SRI VENKATESA PERUMAL
COLLEGE OF ENGINEERING & TECHNOLOGY
| AUTONOMOUS | NAAC ACCREDITED |
RVS Nagar, K.N Road, Puttur, Chittoor dist, AP. | www.svpcet.org

Institute Vision and Mission

Vision: To emerge as a Centre of Excellence for Learning and Research in the domains of Engineering, Technology, Computing and Management.

Mission:

M1: To provide congenial academic ambience with state-of-art resources for learning and research,

M2: Ignite the students to acquire self-reliance in the latest technologies,

M3: Unleash and encourage the innate potential and creativity of students,

M4: Inculcate confidence to face and experience new challenges, and

M5: Foster enterprising spirit among students working collaboratively with technical Institutes / Universities / Industries of National and International repute.

Department Vision and Mission

Vision: To contribute for the society through excellence in Computer Science and Engineering with a deep passion for wisdom, culture and values

Mission:

M1: Provide congenial academic ambience with necessary infrastructure and learning resources.

M2: Inculcate confidence to face and experience new challenges from industry and society.

M3: Ignite the students to acquire self-reliance in the latest technologies.

M4: Foster Enterprising spirit among students.

Program Educational Objectives

PEO1: Excel in Computer Science and Engineering program through quality studies, enabling success in computing industry. (Professional Competency).

PEO2: Surpass in one's career by critical thinking towards successful services and growth of the organization, or as an entrepreneur or in higher studies. (Successful Career Goals).

PEO3: Enhance knowledge by updating advanced technological concepts for facing the

rapidly changing world and contribute to society through innovation and creativity (Continuing Education and Contribution to Society).

Program Specific Outcomes

PSO1: Have Ability to understand, analyze and develop computer programs in the areas like algorithms, system software, web design, big data analytics, and networking.

PSO2: Deploy the modern computer languages, environment, and platforms in creating innovative products and solutions.

Program Outcomes

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

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

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

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

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and 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.

SRI VENKATESA PERUMAL COLLEGE OF ENGINEERING & TECHNOLOGY

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Academic Regulations (R18) for
B.Tech (Regular-Full time)
CHOICE BASED CREDIT SYSTEM (CBCS)

(Effective for the students admitted into I year from the Academic Year 2018-19 onwards)

NOTE: The regulations below are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of students (including those already undergoing the programme) as may be decided by the Academic Council. The Jawaharlal Nehru Technological University Anantapur, Ananthapuramu shall confer B.Tech. Under Graduate degree to candidates who are admitted to the Bachelor of Technology Programs and fulfill all the requirements for the award of the degree.

Preliminary Definitions and Nomenclature

In the following Regulations, unless the context otherwise requires:

(i) "**Programme**" means Degree Programme that is B.Tech Degree Programme.

(ii) "**Branch**" means specialization or discipline of B.Tech Degree Programme, like Mechanical Engineering, Electrical and Electronics Engineering etc.

(iii) "**Course**" means a theory or practical subject that is normally studied in a Semester, like Mathematics, Physics, etc.

(iv) "**College/Institute**" means Sri Venkatesa Perumal College of Engineering & Technology, Puttur.

(v) "**University**" means Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

1. Admission Procedure

Admissions are made to the first year of Four year B.Tech. Degree programme as per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. Program Pattern

2.1. The medium of instruction, examinations and project reports shall be in English.

2.2 The entire program of study is for four academic years. All four academic years shall be on semester pattern.

2.3 A student eligible to appear for the end examination in a course, but absent or has failed in the end examination may appear for that course at the next supplementary examination when offered.

2.4 When a student is detained due to lack of credits/shortage of attendance he/she may be readmitted when the semester is offered after fulfillment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

2.5 The minimum instruction days including exams for each semester shall be 90 days.

3. Award of B.Tech. Degree

A student will be declared eligible for the award of the B.Tech. Degree if he/she fulfils the following academic regulations:

3.1 Pursues a course of study for not less than four academic years and in not more than eight academic years from the year of their admission. However, for the students availing Gap year facility this period shall be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation.

3.2 Registers for 160 credits and secure all 160 credits.

3.3 Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

Credits

Course	Credits / Course
Lecture (L)	**3 or 4**
Tutorial (T)	**1**
Practical (P)	**1.5**
CRT	**1**
Seminar	**1**
Project (Mini)	**1**
Project Phase-I	**4**
Project Phase-II	**9**

Seminar: 2 technical Presentations + 1 participation in external technical symposia + participation in one 2-day workshop, In the place of one technical presentation, students can choose to participate one day in NSS activity.

4. Branches of study:

With the approval of AICTE & JNTUA, following courses are offered for the B.Tech. Programme from 2018-19

S.No.	Name of the Branch	Branch Code
1	Civil Engineering	01
2	Electrical and Electronics Engineering	02
3	Mechanical Engineering	03
4	Electronics and Communication Engineering	04
5	Computer Science and Engineering	05

and any other course as approved by the authorities of statutory bodies of the college from time to time.

5. Distribution and Weightage of Marks

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5.1 The performance of a student in each semester shall be evaluated through internal evaluation and /or an external evaluation conducted semester wise.

5.2 Performance evaluation in each course (theory/ practical) shall be based on a total of 100 marks, of which the relative weightage for internal evaluation and end semester examination shall be 30% and 70% respectively.

5.3 Internal Evaluation

The total internal weightage for theory courses is 30 marks with the following distribution.

a) 20 marks for descriptive test.

b) 10 marks for objective test.

For all theory courses there shall be two mid-term tests in each semester. The duration of the mid-term test shall be 1 hr 50 minutes. In that, 90 minutes will be for descriptive tests and 20 minutes for objective tests. The descriptive test consists of 3 questions with individual choice (‘either’, ‘or’ type) for 10 marks each. The total marks 30 shall be scaled down to 20 marks.

The objective test consists of 20 objective questions for 10 marks in 20 minutes duration. Together, the maximum marks for each mid-term test shall be 30. First mid-term test shall be conducted for 50% of the syllabus and second mid-term for the remaining syllabus.

Among the two midterm examinations 80% weightage will be given for the better performance and 20 % for the other. The final mid-term marks will be the addition of these two.

Example: If a student scores 23 marks and 24 marks in the first and second mid-term examinations respectively, then

Weighted Average Marks = 24 x 0.8 + 23 x 0.2 = 23.8, rounded to 24 Marks.

Note: The marks of any fraction shall be rounded off to the next higher mark.

5.4 Practical Courses

The total internal weightage for Practical courses is 30 marks. The marks can be evaluated based on Day to Day assessment.

The end semester examination shall be conducted for 70 marks by the laboratory faculty concerned and one senior faculty of the same department nominated by the Principal.

In a practical course consisting of two parts (ex: Engineering and IT workshop Lab), the internal examination shall be evaluated for 30 marks in each part and final internal marks shall be arrived at by considering the average of marks obtained in the two parts. End semester examination shall be conducted for 70 marks in each part and final marks shall be arrived at by considering the average of marks obtained in the two parts.

5.5 For the subjects having design and /or drawing, such as Engineering drawing, Estimation, Design and Drawing of Irrigation Structures, etc., the distribution will be 30 marks for internal evaluation and 70 marks for the end semester examination.

5.5.1 Within internal evaluation, 10 marks will be for day to day work in the class that shall be evaluated by the concerned subject teacher based on the reports / drawing sheets submitted in the class.

5.5.2 The remaining 20 marks will be based on the student's performance in two mid-term tests of 2 hours duration each. Among the two mid-term examinations 80% weightage will be given for the better performance and 20% for the other. The final midterm marks will be the sum of these two.

5.6 The laboratory records shall be preserved in the respective department as per the institution norms and should be produced to the committee as and when the same is asked for.

5.7 The student has to complete mandatory courses with a minimum of 40% of marks in internal examination to award the degree and there will be no external examination. The evaluation for the mandatory course shall be carried out for a maximum of 30 marks.

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5.8 End Semester Examination

- There shall be 6 questions and all questions are compulsory.
- First question shall contain 10 compulsory short answer questions for a total of 20 marks such that the question carries 2 marks. There shall be 2 short answer questions from each unit.
- In each of the questions from 2 to 6, there shall be 'either', 'or' type questions each one carrying 10 marks. Students shall answer any one of them.
- Each of these questions from 2 to 6 shall cover one unit of the syllabus.

The duration of theory/practical end semester examination shall be 3 hours.

- End semester examination for theory courses consisting of two parts of different courses, for ex: Basic Electrical & Electronics Engineering shall have the following pattern:
    a. Question paper shall be in two parts viz., Part A and Part B with equal weightage.
    b. In each part there shall be 3 either-or type questions for 12, 12 and 11 marks.

5.9 Project Phase - I

Project Phase – I will be introduced at IV year I Semester. The objective of Project Phase - I is to enable a group of students to take up investigative study in the broad field of relevant engineering branch, theoretical/practical problems to be assigned by the Department under the guidance of a Project Supervisor. The group of students should submit a report and present a seminar at the end of the semester before the Project Supervisor and Internal Department Committee (IDC) consists of the Head of Department (HOD), Project Coordinator and a senior faculty of the department nominated by HOD. The report submission and oral presentation shall

be evaluated for 100 marks by Project Supervisor and IDC.

5.10 Project Phase - II

The objective of Project Phase - II which is continued in IV year II semester is to enable the student to extend further the investigative study taken up under Project Phase - I, and to provide a solution for the theoretical/practical problem**.**

Out of the total 200 marks for the Project Phase - II, 60 marks shall be for internal evaluation and 140 marks for the external evaluation (Viva-voce)**.** The evaluation method of the project is as follows.

Internal Evaluation

Two reviews one at the mid of semester and the other before submitting the project the report shall be conducted by IDC and Project Supervisor jointly.

External Evaluation

The external project viva-voce will be conducted by the committee consisting of HOD, Project Supervisor and External examiner nominated by the principal.

Supplementary Examinations

At the end of each Semester there will be regular examinations for the current Semester. Those students who could not clear their courses in their previous attempt can appear for the examinations under supplementary category along with the regular students after registering themselves at the examination branch. Supplementary examinations for all the other Semesters other than the current one will also be conducted at the same time.

