created Equal, Bug-Tracking Systems.

UNIT-V:

Quality Concepts & Software Quality Assurance

Quality Concepts-What is Quality?, Software Quality, The Software Quality Dilemma, Achieving Software Quality, Software Quality Assurance-Background Issues, Elements of Software Quality Assurance, SQA Processes and Product Characteristics, SQA Tasks, Goals and Metrics, Formal Approaches to SQA, Statistical SQA, Software Reliability, The ISO 9000 Quality Standards, CMM, The SQA Plan.

UNIT-VI:

Automated Testing and Testing Tools

Introduction, The Benefits of Automation and Tools, Test Tools, Software Test Automation, Random Testing, Realities of Using Test Tools and Automation, Open Source Testing Tools, Case Studies on Testing Tools-Selenium.

Text Books:

1. Software Testing Principles, Techniques and Tools by M G Limaye, Published by Tata McGraw-Hill Education Private Limited, Published 2009, ISBN (13): 978-0-07-013990-9.

2. Software Testing, Second Edition By: Ron Patton, Published by SAMS, ISBN-13: 978- 0672327988 ISBN-10: 0672327988 (Chapter 2, 4 & 6)

3. Software Engineering: A Practitioner's Approach by Roger S Pressman, 8th Edition, Publisher McGraw Hill (Chapter 5)

References:

1. Software Testing Principle and Practices By Ramesh Desikan, Gopalaswamy Ramesh, Pearson Education, ISBN 978-81-7758-121-8

SEMESTER-VII	L	T	P	C
	3	1	-	3
OPEN SOURCE SOFTWARE(BTCS7T03)				

COURSE OBJECTIVES:

1 Describes the fundamentals of free open source software and open source operating system like Linux.

2 Acquire background knowledge on MySQL database with php.

3 Understands the basic knowledge of perl and python.

COURSE OUTCOMES:

1 An ability to distinguish various open source and closed source software's.

2 An ability to review on open source operating system like Linux.

3 An ability todescribe applications using MySQL database.

4 An ability to analyze MySQL php connectivity and Perl programming

UNIT-I:

INTRODUCTION: Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux.

UNIT-II:

OPEN SOURCE DATABASE: MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

UNIT-III:

OPEN SOURCE PROGRAMMING LANGUAGES : PHP: Introduction –variables – constants – data types – operators – Statements – Functions – Arrays –String Manipulation and regular expression – File handling and data storage PHP and SQL database –PHP and LDAP – PHP Connectivity – Sending and receiving E-mails

UNIT-IV:

PYTHON : Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops

UNIT-V

Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

UNIT-VI:

PERL : Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

Text Books:

1. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003
2. Funadamentals of open source software by M.N Rao, PHI publications.
3. Steve Suchring, "MySQL Bible", John Wiley, 2002

References:

1. Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002
2. Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001
3. Martin C. Brown, "Perl: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
5. Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw -Hill Publishing Company Limited, Indian Reprint 2009.

SEMESTER-VII	L	T	P	C
	3	1	-	3
BIG DATA (BTCS7T04)				

COURSE OBJECTIVES:

1. Optimize business decisions and create competitive advantage with Big Data analytics
2. Introducing Java concepts required for developing map reduce programs
3. Derive business benefit from unstructured data
4. Imparting the architectural concepts of Hadoop and introducing map reduce paradigm
5. To introduce programming tools PIG & HIVE in Hadoop echo system.

COURSE OUTCOMES

1. Preparing for data summarization, query, and analysis.
2. Applying data modelling techniques to large data sets
3. Creating applications for Big Data analytics
4. Building a complete business data analytic solution

UNIT-I:

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization.

Reference: Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC

UNIT-II:

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

References: Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly Hadoop in Action by Chuck Lam, MANNING Publ.

UNIT-III:

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, RecordReader, Combiner, Partitioner

Reference: Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly

UNIT-IV:

Hadoop I/O: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

Reference: Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly

UNIT-V:

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Reference: Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

UNIT-VI:

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

References: Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss.

Text Books:

Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC

Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly

Hadoop in Action by Chuck Lam, MANNING Publ.

Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

References:

Hadoop in Practice by Alex Holmes, MANNING Publ.

Hadoop MapReduce Cookbook,Srinath Perera, Thilina Gunarathne

Software Links:

Hadoop:http://hadoop.apache.org/

Hive: https://cwiki.apache.org/confluence/display/Hive/Home

Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html

ELECTIVE-II

SEMESTER-VII	L	T	P	C
	3	1	-	3
WIRELESS SENSOR NETWORKS(BTCS7TE1)				

COURSE OBJECTIVES:

1. Describes the fundamentals of Wireless Communication Technology and wireless sensor networks, Ad hoc networks
2. Acquire background knowledge on Protocols For Ad Hoc Wireless Networks. And Routing Protocols
3. Understands the basic knowledge on Wireless Sensor Networks ROUTING.

COURSE OUTCOMES:

1. An ability to distinguish MANETs and WSNs
2. An ability to review on MAC Protocols For Ad Hoc Wireless Networks
3. An ability todescribe routing and Transport Layer protocol for Ad hoc networks-
4. An ability to analyze MAC Protocols and WSN Routing

UNIT-I:

INTRODUCTION Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs) :concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.

UNIT-II:

MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS Issues in designing a MAC Protocol-Classification of MAC Protocols- Contention based protocolsContention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

UNIT-III:

ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

UNIT-IV:

WIRELESS SENSOR NETWORKS (WSNS)-Single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies

UNIT-V:

MAC PROTOCOLS-MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

UNIT-VI:

WSN ROUTING, LOCALIZATION & QOS Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

Text Books:

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.

References:

1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal “Ad Hoc & Sensor Networks: Theory and Applications”, World Scientific Publishing Company, 2006.

2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication – 2002.

3. Holger Karl and Andreas Willig “Protocols and Architectures for Wireless Sensor Networks”, Wiley, 2005 3. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks-Technology, Protocols, and Applications”, John Wiley, 2007.

4. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

ELECTIVE-II

SEMESTER-VII	L	T	P	C
	3	1	-	3
INFORMATION STORAGE MANAGEMENT(BTCS7TE2)				

COURSE OBJECTIVES:

1. Identify the components of managing the data center and Understand logical and physical components of a storage infrastructure.
2. Evaluate storage architectures, including storage subsystems SAN, NAS, IPSAN, CAS
3. Understand the business continuity, backup and recovery methods.
4. To understand cloud computing technologies and storage infrastructure challenges.

COURSE OUTCOMES:

1. To learn about Information Storage Environment
2. Know about different type of Storage Area Networks
3. To learn about Content –Addressed Storage, Storage security and Management
4. An ability to analyze cloud computing technologies and storage infrastructure challenges.

UNIT-I:

INTRODUCTION TO STORAGE AND MANAGEMENT

Introduction to Information Storage Management - Data Center Environment– Database Management System (DBMS) - Host - Connectivity –Storage-Disk Drive Components- Intelligent Storage System - Components of an Intelligent Storage System- Storage Provisioning- Types of Intelligent Storage Systems

UNIT-II:

STORAGE NETWORKING -1 :Fibre Channel: Overview - SAN and Its Evolution -Components of FC SAN -FC Connectivity-FC Architecture- IPSAN-FCOE-FCIP-Network-Attached StorageGeneral-Purpose Servers versus NAS Devices - Benefits of NAS-

UNIT-III:

STORAGE NETWORKING -2 :File Systems and Network File Sharing-Components of NAS - NAS I/O Operation -NAS Implementations -NAS File-Sharing Protocols-Object-Based Storage DevicesContent-Addressed Storage -CAS Use Cases.

UNIT-IV:

BACKUP AND RECOVERY Business Continuity -Information Availability -BC Terminology-BC Planning Life Cycle - Failure Analysis -Business Impact Analysis-Backup and Archive - Backup Purpose -Backup Considerations -Backup Granularity - Recovery Considerations - Backup Methods - Backup Architecture - Backup and Restore Operations.