However, Advanced Supplementary examinations will be conducted for IV-II semester examinations.

5.11 Summer Internship / mini project

The student shall do either a summer internship or a mini-project during their course of study preferably during his/her summer vacation immediately after 6th semester.

There shall be 6 weeks duration to complete summer internship during summer vacations. The total internal weightage for the internship course is 50 marks and will be evaluated based on day to day assessment by concerned industry.

In place of summer internship, a student can also do a mini-project within the college under the supervision of the department faculty.The weightage of marks is similar to

that of internship.

The student shall secure a minimum of 40% to pass an internship / mini-project.

6. Attendance Requirements

6.1 A student shall be eligible to appear for final examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.

6.2 Shortage of attendance below 65% in aggregate shall in **NO** case be condoned.

6.3 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

6.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end semester examination of that class.

6.5 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek re-admission for that semester when offered next.

6.6 A stipulated fee shall be payable towards condonation for shortage of attendance to the Institute as decided by the College Academic Committee.

7. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in Section No.6

7.1 A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks (i.e., 25) in the end semester examination and a minimum of 40% of marks (i.e., 40) in the sum total of the internal evaluation and end examination taken together.

7.2 A student shall be promoted from 4th semester to 5th semester only if he/she acquires 23 credits (i.e 40% of total credits) that have been studied up to 3rd semester from the following examinations, irrespective of whether the candidates takes the end examinations or not as per the normal course of the study

B.Tech 1st Sem - one regular and two supplementary

B.Tech 2nd Sem - one regular and one supplementary

B.Tech 3rd Sem - one regular only

7.2 A student shall be promoted from 6th semester to 7th semester only if he/she acquires 39 credits(i.e 40% of total credits) that have been studied up to 5th semester from the

following examinations, irrespective of whether the candidates takes the end examinations or not as per the normal course of the study

B.Tech 1st Sem - one regular and four supplementary

B.Tech 2nd Sem - one regular and three supplementary

B.Tech 3rd Sem - one regular and two supplementary

B.Tech 4th Sem - one regular and one supplementary

B.Tech 5th Sem - one regular only

7.4 In case if a student is already detained for want of credits for a particular academic year as per Section No. 7.2 and 7.3 above, the student may make up the credits through supplementary exams of the above exams before the commencement of third or fourth year I semester class work respectively next year.

7.5 A student shall register and put up minimum attendance in all 160 credits and earn all the 160 credits. Marks obtained in all 160 credits shall be considered for the calculation of aggregate percentage of marks obtained.

7.6 Students who fail to earn 160 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand canceled.

8. With–Holding of Results

If the candidate has any dues not paid to the institute or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld and he/she will not be allowed / promoted into the next higher semester. The issue of awarding a degree is liable to be withheld in such cases.

9. Grading

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below:

Table – Conversion into Grades and Grade Points assigned

for Theory, Practical, Internship & Project Phase - I

Range in which the marks in the theory, practical, internship & project phase - I fall	Grade	Grade Points (GP) Assigned
≥ 90	S (Superior)	10
80-89	A (Excellent)	9
70-79	B (Very Good)	8
60-69	C (Good)	7

50-59	D (Average)	6
40-49	E (Below Average)	4
< 40	F (Fail)	0
Absent	Ab (Absent)	0

Table – Conversion into Grades and Grade Points assigned for Project Phase - II

Range in which the marks in the subject fall	Grade	Grade Points (GP) Assigned
≥ 190	S (Superior)	10
170-189	A (Excellent)	9
150-169	B (Very Good)	8
120-149	C (Good)	7
100-119	D (Average)	6
80-99	E (Below Average)	4
< 80	F (Fail)	0
Absent	Ab (Absent)	0

i. A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered.

ii. For audit courses "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

9.1. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

(i) Semester Grade Point Average (SGPA)

The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$\mathbf{SGPA\ (S_i) = \Sigma\ (C_i \times G_i) / \Sigma C_i}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

(ii) Cumulative Grade Point Average (CGPA)

The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.,

$$\mathbf{CGPA = \Sigma (C_i \times S_i) / \Sigma C_i}$$

Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- While computing the CGPA the subjects in which the student is awarded Zero grade points will also be included.
- ***Grade Point:*** It is a numerical weight allotted to each letter grade on a 10-point scale.
- ***Letter Grade:*** It is an index of the performance of students in a said course, Grades are denoted by letters S, A, B, C, D, E and F.

EXAMPLE: Computation of SGPA and CGPA

Illustration for SGPA

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade Point)
Course-I	3	S	10	3x10 = 30
Course-II	3	A	9	3x9 = 27
Course-III	3	B	8	3x8 = 24
Course-IV	3	D	6	3x6 = 18
Course-V	2	B	8	2x8 = 16
Course-VI	1	C	7	1x7 = 7
	18			122

Thus, SGPA = 122/18 = 6.8

Illustration for CGPA

Semester	Credits	SGPA	CGPA
1	18.50	6.80	6.80
2	20.50	6.90	6.85
3	19.00	7.30	6.99
4	19.00	6.80	6.95

5	22.00	8.20	7.22
6	23.00	7.40	7.26
7	20.00	7.20	7.25
8	18.00	7.80	7.31

Thus, CGPA = $\frac{(18.5\times6.8)+(20.5\times6.9)+(19\times7.3)+(19\times6.8)+(22\times8.2)+(23\times7.4)+(20\times7.2)+(18\times7.8)}{160}$ = 7.31

10. Award of Class

After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B.Tech. Degree he/she shall be placed in one of the following four classes:

Class Awarded	**CGPA Secured**
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 4.0 < 5.5

A student with a final CGPA is < 4.00 will not be eligible for the Award of the Degree.

11. Gap Year – Concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the maximum time for graduation. Such proposals were submitted by the students to the Principal. An evaluation committee shall be constituted by the Principal to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit student(s) to avail the Gap Year.

12. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who

have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section No. 3.3 and they will be in the academic regulations into which they get re-admitted.

Candidates who were permitted with Gap Year shall be eligible for rejoining into the succeeding year of their B.Tech from the date of commencement of class work, subject to Section No. 3.3 and they will be in the academic regulations into which the candidate is presently rejoining.

13. Massive Open Online Courses (MOOCs)

The college, in line with the developments in Learning Management Systems (LMS) intends to encourage the students to do online courses in MOOCs, offered internationally. The main intention to introduce MOOCs is to obtain enough exposure through online tutorials, self-learning at one's own pace, attempt quizzes, discuss with professors from various universities and finally to obtain certificate of completion for the course from the MOOCs providers.

Regulations for MOOCs

13.1 Institution intends to encourage the students to do two MOOC courses one in III year II Semester and the other IV year I Semester of relevant B.Tech Programme.

13.2 The respective departments shall give a list from NPTEL or any other standard providers, whose credentials are endorsed by the HOD.

13.3 Each department shall appoint Coordinators/Mentors and allot the students to them who shall be responsible to guide students in selecting online courses and provide guidance for the registration, progress and completion of the same.

13.4 A student shall choose an online course (relevant to his/her programme of study) from the given list of MOOCs providers, as endorsed by the teacher concerned, with the approval of the HOD.

13.6 The details of MOOC(s) shall be displayed in the Grade card of a student, provided he/she submits the proof of completion of it to the department concerned through the Coordinator/Mentor.

13.7 Students can get certificates from SWAYAM/NPTEL. The course work should not be less than 12 weeks or students may appear for the end examination conducted by the Institute.

13.8 The end examination conducted by Institution for 60 marks shall be scaled up to 100 marks.

13.9 The Provisional Degree Certificate and/or consolidated grade sheet shall be issued only to those students, who have submitted proof of completion of online/offline MOOCs for the courses they have registered with.

14. Virtual Labs

With the help of Virtual Labs the student will be given additional exposure to laboratory practice. This helps in better understanding the concepts and practical significance of engineering.

15. Choice Based Credit System (CBCS)

The CBCS provides a choice for students to select from the prescribed courses (core, elective or minor or soft skill courses). The CBCS provides a 'cafeteria' type approach in which students can take courses of their choice, learn at their own pace and adopt an interdisciplinary approach to learning.

Regulations for CBCS

15.1 The CBCS, also called as Open Electives (OEs) will be implemented in the College.

15.2 It is mandatory for Under Graduate (UG) students to study two CBCS course during IV Year II Sem of their programme by taking one course.

15.3 A student shall opt for any two courses from the list given by the institute.

15.4 A CBCS course shall be offered by a department, only when there are a minimum number of 20 students opting for that course.

16. Minor Engineering

A student shall be eligible to get an Undergraduate degree with Honors or additional Minor Engineering. The following are the rules to acquire Minor Degree Engineering

- To earn a minor degree a student has to get a minimum of 20 extra credits.
- These could be acquired through MOOCs.
- Students who have a SGPA of 8.0 or above up to 3rd semester and without any backlog subjects will be permitted to register for a minor degree.
- The student has to maintain SGPA of 8.0 and above in the subsequent semesters without any backlogs to keep the minor registration active, otherwise their registration will be canceled.

17. Student Transfers

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh from time to time.

18. General

18.1 The academic regulations should be read as a whole for the purpose of any interpretation.

18.2 Malpractice rules- nature and punishments are appended.

18.3 Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.

18.4 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

18.5 The Institute, with the approval of the Academic Council, may change or amend the academic regulations / structure / credits / syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Institute.

19. Mandatory Course: A student shall pursue the following four non credit mandatory courses.

i. Environmental Science ii. Induction Training

iii. Indian Constitution iv. Essence of Indian traditional knowledge.

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Academic Regulations (R18) for
B. Tech (Lateral Entry)

(Effective for the students admitted into II year from the Academic Year 2019-20 onwards)

NOTE: All the regulations adopted for B.Tech (Regular-Full Time) programme are applicable to lateral entry students in addition to the following:

1. Award of B.Tech Degree

A student will be declared eligible for the award of the B.Tech. Degree if he/she fulfills the following academic regulations:

i. Pursues a course of study for not less than three academic years and in not more than six academic years. However, for the students availing Gap year facility this period shall be extended to two years at the most and these two years would not be counted for the maximum time for graduation.

ii. Registers for 121 credits and secure all 121 credits.

iii. Students, who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands were canceled.

2. Minimum Academic Requirements:

Students need to acquire necessary credits to get promoted to the subsequent academic year, in addition to the attendance requirements mentioned above.

2.1 A student shall be promoted from 6th semester to 7th semester only if he/she acquires 24 of the credits (i.e 40% of the credits) from the courses that have been studied up to 5th semester from all the regular and supplementary examinations until 5th semester.

- Two regular and one supplementary examinations of 3rd Semester.
- One regular and one supplementary examination for the 4th Semester.
- One regular examination of 5th semester.

2.2 A student shall register and put up minimum attendance in all 121 credits and earn all the 121 credits. Marks obtained in all 121 credits shall be considered for the calculation of aggregate percentage of marks obtained.

2.3 Students who fail to earn 121 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand canceled.

3. Course Pattern:

3.1 The entire course of study is for three academic years. All years shall be on semester pattern.

3.2 A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may appear for that subject at the next supplementary examination when offered.

3.3 When a student is detained due to lack of credits/shortage of attendance he may be readmitted when the semester is offered after fulfillment of academic regulations. In such a case, he/she shall be in the academic regulations into which he/she is readmitted.

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RULES FOR
DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, notebook, programmable calculators, Cell phones, pager, palm computers, bluetooth or any other form of material concerned with or	Expulsion from the examination hall and cancellation of the performance in that course only.

	related to the course of the examination (theory or practical) in which he/she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the examination hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he/she will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be canceled.
3	Impersonates any other candidate in connection with the examination	The candidate who has impersonated shall be expelled from the examination hall. The Candidate is also debarred for four consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with the feature of the seat. The performance of the original candidate, who has been impersonated, shall be canceled in all the courses of the examination (including

		practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that Semester/year. The candidate is also debarred for four consecutive Semesters from class work and all Semester end examinations if his involvement is established. Otherwise the candidate is debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he/she will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year. The candidate is also debarred for two consecutive Semesters from class work and all Semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner	Cancellation of the performance in that course.

	requesting him to award pass marks.	
6	Refuses to obey the orders of the any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walkout or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that Semester. If candidate physically assaults the invigilator or/officer in charge of the examination, then the candidate is also barred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the examination hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year. The candidate is also debarred for two consecutive Semesters

		from class work and all Semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that Semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the Courses of that Semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining

		examinations of the courses of that Semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course and all other courses the candidate has appeared including practical examinations and project work of that Semester examinations depending on the recommendation of the committee.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal for further action to award suitable punishment.	

Note:

i. All malpractices cases are to be handled by the Chief Controller with a committee consist of Controller of Examinations, HOD concerned and subject expert.

ii. Whenever the performance of a student is cancelled in any course/ courses due to Malpractice, he has to register for the End Examination in those course/courses consequently and has to fulfill all the norms required for award of Degree.

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Course Structure of B.Tech (R18) - 2018-19

I Semester – Computer Science & Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH01	Mathematics-I	3	1	0	4
2	18BSBH12	Engineering Chemistry	3	0	0	3
3	18ES0501	Problem Solving Using ‘C’	3	1	0	4
4	18ES0206	Basic Electrical Engineering	3	0	0	3
5	18BSBH13	Engineering Chemistry lab	0	0	3	1.5
6	18ES0502	Problem Solving Using ‘C’ lab	0	0	3	1.5
7	18ES0302	Engineering & IT Workshop Practice	0	0	3	1.5
		Total	**12**	**2**	**9**	**18.5**

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Course Structure of B.Tech (R18) - 2018-19

II Semester – Computer Science & Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH02	Mathematics-II	2	1	0	3
2	18BSBH14	Applied Physics	3	0	0	3
3	18HSBH01	Technical English	3	0	0	3
4	18ES0301	Engineering Graphics & Design	2	0	4	4
5	18PC0501	Data Structures	3	0	0	3
6	18BSBH11	Physics lab	0	0	3	1.5
7	18HSBH02	English Language and communication skills lab	0	0	3	1.5
8	18PC0502	Data Structures Lab	0	0	3	1.5
9	18MCBH02	Environmental Science (Mandatory Course)	2	0	0	0
		Total	**15**	**1**	**13**	**20.5**

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Course Structure of B.Tech (R18) - 2018-19

III Semester – Computer Science & Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH04	Probability & Numerical Methods	3	0	0	3
2	18HS0112	Managerial Economics And Financial Accountancy	3	0	0	3
3	18PC0503	Database Management Systems	3	0	0	3
4	18ES0405	Analog Electronic Circuits	3	0	0	3
5	18ES0407	Digital Logic Design	3	0	0	3
6	18PC0504	Database Management Systems Lab	0	0	3	1.5
7	18ES0406	Analog Electronic Circuits Lab	0	0	3	1.5
8	18HSBH03	Soft Skills	0	0	2	1
9	18MCBH03	Constitution of India	2	0	0	0
		Total	**17**	**0**	**8**	**19**

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Course Structure of B.Tech (R18) - 2018-19

IV Semester – Computer Science & Engineering

S.No	Course Code	Course Title	L	T	P	Credits
1	18BSBH07	Discrete Mathematics	3	0	0	3
2	18PC0505	Computer Organization	3	0	0	3
3	18PC0506	Design And Analysis Of Algorithms	3	0	0	3
4	18PC0507	Oops Using Java	3	0	0	3
5	18PC0508	Software Engineering	3	0	0	3
6	18PC0509	Oops Using Java Lab	0	0	3	1.5
7	18PC0510	Case Tools Lab	0	0	3	1.5
8	18PS0501	Seminar-1	0	0	2	1
9	18MCBH04	Essence of Indian Traditional Knowledge	2	0	0	0
		Total	**17**	**0**	**8**	**19**

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Course Structure of B.Tech (R18) - 2018-19

V Semester – Computer Science & Engineering

S.NO	COURSE CODE	COURSE NAME	PERIODS/WEEK			CREDITS
			L	T	P	
1	18PC0511	Artificial Intelligence	3	0	0	3
2	18PC0512	Operating Systems	3	0	0	3
3	18PC0513	Formal Language And Automata Theory	3	0	0	3
4	18PC0514	Python Programming	3	0	0	3
5	18PC0515	Computer Networks	3	0	0	3
6	18PE0501	Professional Elective -1 Cryptography and Network Security	3	0	0	3
7	18PC0516	Operating Systems Lab	0	0	3	1.5
8	18PC0517	Python Programming Lab	0	0	3	1.5
9	18BSBH15	Quantitative Aptitude	0	0	2	1
TOTAL CREDITS						**22**

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Course Structure of B.Tech (R18) - 2018-19

VI Semester – Computer Science & Engineering

S.NO	COURSE CODE	COURSE NAME	PERIODS/WEEK			CREDITS
			L	T	P	
1	18PC0518	Compiler Design	3	0	0	3
2	18PC0519	Web Technologies	3	0	0	3
3		Open Elective-1	3	0	0	3
4		Professional Elective-2	3	0	0	3
5		Professional Elective-3	3	0	0	3
6		Open Elective-2	3	0	0	3
7	18PC0520	Web Technologies Lab	0	0	3	1.5
8	18PC0521	Compiler Design Lab	0	0	3	1.5
9	18PS0502	Technical Seminar	0	0	2	1
	18BSBH16	Quantitative Aptitude	0	0	2	1
TOTAL CREDITS						**23**

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Course Structure of B.Tech (R18) - 2018-19

VII Semester – Computer Science & Engineering

S.NO	COURSE CODE	COURSE NAME	PERIODS/WEEK			CREDITS
			L	T	P	
1	18PC0522	Big Data Analytics Using R	3	0	0	3
2	18PC0523	Mobile Application Development	3	0	0	3
3	18PE0510	Professional Elective -4 Machine Learning	3	0	0	3
4	18PE0515	Professional Elective -5 Software Testing	3	0	0	3
5	18PC0524	R Programming Lab	0	0	3	1.5
6	18PC0525	Mad Lab	0	0	3	1.5
7	18PS0503	Project Work-Phase-1	0	0	0	4
8	18PS0504	Project/Summer Internship	0	0	0	1
TOTAL CREDITS						**20**

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Course Structure of B.Tech (R18) - 2018-19

VIII Semester – Computer Science & Engineering

S.NO	COURSE CODE	COURSE NAME	SUBJECT AREA	PERIODS/WEEK			CREDITS
				L	T	P	
1.		Professional Elective -6	PEC	3	1	0	3
2		Open Elective-3	OE	3	1	0	3
3		Open Elective-4	OE	3	1	0	3
4	18PS0505	Project Phase-II	PWS	0	0	0	9
TOTAL CREDITS							**18**

PROFESSIONAL ELECTIVE COURSES

	PROFESSIONAL ELECTIVE -1
18PE0501	CRYPTOGRAPHY AND NETWORK SECURITY
18PE0502	SOFTWARE PROJECT MANAGEMENT
18PE0503	STORAGE AREA NETWORKS
	PROFESSIONAL ELECTIVE-2
18PE0504	HIGH PERFORMANCE COMPUTING
18PE0505	CLOUD COMPUTING
18PE0506	INTERNET OF THINGS
	PROFESSIONAL ELECTIVE-3
18PE0507	SCRIPTING LANGUAGES
18PE0508	SERVICE ORIENTED ARCHITECTURE
18PE0509	COMPUTER VISION
	PROFESSIONAL ELECTIVE-4
18PE0510	MACHINE LEARNING
18PE0511	DATA MINING AND DATA WAREHOUSING
18PE0512	DISTRIBUTED SYSTEMS
	PROFESSIONAL ELECTIVE-5
18PE0513	NATURAL LANGUAGE PROCESSING
18PE0514	MOOCS
18PE0515	SOFTWARE TESTING
	PROFESSIONAL ELECTIVE-6
18PE0516	UNIX INTERNALS
18PE0517	SOFT COMPUTING
18PE0518	DATA SCIENCE