UNIT-V:

CLOUD COMPUTING Cloud Enabling Technologies -Characteristics of Cloud Computing -Benefits of Cloud Computing -Cloud Service Models-Cloud Deployment models-Cloud computing Infrastructure-Cloud Challenges.

UNIT-VI:

SECURING AND MANAGING STORAGE INFRASTRUCTURE Information Security Framework - Storage Security Domains-Security Implementations in Storage Networking - Monitoring the Storage Infrastructure - Storage Infrastructure Management Activities -Storage Infrastructure Management Challenges.

References:

1. EMC Corporation, "Information Storage and Management", WileyIndia, 2nd Edition, 2011.
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
3. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne,2nd Edition, 2001.
4. Meeta Gupta, "Storage Area Network Fundamentals", Pearson Education Limited, 2002.

ELECTIVE-II

SEMESTER-VII	L	T	P	C
	3	1	-	3
DISTRIBUTED SYSTEMS(BTCS7TE3)				

COURSE OBJECTIVES:

1. To impart an introduction to distributed systems and distributed computing
2. To develop basic knowledge on distribution of data and file systems in distributed environment
3. Implement and structure distributed systems programs.

COURSE OUTCOMES:

1. Students will able to understand the concept of distributed systems and various distributed models.
2. Students will able gain knowledge on interprocess communication mechanisms used in distributed systems.
3. Students will able to design and build application programs on distributed systems.
4. Students will able to understand distributed file systems.

UNIT-I:

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the Web, Challenges.

UNIT-II:

System models: Introduction, Architectural models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT-III:

Interprocess Communication: Introduction, The API for the Internet protocols- The Characteristics of Interprocess communication, Sockets, UDP, Datagram Communication, TCP Stream Communication, External Data Representation and Marshalling, Client Server Communication, Group Communication- IP Multicast-an implementation of group communication, Reliability and Ordering of Multicast.

UNIT-IV:

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVARMI.

UNIT-V:

Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads -Address Space, Creation of a New Process, Threads.

UNIT-VI:

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions: Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication.

Textbooks:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems-Concepts and Design", Fourth Edition, Pearson Publication.

2. Ajay D Kshemkalyani, Mukesh Sighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge.

SEMESTER-VII	L	T	P	C
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PROFESSIONAL ETHICS &INTELLECTUAL PROPERTY RIGHTS (BTBM7T01)

UNIT I:

Engineering Ethics: Purposes for Engineering Ethics-Engineering Ethics Consensus 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 – Risk Benefit 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 Granting of 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 .

REFERENCE BOOKS:

Text Books:

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. "Professional Ethics and Human Values" by A.Alavudeen, R.KalilRahman and M.Jayakumaran-Laxmi Publications.
4. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009
5. Deborah E.Bouchoux: "Intellectual Property". Cengagelearning , NewDelhi, BS Publications (Press)
6. PrabhuddhaGanguli: ' Intellectual Property Rights" Tata Mc-Graw –Hill, New Delhi
7. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
8. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights",Excel Books. New Delhi.

SEMESTER-VII	L	T	P	C
	-	-	3	2
MOBILE APPLICATION DEVELOPMENT LAB(BTCS7L01)				

Course outcomes:

1. Know the components and structure of mobile application development frameworks for Android based mobiles.
2. Understand how to work with various mobile application development frameworks.
3. Learn the basic and important design concepts and issues of development of mobile applications.

List of Programs:

1.Write a J2ME program to show how to change the font size and colour.

2. Write a J2ME program to display the image.

3. Write a J2ME program to display message on form.

4.Write a J2ME program to display the Text BOX.

5. Write a J2ME program which creates the following kind of menu.

* cut
* copy
* past
* delete
* select all
* unselect all

6. Create a J2ME menu which has the following options (Event Handling):

- cut - can be on/off
- copy - can be on/off
- paste - can be on/off
- delete - can be on/off
- select all - put all 4 options on
- unselect all - put all

7. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.

8. Write a sample program to show how to make a SOCKET Connection from J2ME phone. This J2ME sample program shows how to how to make a SOCKET Connection from a J2ME Phone. Many a times

there is a need to connect backend HTTP server from the J2ME application. Show how to make a SOCKET connection from the phone to port 80.