OPEN ELECTIVES COURSES

	OPEN ELECTIVE-1
18OE0404	MICROPROCESSOR AND INTERFACING
18PC0421	EMBEDDED SYSTEMS
18PC0402	SIGNALS & SYSTEMS
	OPEN ELECTIVE-2
18M00320	MANAGEMENT SCIENCE
18M00321	INTELLECTUAL PROPERTY RIGHTS
18M00322	ENTREPRENEURSHIP
	OPEN ELECTIVE-3
18OE0501	HUMAN COMPUTER INTERACTION
180E0502	COMPUTER GRAPHICS
18OE0503	REAL TIME SYSTEMS
	OPEN ELECTIVE-4
18OE0504	DESIGN PATTERNS
180E0505	CYBER SECURITY
18OE0506	PARALLEL ALGORITHMS

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B.Tech - I Semester

L	T	P	C
3	1	0	4

(18BSBH01) MATHEMATICS - I
(Common to all branches)

Course Objectives: To learn

• Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
• Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
• Concept of mean value theorems and their application to the mathematical problems, Finding maxima and minima of function of two and three variables.
• Concept of Sequence and series
• Concept of Fourier series

Course Outcomes: After learning the contents of this paper the student must be able to

• Write the matrix representation of a set of linear equations and to analyses the solution of the system of equations
• Find the Eigenvalues and Eigenvectors
• Solve the applications on the mean value theorems.
• Analyses the nature of sequence and series.
• Gain knowledge to tackle engineering problems using the concepts of fourier series

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C111 Mathematics -I	C111.1	3	3	3	-	-	-	-	--	-	-	-	-
	C111.2	3	3	-	-	-	-	-	-	--	-	-	-
	C111.3	3	3	-	-	-	-	-	-	--	-	-	-
	C111.4	3	3	-	-	-	-	-	-	--	-	-	-
	C111.5	3	3	3	-	-	-	-	-	--	-	-	-
	C111	3	3	3	-	-	-	-	-	--	-	-	-

UNIT-I: Matrices

Matrices: Types of Matrices- Rank of a matrix by Echelon form and Normal form- System of linear equations- Homogeneous and Non-Homogeneous equations - Gauss elimination method- Gauss Seidel Method- Crout's triangularisation method - Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II: Eigenvalues and Eigenvectors

Eigenvalues and Eigen vectors and their properties- Cayley-Hamilton Theorem (without proof)- finding inverse by Cayley-Hamilton Theorem- Diagonalization of a matrix- finding power of a matrix - Quadratic forms: Reduction of Quadratic form to canonical form and their nature .

UNIT-III: Differential Calculus and its applications

Rolle's theorem- Lagrange's Mean value theorem- simple examples of Taylor's and Maclaurin's series –Functions of several variables- Jacobian–maxima and minima functions of two variables - Lagrange's method of multipliers with three variables.

UNIT-IV: Sequences & Series

Convergence of sequence and series- Tests for convergence - Geometric test- P- test- limit comparison test- D' Alember ratio test- Raabe's test- Cauchy's Integral test- Cauchy's root test-

Logarithmic test- Power series - Taylor's series-series for exponential-trigonometric and logarithmic functions.

UNIT-V: Fourier Series

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, 9th Edition, John Wiley & Sons,2006.
3. Calculus and Analytic geometry by G.B. Thomas and R.L. Finney, 9thEdition,Pearson, Reprint, 2002.

References:

1. A text book of Engineering Mathematics by N.P.Bali and Manish Goyal, Laxmi Publications, Reprint, 2008.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Engineering mathematics, volume-I&II, E.Rukmangadachari & E.Keshava Reddy Pearson Publishers.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

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B.Tech - I Semester

L	T	P	C
3	0	0	3

(18BSBH12) ENGINEERING CHEMISTRY

Course Objectives:

- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student understand the technology based on them.
- To provide the information regarding hardness of water, effects of hard water in boilers and treatment methods to avoid bad effects on human health. To check the parameters of various water samples by experimental techniques.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways.
- To make students familiar with the importance of electrochemical processes in nature and industry, like coating of objects with metals or metal oxides through electro deposition.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course Outcomes: The basic concepts included in this course will help the student to gain:

- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C112: Engineering Chemistry	C112.1	3	2	1	-	-	-	-	-	-	-	-	-
	C112.2	3	2	3	-	-	-		-	-	-	-	-
	C112.3	3	3	2	--	--	--	3	-	--	-	-	-
	C112.4	3	2	-	-	-	-	-	-	-	-	-	-
	C112.5	3	2	-	-	-	-	-	--	-	-	-	-
	C112	3	2.2	2	-	-	-	3		-	-	-	-

UNIT – I: WATER QUALITY AND ITS TREATMENT

INTRODUCTION: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness –Numerical problems on estimation of hardness.

CHEMICAL ANALYSIS OF WATER: Estimation of hardness of water by EDTA method, acidity, alkalinity and dissolved oxygen (BOD & COD).

BOILER TROUBLES: scales and sludges, caustic embrittlement, boiler corrosion and priming and foaming.

SOFTENING OF WATER: Internal Conditioning - Phosphate Conditioning, Calgon Conditioning; **External Treatment** - Zeolite process and Ion-exchange process, advantages and applications.

WATER FOR MUNICIPAL TREATMENT: Disinfection, Chlorination – Breakpoint Chlorination**,** Ozonization, UV Treatment – Reverse Osmosis: Desalination of Brakish water by Electrodialysis.

UNIT – II: MOLECULAR STRUCTURE & THEORIES OF BONDING:

Atomic and Molecular orbitals, Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and H_2^+ molecules. π molecular orbitals of 1,3 butadiene, CO_2 and benzene.

CRYSTAL FIELD THEORY (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries (One Specific Example for Each)

UNIT – III: ELECTROCHEMISTRY AND CORROSION

Electrochemistry and corrosion: Electrochemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation, Electrochemical series and its applications. Conductometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – Acid Battery and Lithium ion Batteries).

FUEL CELLS: H_2-O_2 fuel cell, Solid oxide fuel cell, PEM fuel cell – Principles, advantages and applications.

SCIENCE OF CORROSION: Definition, Types of Corrosion – Examples: Mechanism of Dry and Wet Corrosion, Factors influencing corrosion

Corrosion control- Cathodic protection – Sacrificial anodic and impressed current cathodic protection methods - Electroplating of (Cu & Cr) and Electro less Plating (Zn & Sn).

UNIT-IV: STEREOCHEMISTRY, REACTION MECHANISM & SYNTHESIS OF DRUG MOLECULES:

STEREO CHEMISTRY: Introduction to representation of 3-dimensional structures, Structural isomers and stereoisomers, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration.

REACTION MECHANISM: Substitution reactions: Nucleophilic substitution reactions: Mechanism of SN^1, SN^2 reactions. Electrophilic and nucleophilic addition reactions: Markownikoff and anti Markownikoff's additions. Elimination reactions: Dehydro halogenation of alkylhalides. Oxidation reactions: Oxidation of alcohols using $KMnO_4$. Reduction reactions: reduction of carbonyl compounds using $NaBH_4$.

SYNTHESIS OF DRUG MOLECULES: Structure, synthesis and pharmaceutical applications of Aspirin.

UNIT – V: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS:

Introduction – Basic principles of UV-Vis, FT-IR, ^{1}HNMR, XRD –One Specific application for each Technique.

Suggested Text Books:

1. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
3. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Physical Chemistry, by P. W. Atkins
6. Inorganic Chemistry by J.D.LEE.

References

1. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
2. University Chemistry, by B.M. Mahan, Pearson IV Edition

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B.Tech - I Semester

L	T	P	C
3	1	0	4

(18ES0501) PROBLEM SOLVING USING 'C'
(Common to EEE,ECE & CSE)

Course Objectives:

- To Understand the Hardware of the computer and the General form of a C program.
- To Understand the Decision Making and Loop statements of C Language.
- To Understand the Arrays and String concept of C Language.
- To understand the concept of Functions and Pointers in C Language.
- To Understand about Structures, Unions and Files in C Language.

Course Outcomes:

- Able to describe the Hardware components of a computer.
- Able to implement the 'if...else' statements and 'for', 'while', 'do…while' loop statements.
- Able to write programs using Arrays and Strings concept.
- Able to implement Function and Pointer concepts on various applications.
- Able implement File concepts of C Language.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C113: Problem Solving Using 'C'	C113.1	3	3	-	-	-	--	-	-	-	-	-	-
	C113.2	3	2	3	-	-	--	-	-	-	-	-	-
	C113.3	3	3	-	-	-	--	-	-	-	-	-	-
	C113.4	3	3	-	3	-	--	-	-	-	-	-	-
	C113.5	2	3	-	-	-	--	-	-	-	-	-	-
	C113	2.8	2.8	3	3	-	--	-	-	-	-	-	-

UNIT-I

Overview of Computers and Programming: Electronic Computers Then and Now, Computer Hardware, Computer Software, Computer Languages, Algorithm, Steps in an Algorithm, Flowchart, The Software Development Method, Applying The Software Development Method.

Introduction to C Programming: C Language Elements, Variable Declarations, Data Types, Executable Statements, General Form of a C program, Expressions, Precedence and Associativity, Operators, Type Conversion.

UNIT-II

Decision Making Statements- Simple **if** Statement, **if-else** Statement, Nested **if-else** Statement**, if-else-if** Ladder Statement**,** Example Programs.

Loop Control Statements- The "for" loop, the "while" loop, the "do-while" loop, Example Programs, **Break** Statement, **Continue** Statement, **go to** Statement, **Switch ()- Case** Statement

UNIT-III

Arrays- Definition, One-Dimensional Arrays- Declaration, Initialization, "for" loop for Sequential access, Example Programs. Two-Dimensional Arrays: Declaration, Initialization, Example Programs.

Strings- Introduction, Declaration and Initialization of String Variables, Reading Strings from Terminal, Writing Strings to screen, Arithmetic Operators on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions, Table of Strings.

UNIT-IV

Functions- Elements of User-Defined Functions, Definition of Functions, category of Functions, Nested Functions, Recursion, Passing Arrays to Functions, Scope, Storage Classes, Type Qualifiers.

Pointers- Introduction, Understanding Pointers, Accessing the Address of a Variable, Declaring Pointer Variable, Initialization of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expression, Pointer Increments and Scale Factor, Pointers and Arrays, Array of Pointers, Pointers as Function Arguments.

UNIT-V

Structures- Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure Variables, Operations on Individual Members, Arrays of Structures, Arrays within Structures, Unions, TYPEDEF, ENUM.

File Management in C- Introduction, Types of Files, Defining and Opening a File, Closing a File, Input/output Operation on Files, Error handling during I/O Operations, Random Access to Files, Command Line Arguments.

Text Books

1. Programming In "C" and Data Structures- By Jeri. R. Hanly, Elliot. B. Koffman, Ashok Kamthane, A. Ananda Rao, 5th Edition, Pearson Publication. (Units I and II).
2. Programming In "C" and Data Structures- By E. Balagurusamy, McGraw Hill Publication (Units III, IV and V).

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B.Tech - I Semester

L	T	P	C
3	0	0	3

(18ES0206) BASIC ELECTRICAL ENGINEERING

Course Objectives:

To help students develop an understanding on analyzing electrical circuits using various techniques. To make the student familiarize with the fundamental concepts of circuits, resonance, two port networks and to analyze the response in electric circuits.

Course Outcomes:

After completing the course the student should be able to do the following:

- Given a network, find the equivalent impedance by using network reduction techniques
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably
- Able to analyze bjt and FET transistors with their characteristics and applications.
- Ability to have knowledge on oscillators and op-amplifiers.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C114: Basic Electrical Engineering	C114.1	3	3	2		2							3
	C114.2	3	2	2		2							3
	C114.3	3	3	2		2							3
	C114.4	3	3	1		1							3
	C114.5	2	2	1		1							2
	C114	2.8	2.6	1.6		1.6							2.8

UNIT I DC Circuits:
Voltage-Current-Ohm's Law, Kirchoff Voltage and Kirchoff Current Law-Series and Parallel Resistors -Voltage Division and Current Division-Star to Delta and Delta to Star Transformation-Basic Nodal and Mesh Analysis-Source Transformation. Network Theorems- Superposition, Thevenin's, Norton's, Maximum Power Transfer Theorem.

UNIT II AC Circuits
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (seriesand parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections

UNIT III Transformers:
Principle, Construction and operation of single-phase transformers, EMF equation, equivalent circuit, Phasor diagram, voltage regulation, Losses and efficiency Testing - Autotransformers - principle, applications, Three-phase transformer connections

UNIT IV Electrical Machines - I
Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT V Electrical Machines - II
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor.

Text-Books:
1) Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2) Basic Electrical Engineering - D.C. Kulshreshtha, 2009, Tata McGraw Hill.

References:
1) Fundamentals of Electrical Engineering, L.S. Bobrow, Oxford University Press, 2011
2) Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3) Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India,

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B.Tech - I Semester

L	T	P	C
0	0	3	1.5

(18BSBH13) ENGINEERING CHEMISTRY LAB

Course Objectives: The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The student will learn:

- The hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.
- The preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications.
- Will be able to understand the knowledge of the processes of corrosion and its prevention.

Course Outcomes: The experiments will make the student gain skills on:

- Would have acquired the practical skill to handle the analytical methods with confidence.
- To learn the desirable limits of various constituents in water analysis and its importance.
- To Measure molecular properties such as viscosity, conductance of solutions, etc.
- Estimation of rate constant of a reaction from concentration – time relationships.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C115. ENGINEERING CHEMISTRY LAB	C115.1	2	3	2											
	C115.2	3	2												
	C115.3	2	3	2											
	C115.4	3	2		2										
	C115.5	2	2	3		2									
	C115.6								3						
	C115.7									2					
	C115.8										3				
	C115.9												3		
	C115	2.6	2.4	2.3	2	2	-	-	3	2	3	-	3	2	2

LIST OF EXPERIMENTS:

Choice of 10 experiments from the following:

1. Estimation of hardness of water by complexometric method using EDTA.
2. Determination of Alkalinity of water.
3. pH Metry- Analysis of acidic and Basic water samples.
4. Estimation of Dissolved oxygen in water.
5. Preparation of standard $KMnO_4$ solution & Estimation of Iron by Potentiometry.
6. Determination of strength of given strong acid and strong base solution by conductometric titration.
7. Determination of Viscosity of oil through Ostwald/Redwood Viscometer – I.
8. Synthesis of Aspirin.
9. Estimation of Manganese in Cement by Colorimetry.
10. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.
11. Determination of surface tension of a given liquid using a stalagmometer.

Prescribed Book:

Lab Manual prepared by SVPCET

Reference Books:

1. Vogel's Textbook of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi).
3. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi).

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B.Tech - I Semester

L	T	P	C
0	0	3	1.5

(18ES0502) PROBLEM SOLVING USING 'C' LAB
(Common to EEE, ECE & CSE)

Course Outcomes: The experiments will make the student gain skills on:

- Design the algorithm and flowchart for the given problem. (PO1, PO2,PO3)
- Develop the programs on control statements and arrays. (PO1, PO2, PO3)
- Analyze the concepts on functions and strings. (PO1, PO2)
- Solve the memory access problems by using pointers and design the programs on structures and unions. (PO1, PO2, PO4)
- Analyze the basics of the file handling mechanism that is essential for understanding the concepts of management systems. (PO1, PO2)
- Follow the ethical principles in implementing the programs (PO8)
- Do experiments effectively as an individual and as a team member in a group. (PO9)
- Communicate verbally and in written form, the understanding about the experiments. (PO10)
- Continue updating their skills related to loops, pointers and files implementing programs in future. (PO12)

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C117 - Problem Solving Using 'C' Lab	C117.1	3	3	2											
	C117.2	3	3	3											
	C117.3	2	3			3									
	C117.4	3	2		3										
	C117.5	3	3												
	C117.6								3						
	C117.7									2					
	C117.8										3				
	C117.9												3		
	C117	2.8	2.8	2.5	3	3	-	-	3	2	3	-	3	3	2

LIST OF EXPERIMENTS/TASKS

1. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, to read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
2. Write a program to find the roots of a Quadratic equation.
3. Write a program to compute the factorial of a given number.
4. Write a program to check whether the number is prime or not.
5. Write a program to find the series of prime numbers in the given range.
6. Write a program to generate Fibonacci numbers in the given range.
7. Write a program to find the maximum and minimum of a set of numbers.
8. Write a program to reverse the digits of a number.
9. Write a program to find the sum of the digits of a number.
10. Write a program to find the sum of positive and negative numbers in a given set of numbers.
11. Write a program to check for number palindrome.
12. Write a program to generate Pascal Triangle.
13. Write a program to read two matrices and print their sum and product in the matrix form.
14. Write a program to read matrix and perform the following operations.
    i. Find the sum of Diagonal Elements of a matrix.
    ii. Print Transpose of a matrix.
    iii. Print sum of even and odd numbers in a given matrix.
15. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
16. Write a program to insert a substring in to a given string and delete few characters from the string. Don't use library functions related to strings.
17. Write a program to split a „file" in to two files, say file1 and file2. Read lines into the file from standard input. File1 should consist of odd numbered lines and file2 should consist of even numbered lines.
18. Write a program to merge two files.
19. Write a program to read a set of strings and sort them in alphabetical order.
20. Write a program to read two strings and perform the following operations without using Built in string Library functions and by using your own implementations of functions.
    i. String length determination ii .Compare Two Strings
    iii. Concatenate them, if they are not equal iv. String reversing
21. Write programs using recursion for finding Factorial of a number, GCD, LCM, and solving Towers of Hanoi problem.
22. Write a program to exchange two numbers using pointers.
23. Write a program to read student records into a file. Record consists of roll no, name and Marks of a student in six subjects and class. Class field is empty initially. Compute the

class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.

24. A file consists of information about employee salary with fields employee id, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employee id, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions are user specified. Compute the Gross and Net salary of the employee and update the file.

25. Write a program to perform Base (decimal, octal, hexadecimal,…) conversions.

26. Write a program to find the square root of a number without using built-in library function.

27. Write C program to convert a string to number.

28. Write C program to generate multiplication tables from 11 to 20.

References:

1. “How to Solve it by Computer”, R.G. Dromey, Pearson.
2. “The C Programming Language”, Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. “Let us C”, YeswantKanetkar, BPB publications
4. “Pointers in C”, YeswantKanetkar, BPB publications.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.AnandaRao,Pearson Education.

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B.Tech - I Semester

L	T	P	C
0	0	3	1.5

(18ES0302) ENGINEERING & IT WORKSHOP PRACTICE
(Common to CE, MECH & CSE)

PART-A ENGINEERING WORKSHOP LAB

Course Objectives:

- To Study of different hand operated tools, uses and their applications
- To Know basic working knowledge, team work, precision and safety on production of various engineering products.
- To Provide a hands on experience of different engineering materials, tools, equipment and processes that are commonly used in the engineering fields.

Course Outcomes:

At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacture of components in different workshop trades.
- Identify and apply suitable tools for different trades of Engineering processes
- Apply basic electrical engineering knowledge for house wiring practice.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
	CO1	3	3	2											
	CO2	3	3	3		3									
	CO3	2	3			3									
	CO4	3	2		3	3									
	CO5	3	3												
	CO6								3						
	CO7									2					
	CO8										3				
	CO9												3		
		2.8	**2.8**	**2.5**	**3**	3	-	-	3	2	**3**	-	**3**	**3**	**2**

1. TRADES FOR EXERCISES:

At least TWO exercises from each trade:

I. Carpentry	:	T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint
II.Tin-Smithy	:	Square Tin, Rectangular Tray & Conical Funnel

At least ONE exercises from each trade:

III.Fitting	:	V-Fit, Dovetail Fit & Semi-circular fit
IV.Foundry	:	Preparation of Green Sand Mold using Single Piece and Split Pattern
V.Welding practice	:	Arc Welding & Gas Welding
VI.House-wiring	:	Parallel & Series, Two-way Switch and Tube Light
VII.Black Smithy	:	Round to Square, Fan Hook and S-Hook

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Tools in construction work and Wood Working.