9. Write an Android application program that displays Hello World using Eclipse.

10. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse.

11. Write an Android application program that demonstrates the following:

(i) LinearLayout(ii) RelativeLayout(iii) TableLayout(iv) GridView layout

12. Write an Android application program that converts the temperature in Celsius to Fahrenheit.

13. Write an Android application program that demonstrates intent in mobile application development.

LIST OF EQUIPMENTS

Standalone desktops with Windows or Android Equivalent Mobile Application Development Tools with appropriate emulators and debuggers.[Eclipse].

SEMESTER-VII	L	T	P	C
	-	-	3	2
SOFTWARE TESTING LAB(BTCS7L02)				

COURSE OUTCOMES

1. Understand what a software bug is, how serious they can be, and why they occur.
2. Test software to meet quality objectives & requirements
3. Apply testing skills to common testing tasks
4. Perform the planning and documentation of test efforts
5. Understand software quality concepts, assurance & standards
6. Use testing tools to test software in order to improve test efficiency with automation

UNIT-I:

1. Identify the Software Defects, Prepare the document during the execution of software.
2. Prepare the document for skills required Recovery of defects/Errors.

UNIT-II:

1. Prepare the document on Verification and Validation Tests like sequential code testing, if conditions, Nested if conditions, Looping and Nested Looping on Sample Software Programs in C , C++ and Java.

UNIT-III:

1. Prepare the Requirement Analysis Document using STLC for Case Study on Model Based Applications/GUI Applications.
2. Identify the Software needs Test Levels on Model Based Applications/GUI Applications.

UNIT-IV:

1. Prepare the Test case as per IEEE 829 standard format for each case study: Different organizations have modified this template as per their needs, however any template that is followed by organizations contains all the below mentioned information: Test case specification identifier, Test items, Input specifications, Output specifications, Environment needs, Special procedural requirements, and Inter-case dependencies.
2. Prepare the Test Plan as per IEEE 829 standard format for each case study: This experiment cover IEEE 829 standard items along with some additional points: Test plan identifier, Introduction, Testitems1, Features to be tested, Features not to be tested, Approach, Item pass/fail criteria, Suspension criteria and resumption requirements, Test deliverables, Testing tasks, Environmental needs, Responsibilities, Staffing and training needs, Schedule, Risks and contingencies and Approvals.
3. Prepare the Bug Report for each case study.

UNIT-V:

1.Prepare the Document of Quality for each case study.

UNIT-VI:

Implement Application case study

(i)Prepare the Document for case study using Software Testing Life Cycle

This experiment covers the following topics: Requirements Analysis, Test Planning, Test Analysis, Test Design, Test Construction and Verification, Test Execution and Bug Reporting, Final Testing and Implementation, Post Implementation.

(ii)For every case study should follow the following levels:

A.Implement the unit level testing on test design documents like test cases using automation tools.

i.Create the Bug Report, whether it pass or fail.

B.Implement the Integration level testing on unit level test cases using automation tools

i.Create the Bug Report, whether it pass or fail.

C.Implement the System level testing on entire case study.

i.Create the Bug Report, whether it pass or fail.

D.Implement the various types tests conduct on case study

i.Create the Bug Report, whether it pass or fail.

SEMESTER-VIII	L	T	P	C
	3+1	-	-	3
INFORMATION RETRIEVAL SYSTEMS(BTCS8T01)				

COURSE OBJECTIVES:

1 Become familiar with difference between Information retrieval and data Base Management Systems
2 Students will be able to learn different indexing techniques to apply data Base systems
3 students will be able to understand various searching techniques to retrieve data from databases and ware houses.

COURSE OUTCOMES:

1 Ability to **identify** Data Base Management systems and data ware houses
2 Ability to **use** knowledge of data structures and indexing methods in information retrieval Systems
3 Ability to **choose** clustering and searching techniques for different data base systems
4 Ability to **Explain** different types of search algorithms like Hardware text search systems and software text search systems

UNIT-I:

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses. Information Retrieval System Capabilities Search, Browse, Miscellaneous

UNIT-II :

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure.