NOTE: At least the total number of exercises must be SEVEN.

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage

2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech

2. Workshop Manual / Venkat Reddy/ BSP

PART-B IT WORKSHOP LAB

Course Objective:

- To provide Technical training to the students on Productivity tools like Wordprocessors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a Computer from the parts, preparing a computer for use by installing the operating System
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Learning Outcome:

- disassemble and assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C117. ENGINEERING AND IT WORKSHOP LAB	C117.1	2	3		2										
	C117.2	3				2				2					
	C117.3	2		3									3		
	C117.4	2									2		2		
	C117.5	3		2									3		
	C117.6								3						
	C117.7									2					
	C117.8										3				
	C117.9												3		
	C117	**2.4**	**3**	**2.5**	**2**	2	-	-	3	2	**2.5**	-	**2.7**	**2**	**3**

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals.

Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Networking and Internet Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.
Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, Skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending Messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Productivity tools
Task 5: Word Processor: Students should be able to create documents using the word Processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, Changing the font, changing the color, including images and tables in the word file, Making page setup, copy and paste block of text, images, tables, linking the images Which are present in other directory, formatting paragraphs, spell checking, etc. Studentsshould be able to prepare project cover pages, content sheet and chapter pages atthe end of the task using the features studied. Students should submit a user manualof the word processor considered.

Task 6: Spreadsheet: Students should be able to create, open, save the application Documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and Deleting cell data, format cells, adjust the cell size, applying formulas and functions, Preparing charts,+ sorting cells. Students should submit a user manual of the Spreadsheet Application considered.

Task 7: Presentations:creating, opening, saving and running the presentations, Selectingthe style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Task 8: Latex introduction, Document Structure, Typesetting Text, table of contents packages, math, adding pictures

Task 9: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I

B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

_ Desktop computer
_ Server computer
_ Switch (computer science related)

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B.Tech - II Semester

L	T	P	C
2	1	0	3

(18BSBH02) MATHEMATICS-II
(Common to all Branches)

Course Objectives:

- Methods of solving the differential equations of first and higher order.
- Evaluation of method of integration and it's applications.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line Surface and volume integrals.
- To understand Z-Transforms and its applications.

Course Outcomes: After learning the contents of this paper the student must be able to

- Have strong Knowledge on microprocessors and microcontrollers architectures
- Have strong Knowledge on 8051 architecture.memory organization and their timing diagrams
- Have strong Knowledge on instruction set,addressing modes
- Able to understand memory states and input output interfacing devices
- Able to understand interfacing to protocols like bluetooth and Zigbee

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C121: Mathematics – II	C121.1	3	3	-	-	-	-	-	-	-	-	-	-
	C121.2	3	3	-	-	-	-	-	-	-	-	-	-
	C121.3	3	3	-	-	-	-	-	-	-	-	-	-
	C121.4	3	3	-	--	--	--	--	--	--	--	--	--
	C121.5	3	3	3	-	-	-	-	-	-	-	-	-
	C121	3	3	3	-	-	-	-	-	-	-	-	-

UNIT – 1: First Order O.D.E

Exact - linear and Bernoulli's equations - Applications to Newton's law of cooling-Orthogonal trajectories. Equations of first order but not of first degree - equations solvable for p- equations solvable for y-equations solvable for x and Clairaut's type.

UNIT –2: Ordinary Differential Equations of higher order

Homogeneous and Non homogeneous linear differential equations of second and higher order with constant coefficients with RHS terms of type e^{ax} e^{ax} - sin ax- cos ax- polynomials in x- e^{ax} e^{ax} v(x) - xv(x).

UNIT –3: Multiple integrals

Multiple integral- double and triple integrals- change of order of integration. Applications to areas and volumes in Cartesian and polar coordinates using double and triple integral.

UNIT –4: Vector Calculus

Introduction-Vector differentiations-Vector differential operator- Gradient – Divergence-Curl and their properties - Vector integration - Line integral-Potential function – Area - Surface and volume integrals- Vector integrals theorems: Green's theorem - Stoke's and Gauss's Divergence theorem (without proof).

UNIT –5: Z-TRANSFORMS

Z-Transform - Inverse Z-transform- properties-Damping Rule – Shifting rule-Initial and Final value theorem - Convolution theorem –Introdution to difference equations -Solutions of difference equations by Z-transforms.

Text Books:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics Volume-I &II by T.K.V. Iyengar, S.Chand publication.

Reference Books:

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
2. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. Engineering Mathematics, volume-I&II, E. Rukmangadachari& E.Keshava Reddy Pearson Publishers.

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B.Tech - II Semester

L	T	P	C
3	0	0	3

(18BSBH09) APPLIED PHYSICS

Course Objectives:

- Will understand the basics of electronic materials
- Will recognize the basic concepts and applications of lasers and optical fibers
- Will understand the basic concepts of semiconductors, dielectrics, magnetic and nanomaterials.

Course Outcomes:

Studies will be familiar with

• The student would be able to learn the fundamental concepts on electronic materials

• The knowledge of fundamentals of Semiconductor physics, Nano materials, Lasers and fiber optics

• Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.

• The course also helps the students to be exposed to the phenomena of exposure on magnetic materials and dielectric materials.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C122: Applied Physics	C122.1	3	2	-									
	C122.2	2	3										
	C122.3	2	2	2									
	C122.4	3	2	-									
	C122.5	3	-	-									
	C122	2.6	2.25	2									

UNIT-I: Electronic Materials

Free electron theory , density of states and energy band diagrams – Energy bands in solids – E-K band diagram, direct and indirect band gaps, types of electronic materials: metals, semiconductors and insulators – occupation probability – Fermi level – effective mass.

UNIT-II: Lasers and Fibre Optics

Lasers: basic principle, characteristics, spontaneous and stimulated emission, Coherence, Principle and working of Laser, Population inversion, Pumping mechanism, Types of Lasers: Nd: YAG laser, He-Ne laser, Applications of laser.

Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Types of optical fibres: Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

UNIT-III: Semiconductor Physics

Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect, p-n junction diode, Zener diode and their V-I Characteristics.

UNIT-IV Dielectrics and Magnetic Materials

Introduction: Dielectric constant-Dipole moment –Various types of polarization –Electronic –ionic and orientional polarization -Clausius-Mossotti equation-Measurement of Dielectric constant – Application of dielectrics

Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

UNIT-V: Physics of Nano materials

Introduction of nano materials : Zero, one , two dimensional nano structures, surface to volume ratio– Quantum confinement –density of states and dependence of dimensionality –properties of nano materials physical and electrical-Synthesis of nano materials: Top down process: Ball milling –Bottom up process –Sol gel method , Application of Nano materials.

Text Books:

1. Engineering Physics-K.Thyagarajan,MCGrawHill Education Private Ltd, New Delhi.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

References:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc

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B.Tech - II Semester

L	T	P	C
3	0	0	3

(18HSBH01) TECHNICAL ENGLISH
(Common to CSE)

Course Objective:

- To enable the students to communicate in English for academic and social purpose
- To enable the students to acquire structures and written expressions required for the profession
- To enhance the study skills of the students with emphasis on LSRW skills
- To encourage investigating questions of the humanities throw rhetorical study
- To develop and practice and evaluative reading

Course Outcomes:

- Student can responding to a variety of situations and contexts calling for purposeful shifts in the voice, tone level of formality, design, medium and structure
- Become effective in the use of different modes of written communication in professional environment
- Well trained in LSRW skills and develop communicate competence
- Use key rhetorical concepts through analyzing and composing a variety of text
- Develop competence to apply different reading methods to evaluate a mass of data on the net and to glean the necessary information

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C123: Technical English	C123.1	3	-	-	-	-	-	-	-	-	3	-	-
	C123.2	3	-	-	-	-	-	-	-	-	2	-	2
	C123.3	3	-	-	-	-	-	-	-	3	-	-	-
	C123.4	3	-	-	-	-	-	-	-	-	-	-	3
	C123.5	3	-	-	-	-	3	-	-	-	-	-	-
	C123	3	-	-	-	-	3	-	-	3	2.5	-	2.5

UNIT – I

Chapter entitled " MEDIA MATTERS" from Mindscapes English for Technologists and Engineers

L - Techniques – Importance of Phonetics and Correct Pronunciation

S - Meet & Greet and Leave taking, Introducing Oneself and others (Formal and Informal situations)

R - Reading strategies - Skimming and Scanning

W - Writing strategies – Sentence structures

G - Parts of Speech – Noun -number, Pronoun- Personal Pronoun – Verb –analysis

V - Affixes – Prefix and Suffix – Root words, derivatives

UNIT – II

Chapter entitled "LESSONS FROM THE PAST" from Mindscapes English for Technologists and Engineers

L - Listening to details: Types of Listening 1. Discriminative listening 2. Comprehension

listening 3. Critical listening 4. Appreciative listening

S - Requesting, Making Polite Conversations and Role Play

R - Note Taking and Note Making Strategies

W - Paragraph Writing and Good qualities of Paragraph

G - Tenses – Present Tense, Past Tense and Future Tense

V - Homonyms, Homophones, Homographs, Synonyms and Antonyms

UNIT – III

Chapter entitled "TRAVEL AND TOURISM" from Mindscapes English for Technologists and Engineers

L - Listening to Speeches of Great leaders and Scientists

S - Accepting Invitations, Fixing a Time and Advising

R - Reading Tables, and Charts

W - Conversation, Role Play and autobiography

G - Types of Sentences (Simple, Complex and Compound)

V - Word formations and One –Word Substitutes

UNIT – IV

Chapter entitled "THE LOST LEAF" from American stories by O. Henry

L - Listening Dialogues and News

S - Expressing Ideas, Opinions and Telephone Skills

R - Reading Short Stories

W - Biography and Reporting Writing

G - Conditional Clauses and Voices

V - Fixed Expressions and Idioms

UNIT – V

Chapter entitled "SUNITA WILLIAMS" A Star in Space: Puffin Lives Kindle Edition by Aravinda Anatharaman