UNIT-III:

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT-IV:

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext.

UNIT-V:

Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

UNIT-VI :

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. Information System Evaluation: Introduction, Measures used in system evaluation.

Text Books:

1.Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.

ELECTIVE-III

SEMESTER-VIII	L	T	P	C
	3	1	-	3
IMAGE PROCESSING(BTCS8TE1)				

COURSE OBJECTIVES:

To make the students to understand

1. The fundamentals of Computer Graphics and Image Processing
2. The concepts related edge detection, segmentation, morphology and image compression methods.

COURSE OUTCOMES:

1. Understanding of digital image processing fundamentals: hardware and software, digitization, enhancement and restoration, encoding, segmentation, feature detection
2. Ability to apply image processing techniques in both the spatial and frequency (Fourier) domains
3. Ability To understand (i.e., be able to describe, analyse and reason about) how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.

UNIT-I:

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

UNIT-II:

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

UNIT-III:

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

UNIT-IV:

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

UNIT –V:

Representation and Description

Chain codes, Polygonal approximation, Signature Boundary Segments, Skeletons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description, Relational Descriptors

UNIT-VI:

Pattern Recognition Fundamentals: Basic Concepts of patternrecognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

Pattern classification:

Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, and Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

TEXT BOOKS:

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods
2. Pattern recognition Principles: Julus T. Tou, and Rafel C. Gonzalez, Addision-Wesly Publishing Company

ELECTIVE-III

SEMESTER-VIII	L	T	P	C
	3	1	-	3
BIO INFORMATICS(BTCS8TE2)				

COURSE OBJECTIVES:

1. To know the importance of Bioinformatics for computational learning.
2. To understand basic biological databases, algorithms for proteomics and genomics analysis.
3. To learn the Bioinformatics packages to solve the biological problems.

LEARNING OUTCOMES:

1. The differences between genomics and proteomics.
2. To solve the biological problems using computational approach.
3. To perform data sequence search

UNIT-I:

NTRODUCTION TO BIOINFORMATICS & SEQUENCING ALIGNMENT CONCEPTS:

Need of Computers in Biotechnology Research; File Transfer Protocol (FTP), TELNET,HTTP; Bioinformatics- Introduction, Scope, Applications; Strings, Edit distance, Pair wise Alignment-Local, Global alignment; Gap- Gap penalty; Comparison of Pair wise and Multiple alignment.

UNIT-II:

BIOLOGICAL DATABASES AND DATAMINING: Biological Information on the web-Introduction to databases; Classification of Biological databases; Information retrieval from Databases; Sequence database search- FASTA, BLAST; Amino acid substitution matrices- PAM and BLOSUM; Data Mining and Visualization (RASMOL).

UNIT-III:

PHYLOGENETIC ANALYSIS AND PREDICTION: Understanding Evolutionary process;Origins of Molecular Phylogenetics; Common Multiple Sequence alignment methods; Phylogenetic analysis: Methods, Tools & Problems (Clustal W).

UNIT-IV:

GENOME MAPPING AND PREDICTION: Genome sequencing; Genome Mapping;Comparative Sequence Analysis; Gene Prediction Methods &Tools, Gene Annotation; Human Genome Mapping (HGP). **RNA Sequence and Structure Analysis** - si-RNA design and development, micro RNAidentification strategies, RNA secondary structure, RNA structure Prediction Methods.

UNIT-V:

PROTEIN STRUCTURE PREDICTION METHODS: Basics of Protein biology(Classification, Structural Organization, Domains & Motifs);

UNIT VI:

PROTEIN STRUCTURE PREDICTION CONCEPTS : Secondary & Tertiary Structure Predictions (Chou-Fasman Method, GOR Method, Neural Network method, Homology Modeling, Abintio method, Threading methods).

Text Books:

1. Bioinformatics. Genome and sequence analysis by David Mount, CSH Publications
2. Essential Bioinformatics by Jin Xiong, Cambridge University Press, 2011.