L - Types of Listening Speeches: ***Informative, Demonstrative, Persuasive , Entertaining***

S - Making Presentations (Mime and Guess, Mono action, Autobiography and Biography)
R - Reading for Entertainment (Humorous short skits)
W – Resume, CV and Cover letter
G - Direct Speech & Indirect Speech
V - Phrasal Verbs and Collocations

Text Books:

1. Mindscapes English for Technologists and Engineers Published by Orient Black Swan
2. American stories by O. Henry
3. A Star in Space: Puffin Lives Kindle Edition by **Aravinda Anatharaman**

References:

1. A. Textbook of English Phonetics for Indian Students by T. Balasubramanian, 2012
2. Communication Skills, Sanjay Kumar & Pushpalatha Oxford University Press
3. Every Day Dialogues in English – Robert J. Dixson, Prentice Hall of India
4. Raymond Murphy's English Grammar with CD, Murphy, Cambridge University Press, 2012

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B.Tech - II Semester

L	T	P	C
2	0	4	4

(18ES0301) ENGINEERING GRAPHICS & DESIGN
(Common to EEE & ECE & CSE)

Course Objectives:

- To gain an understanding of the basics of geometrical constructions of various planes and solids, understanding systems of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
- To learn about various projections, to understand complete dimensions and details of objects.
- Ultimately, students must get imaginary skills to put an idea of an object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

Course Outcomes:

At the end of the course, the student will be able to:

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C124: Engineering Graphics & Design	C124.1	3	2	2	-	-	-	-	-	-	1	-	-
	C124.2	3	3	3	-	-	-	-	-	-	1	-	-
	C124.3	3	3	3	-	-	-	-	-	-	1	-	-
	C124.4	3	3	3	-	-	-	-	-	-	2	-	-
	C124.5	3	3	3	-	-	-	-	-	-	2	-	-
	C124	3	2.8	2.8	-	-	-	-	-	-	1.4	-	-

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Dimensioning, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of regular Plane.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Auto CAD (for Practice only not for External Exam)

Introduction to CAD, Applications, commands, Tool bar, modeling of Simple parts, isometric problems.

Text Books:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai
3. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

Reference Books:

1. Engineering Drawing / BasantAgrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. A text Book of Engineering Drawing and Graphic, K.Venugopal New Age Publishin New Delhi, 2008.
4. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

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B.Tech - II Semester

L	T	P	C
3	0	0	3

(18PC0501) DATA STRUCTURES

Course Objectives:

- To understand the concepts of all types of Linked List.
- To understand the concepts of Stacks and Queues.
- To understand the concepts of Trees Graphs.
- To understand the concept of various Sorting techniques.
- To Understand the concept of various Searching and Collision Resolution techniques.

Course Outcomes:

- Able to implement all types of Linked List.
- Able to implement Stack and Queue Operations.
- Able to implement various Tree and Graph Operations.
- Able to implement all sorts of Sorting techniques.
- Able to implement various Searching techniques.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C125: Data Structures	C125.1	3	3	-	-	-	-	-	-	-	-	-	-
	C125.2	2	3	3	-	-	-	-	-	-	-	-	-
	C125.3	2	3	-	3	-	-	-	-	-	-	-	-
	C125.4	2	3	-	3	-	-	-	-	-	-	-	-
	C125.5	2	3	3	-	-	-	-	-	-	-	-	-
	C125	2.2	3	3	3	-	-	-	-	-	-	-	-

UNIT-I

Introduction and Overview: Asymptotic Notations, One-Dimensional Array, Multi-Dimensional Array, Pointer Array.

Linked Lists: Definition, Single Linked List, Circular Linked List, Double Linked List, Circular Doubly Linked List, Applications of Linked Lists.

UNIT-II

Stacks: Introduction, Definition, Representation of Stack, Operations on Stacks, Applications of Stacks.

Queues: Introduction, Definition, Representation of Queue, Various Queue Structures, Applications of Queues.

UNIT-III

Trees: Basic Terminologies, Definition and Concepts, Representation of Binary Tree, Operation on a Binary Tree, Types of Binary Trees- Binary search Trees, Heap Trees, Height Balanced Trees.

Graph: Introduction, Graph Terminologies, Representation of Graphs, Operations on Graphs, Application of Graph Structures: Shortest Path Problem- Warshall's Algorithm, Dijkstra's Algorithm, Topological Sorting.

UNIT-IV

Sorting: Sorting by Insertion- Straight Insertion Sort, List Insertion Sort, Binary Insertion Sort, Sorting by Selection- Straight Selection Sort, Heap Sort, Sorting by exchange- Bubble Sort, Shell Sort, Quick Sort, Sorting by Merging- Simple Merging, Binary merge, Merge Sort- Internal Merge Sort.

UNIT-V

Searching: Sequential search- Variations on Sequential Search, Binary Search, Analyzing Search Algorithms**.**

Tables: Hash Tables, Hashed List Searches, Basic Concepts, Hashing Methods, Collision Resolutions- Open Addressing, Closed Hashing**.**

Text Books

1. "Classic Data Structures ", Second Edition By Debasis Samanta, PHI.

Reference Books

1. Fundamentals of Data Structures in C- Horowitz, Sahni, Anderson, University Press, Second Edition.
2. Schaum' Outlines- Data Structures- Seymour Lipschutz, McGraw Hill, Revised First Edition.

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B.Tech - II Semester

L	T	P	C
0	0	3	1.5

(18BSBH11) PHYSICS LAB

Course Objectives:

- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- Illustrate the basics of mechanics, waves and optics to analyze the behavior and characteristics of various materials for its optimum utilization.
- Develop an ability to apply the knowledge of physics experiments in the latter studies

Course Outcomes:

- Recognize the important radius of curvature - Newton's Rings (PO1, PO2) (PO1, PO2,PO3)
- Acquired the practical application knowledge of optical fiber, resonance – series and parallel LCR circuits (PO1, PO2, PO3)
- Analyze the practical applications of dielectric and magnetic materials and crystal structure in various engineering feels. (PO1, PO2)
- Understanding of practical lasers by the study of their relative parameters. (PO1, PO2)
- Recognize power of prism – Spectrometer, material of p-n junction in various engineering tools (PO1,PO2,PO4)in various engineering fields. (PO1, PO2, PO4).
- Follow the ethical principles in implementing the experiments (PO8)
- Do experiments effectively as an individual and as a team member in a group. (PO9)
- Communicate verbally and in written form, the understanding about the experiments. (PO10)
- Continue updating their skill related to optical fiber, p-n junction, laser and LCR circuits in implementing experiments in future. (PO12)

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C126. ENGINEERING PHYSICS LAB	C126.1	3	2												
	C126.2	2	3	3											
	C126.3	2	3												
	C126.4	3	2			2									
	C126.5	3	2		3										
	C126.6								3						
	C126.7									2					
	C126.8										3				
	C126.9												3		
	C126	2.6	2.4	3	3	2	-	-	3	2	3	-	3	2	3

LIST OF EXPERIMENTS: (Any <u>Eight experiments</u> to be performed in a semester)

1. Determination of radius of curvature - Newton's Rings
2. Magnetic field along the axis of a current carrying coil - Stewart Gees' Apparatus
3. Determination of Energy gap of a material of p-n junction.
4. Dispersive power of prism – Spectrometer
5. Wavelength of a given laser source- Diffraction Grating
6. Optical fibre: Numerical Aperture and acceptance angle of an optical fibre
7. Diffraction grating: normal incidence method
8. Particle size determination -Laser
9. Study of B-H curve
10. Study of resonance – series and parallel LCR circuits

Reference Books:

1. Engineering Physics practical-NU Age Publishing House, Hyderabad
2. Engineering practical Physics – Cengage Learning, Delhi.

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B.Tech - II Semester

L	T	P	C
0	0	3	1.5

(18HSBH02) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common to CE, EEE, MECH & ECE)

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts

Course Objectives:

- To enable students to learn good pronunciation through stress on word accent, intonation and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence.
- To train students to use language appropriately for interviews, group discussion and public speaking.
- To enable students to read with correct pronunciation and Vocabulary development in today's life.

Course Outcomes:

- Understand the active participants in the learning process and acquire proficiency in spoken English.(PO1, PO8,PO10)
- Developing the Speak with clarity and confidence thereby enhances employability skills. (PO1, PO8, PO10)
- Second language learners can acquire fluency in spoken English and neutralize their mother tongue influence (PO8, PO9, PO10)
- Develop language appropriately for interviews, Group discussions and Public speaking.(PO8,PO9,PO10). (PO8, PO9, PO10, PO12)
- Understand the read with correct pronunciation and Develop Vocabulary.. (PO8, PO10, PO12).
- Follow the ethical principles in implementing the speaking skills. (PO8)
- Do discuss effectively as an individual and as a team member in a group. (PO9)
- Communicate verbally and in written form, the understanding about the language. (PO10)
- Continue updating their skill related to pronunciation, vocabulary, interview implementing skills in future. (PO12)

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C127. ENGLISH LANGUAGE COMMUNICATION SKILLS LAB	C127.1								3		2				
	C127.2								3		3				
	C127.3								2	3	3				
	C127.4								3	2	2				
	C127.5								2		3		3		
	C127.6								3						
	C127.7									2					
	C127.8										3				
	C127.9												3		
	C127	-	-	-	-	-	-	-	2.5	2.3	**2.6**	-	**3**	**2**	**2**

UNIT – I

LISTENING AND READING - PART

A. Reading – Vocabulary Development.

B. Listening – Speeches / Conversation/ Biographies.

UNIT – II

LISTENING AND READING - PART

A. Phonetics – Importance, Introduction to Sounds of English, Vowel and Consonants Sounds and Phonetic Transcription.

B. Word Stress, Syllabification, Rules of Word Stress, Intonation and Types of Intonations.

UNIT – III

WRITING - PART

A. Reports Writing and Types of Reports.

B. Resume/ CV and Cover Letter.

UNIT – IV

SPEAKING - PART

A. Self Introduction, Introducing the others, JAM and Role Play.

B. Describing objects/things/ places and people.

UNIT – V

PARTCIPATING - PART

A. Debate and Group Discussions.

B. Interview Skills (Basic types of Interviews, Do's & Don'ts in Interviews).

Suggested Software:

1. Clarity Pronunciation Power - Part I - Part II (Sky Pronunciation).

2. Walden Info Tech Software.

References:

1. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice –Hall of India Pvt.Ltd.
2. Speaking English Effectively, 2nd Edition Krishnn Mohan & NP Singh, 2011. (Macmillian).
3. A Hand book for English Laboratories, E.Suresh Kumar, P. Sreehari, Foundation Books, 2011.