References:

1. Computational Molecular Biology – An Introduction by Peter Clote, Rolf Backofen, John Wiley & Sons.
2. Bioinformatics: Methods and Applications- SC Rastogi, N Mendiratta & P Rastogi.
3. Bioinformatics Principles & Applicatrions by Zhumur Ghosh, Oxford University Press

ELECTIVE-III

SEMESTER-VIII	L	T	P	C
	3	1	-	3
COMPUTER VISION(BTCS8TE3)				

COURSE OBJECTIVES:

1. To introduce students with practice and theory of computer vision
2. To introduce the student to computer vision algorithms, methods and concepts
3. Enable the student to implement computer vision systems with emphasis on applications and problem solving
4. To provide students with necessary theory and skills for automatic analysis of digital images, and thereby to construct representations of physical objects and scenes, and to make useful decisions based on them

COURSE OUTCOMES:

1. Upon successful completion of the course, students will
2. Understand the vision technology in conjunction with real world applications
3. Learn the principles and commonly used paradigms and techniques of computer vision
4. Be able to identify the limitations of vision systems
5. Be able to demonstrate successful applications to process and analyze images, and to make automatic decision based on extracted feature information

UNIT-I:

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, Matching.

Morphological Image Processing: Introduction, Dilation, Erosion, Opening, Closing,Hit-or-Miss transformation, Morphological algorithm operations on binary images, Morphological algorithm operations on gray-scale images, Thinning, Thickening , Region growing, region shrinking.

UNIT-II:

Image Representation and Description: Representation schemes, Boundary descriptors, Region descriptors

Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchal segmentation, Spatial clustering, Split & merge, Rule-based Segmentation, Motion-based segmentation.

Area Extraction: Concepts, Data-structures, Edge, Line-Linking, Hough transform, Line fitting, Curve fitting (Least-square fitting).

UNIT-III:

Region Analysis: Region properties, External points, Spatial moments, Mixed spatial gray-level moments, Boundary analysis: Signature properties, Shape numbers.

UNIT-IV:

Facet Model Recognition: Labeling lines, Understanding line drawings, Classification of shapes by labeling of edges, Recognition of shapes, Consisting labeling problem, Back-tracking Algorithm

Perspective Projective geometry, Inverse perspective Projection, Photogrammetry - from 2D to 3D, Image matching: Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching.Object Models And Matching: 2D representation, Global vs. Local features

UNIT-V:

General Frame Works For Matching: Distance relational approach, Orderedstructural matching, View class matching, Models database organization.

General Frame Works: Distance -relational approach, Ordered - Structural matching, View class matching, Models database organization.

UNIT-VI:

Knowledge Based Vision: Knowledge representation, Control- strategies, Information Integration. Object recognition- Hough transforms and other simple object recognition methods, Shape correspondence and shape matching,Principal component analysis ,Shape priors for recognition

BOOKS

Text Books:

1. Robert Haralick and Linda Shapiro, "Computer and Robot Vision", Vol I, II, Addison- Wesley, 1993.

2. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach" References:

3. 1. Milan Sonka,Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis, and Machine Vision" Thomson Learning

ELECTIVE-IV

SEMESTER-VIII	L	T	P	C
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PATTERN RECOGNITION(BTCS8TE4)				

COURSE OBJECTIVES:

The course is designed to introduce students to theoretical concepts and practicalissues associated with pattern recognition

COURSE OUTCOMES:

1. Design systems and algorithms for pattern recognition (signal classification), with focus on sequences of patterns that are analyzed using, e.g., hidden Markov models (HMM),
2. Analyse classification problems probabilistically and estimate classifier performance,
3. Understand and analyse methods for automatic training of classification systems,
4. Apply Maximum-likelihood parameter estimation in relatively complex probabilistic models, such as mixture density models and hidden Markov models,
5. Understand the principles of Bayesian parameter estimation and apply them in relatively simple probabilistic models

UNIT-I:

Introduction: Is Pattern Recognition Important; features, feature vectors, and classifiers; supervised, unsupervised and semi supervised learning; Matlab programs.

UNIT-II:

Classifiers based on Bayes Decision Theory: Introduction, Bayes Decision Theory; discriminant functions and decision surfaces; Bayesian classification for normal distributions- the Gaussian probability density function, the Bayesian classifier for normally distributed classes;

UNIT-III:

Linear & Non linear Classifiers: Introduction; linear discriminant functions and decision hyper planes, the perceptron algorithm, Nonlinear Classifiers: introduction, the xor problem, the two-layer perception-classification capabilities of the two-layer perceptron; three-layer perception.

UNIT-IV:

Feature Selection: Introduction, Preprocessing- outlier removal, data normalization, missing data; the peaking phenomenon; class separability measures- divergence, chernoff bound and Bhattacharya distance, scatter matrices.

UNIT-V:

Supervised Learning: introduction, error-counting approach, exploiting the finite size of the data set; a case study from medical imaging; semi supervised learning- generative models, graph-based methods, transductive support vector machines.

UNIT-VI:

Skin based Pattern Extraction And Recognition -Introduction, Neural color Constancy based skin detection, Image segmentation, Local region graph Pattern, Skin region Synthesis pattern, Matching multiple regions with Local Global Graph Method.

Graph-based methods Introduction, Hyper graph matching and Algorithms, Parquet graphs-similarity function, Local Feature Detectors.

Text Books:

1.Sergios Theodoridis, Konstantinos Koutroumbas, "Pattern Recognition" Fourth Edition, (Unit I – V) Elsevier

2.Horst Bunke, Abrahmkadel, MarksLast, "Applied Pattern Recognition" 2008 Springer –Verlag Berlin Heidelberg.(Unit VI-VIII)

ELECTIVE-IV

SEMESTER-VIII	L	T	P	C
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SOFT COMPUTING(BTCS8TE5)				

COURSE OBJECTIVES:

1. To have a detailed study of neural networks, Fuzzy Logic and uses of Heuristics based on human experience.
2. To Familiarize with Soft computing concepts.
3. To introduce the concepts of genetic algorithm and its applications to soft computing using some applications

COURSE OUTCOMES:

1. Identify and describe soft computing techniques and their roles in building intelligent machines.
2. Recognize the feasibility of applying a soft computing methodology for a particular problem.
3. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.

UNIT-I:

INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics. **OPTIMIZATION:** Derivative based Optimization, Descent Methods,The Method of Steepest Descent, Classical Newton's Method, Step Size Determination, Derivative-free Optimization, Genetic Algorithms, Simulated Annealing, Random Search – Downhill Simplex Search.

UNIT-II:

GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT-III:

NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT-IV:

FUZZY LOGIC

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems– Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT-V:

NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

UNIT-VI

APPLICATIONS OF COMPUTATIONAL INTELLIGENCE: PrintedCharacter Recognition, Inverse Kinematics Problems, Automobile Fuel Efficiency Prediction, Soft Computing for Color Recipe Prediction

Text Books:

1.Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.

2.George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.

3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

ELECTIVE-IV

SEMESTER-VIII	L	T	P	C
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MACHINE LEARNING(BTCS8TE6)				

COURSE OBJECTIVES:

The main objective of this course is for the students to achieve basic knowledge of artificial intelligence, a deepened technical understanding of machine learning research and theories, as well as practical experience of the use and design of machine learning and data mining algorithms for applications and experiments.

COURSE OUTCOMES:

1.The student will be able evaluate and compare the performance or, other qualities, of algorithms for typical learning problems.

2. The student will be able to design a supervised or unsupervised learning system.

UNIT I:

Introduction: Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning.

UNIT II:

Concept Learning: Concept learning and the general to specific ordering, Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

UNIT III:

Decision Tree learning: Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

UNIT IV:

Bayesian learning: Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Bayes optimal classifier, Naïve bayes classifier, An example learning to classify text, Bayesian belief networks.

UNIT V:

Computational learning theory-1: Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - Instance-Based Learning- Introduction.

UNIT VI:

Computational learning theory-2: k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

Text book:

1. Machine Learning, Tom M. Mitchell, MGH

References:

Introduction to machine learning, 2nd ed, Ethem Alpaydin, PHI