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B.Tech - II Semester

L	T	P	C
0	0	3	1.5

(18PC0502) DATA STRUCTURES LAB

Course Outcomes:

- Analysis the program to short, search elements remove the duplicates ordered and unordered array(PO1, PO2)
- Develop the to perform the operations creations, insertions and deletion and traversing on a single linked list and doubly linked list (PO2)
- Implement stack queue, circular queue arrays and linked list (PO2, PO3)
- Develop the sort the element of the and array using selection sort, heap sort, insertion sort.(PO1,PO4). (PO8, PO9, PO10, PO12)
- Understand the linear and binary search on the element of a given array (PO4).
- Follow the ethical principles in implementing the programs. (PO8)
- Do discuss effectively as an individual and as a team member in a group. (PO9)
- Communicate verbally and in written form, the understanding about the programs. (PO10)
- Continue updating their skill related to operations, insertions, deletion arrays implementing skills in future. (PO12)

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C128. DATA STRUCTURE LAB	C128.1	3													
	C128.2	2	2												
	C128.3		2	3											
	C128.4	2			2										
	C128.5				3										
	C128.6								3						
	C128.7									2					
	C128.8										3				
	C128.9												3		
	C128	2.3	2	3	2.5	-	-	-	3	2	3	-	3	2	2

LIST OF EXPERIMENTS:

1. Write a “C” program to Sort (Bubble or Exchange Sorting) and Search elements of an Array.
2. Write a “C” program to remove Duplicates from an Ordered and Unordered Array.
3. Write a “C” program to perform the operations Creation, Insertion, Deletion and Traversing on a Single Linked List.
4. Write a “C” program to perform the operations Creation, Insertion, Deletion and Traversing on a Double Linked List.
5. Write a “C” program to implement Stack operations using Array and Linked List.
6. Write a “C” program to convert Infix expression to Postfix expression and evaluation of Postfix expression.
7. Write a “C” program to implement Queue operations using Array and Linked List.
8. Write a “C” program to implement Circular Queue operations using Array and Linked List.
9. Write a “C” program to perform different operations on Binary Search tree.
10. Write a “C” program to perform different operations on Binary tree.
11. Write a “C” program to implement DFS and BFS on Graphs.
12. Write a “C” program to sort the elements of an array using Selection sort.
13. Write a “C” program to sort the elements using Heap sort.
14. Write a “C” program to sort the elements using Insertion sort.
15. Write a “C” program to implement Quick sort using Recursive method.
16. Write a “C” program to perform Linear Search on the elements of a given array.
17. Write a “C” program to perform Binary Search on the elements of a given array.

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B.Tech - II Semester

L	T	P	C
0	0	0	0

(18MCBH02) ENVIRONMENTAL SCIENCE
(Common to all)

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Students will get sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable lifestyles etc.
- Students will realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approaches based on observation and self learning.
- Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
- By studying environmental sciences, students are exposed to the environment that enables one to find solutions to various environmental problems encountered on and often.
- At the end of the course, it is expected that students will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. This will enable every human being to live in a more sustainable manner.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Environmental Science	CO1	3	3	2	3	3							3
	CO2	2	3	2	3	3							2
	CO3	3	2	2	2	2							3
	CO4	2	2	3	3	2							2
	CO5	3	2	3	3	2							3
		2.6	2.4	2.4	2.8	2.4							2.6

UNIT-I ECOSYSTEMS:

Definition, Scope and Importance of ecosystem – Structure and function of an ecosystem – Energy flow in the ecosystem – Food chain, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-II NATURAL RESOURCES:

Classification of Resources: Living and Non-Living resources, **Water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III BIODIVERSITY AND BIOTIC RESOURCES:

Introduction Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-IV ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES:

Definition, Cause, effects and control measures of:

a. Air Pollution.

b. Water pollution

c. Soil pollution

d. Noise pollution

SOLID WASTE MANAGEMENT: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

E– WASTE MANAGEMENT: Definition of E-Waste, Effect of E-Waste on Humans and Environment, Treating and management of E-Wastes.

UNIT – V SOCIAL ISSUES AND THE ENVIRONMENT:

Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Climate change, global warming, acid rain, ozone layer depletion,– Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Text Books:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2. Environmental Studies by R. Rajagopalan, Oxford University Press.

Reference Books:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela.2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BSPublications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

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B.Tech - III Semester **L T P C**

3 0 0 3

(18BSBH04) PROBABILITY & NUMERICAL METHODS

Course Objectives:

- The main objective of this course is to provide student with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like climate prediction and computer network etc.
- Our emphasis will be more on conceptual understanding and application of Solution of Algebraic, Transcendental Equations and Numerical solutions of ordinary differential equations.

Course Outcomes:

After learning the contents of this course the student must be able to

- Use Probability, probability distributions in many places like academics, real life problems for decision making.
- Test of significance and hypothesis will be useful for them in taking decisions
- Gain knowledge to tackle engineering problems using the concepts of Numerical methods
- Apply interpolation concepts in solving problems.
- Apply Euler's method in problem solving.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
Probability and Numerical Methods	CO1	3	2	2	3	3						
	CO2	3	3	2	3	3						
	CO3	3	3	2	3	3						
	CO4	3	2	2	2	3						
	CO5	3	2	2	2	3						
		3	**2.4**	**2**	**2.6**	**3**						

UNIT I: Probability

Basic concepts of probability, Sample space, Addition theorem, - Conditional probability, independence. Bayes rule. Random variables – Discrete and continuous random variables, Expectation of random variables-probability density function - probability distribution function.

UNIT II: Distributions

Distributions –measures of central tendency-moments-skewness and kurtosis– Binomial Distribution - Poisson Distribution- Normal Distribution - related properties

UNIT III: Test of significance and hypothesis

Test of significance –student t-test – F-test - chi square test - estimation of proportions. Test of Hypothesis: Large sample test for single proportion - difference of proportions - single mean- difference of means, and difference of standard deviations.

UNIT – IV Numerical Method-I

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method

Interpolation: Finite differences-Forward differences- Backward differences- Newton's forward and backward interpolation formulae – Lagrange's formulae.

UNIT– V Numerical Method-II

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method - Modified Euler's Method - Runge-Kutta Method -Predictor-corrector method-Milne's Method.

Text Books:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000
2. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.
3. Statistical methods by S.P. Gupta, S.Chand publications.
4. Probability & Statistics by T.K.V. Iyengar, S.Chand publications.

REFERENCES:

1. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
2. Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
3. Probability and Statistics by R.A. Jhonson and Gupta C.B.
4. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.
5. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
6. Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

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B.Tech - III Semester

L	T	P	C
3	0	0	3

(18HS0112) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- The objective of this course is to equip the student with the basic inputs of Managerial Economics and
- Economic Environment of business and to enrich analytical skills in helping them take sound
- Financial decisions for achieving higher productivity.

Course Outcomes:

- The thorough understanding of Managerial Economics and Analysis of Financial Statements
- Facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in
- The challenging Business Environment.
- To understand how a business will maintain accounting books and the financial position of the business
- To understand how to make better decisions towards investment proposals.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Managerial Economics and Financial Analysis	CO1	3	2	-	-	-	-	-	-	-	-	-	-
	CO2	2	-	3	3	-	-	-	-	-	-	-	-
	CO3	2	2	3	2	-	-	-	-	-	-	-	-
	CO4	2	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	-
		2.4	2	3	2.5	-	-	-	-	-	-	-	-

UNIT I
INTRODUCTION TO MANAGERIAL ECONOMICS
Managerial Economics - Definition, nature and scope –Role of Managerial Economics in Business Decisions- Demand Analysis: Determinants- Law of Demand - Elasticity of Demand.
Significance – types – measurement of elasticity of demand - Demand forecasting- factors governing
Demand forecasting- methods of demand forecasting

UNIT II
THEORY OF PRODUCTION AND COST ANALYSIS
Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost
Combination of inputs - - laws of returns - Internal and ExternalEconomies of scale - **Cost Analysis**: Cost concepts- Time Value of Money - Break-Even Analysis (BEA) – ManagerialSignificance and limitations of BEA - Determination of Break Even Point (Simple Problems)

UNIT III
INTRODUCTION TO MARKETS AND FORMS OF BUSINESS ORGANIZATIONS
Market structures: Types of Markets - Perfect and Imperfect Competition - Features, Oligopoly -
Monopolistic competition. Price-Output determination - Pricing Methods and Strategies. Forms of
Business Organization – Sole Proprietorship- Partnership – Joint Stock Companies –National Income: Concepts-Inflation: Types – Business Cycle: Phases of business cycle

UNIT IV
INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS
Financial Accounting – Concept - emerging need and importance - Double-Entry Bookkeeping-
Journal - Ledger – Trial Balance - Financial Statements - - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Techniques –
Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

UNIT V
CAPITAL AND CAPITAL BUDGETING
Concept of Capital - Sources of Short term and Long term capital - Estimating Working Capital requirement – Capital budgeting – Features of Capital budgeting proposals – Methods and Evaluation of Capital budgeting – Payback Method –Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems).

Text Books:
1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

References:

1. Premchand Babu, Madan Mohan:Financial Accounting and Analysis,Himalaya, 2009
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2009.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Dominick Salvatore: Managerial Economics in a Global Economy, Cengage,2009.
5. H.L.Ahuja: Managerial Economics, S.Chand, 3/e, 2009
6. Gupta G.S., Managerial Economics, TaTa Mc Gra Hill
7. Joel Dean, Managerial Economics, Prentice Hall

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B.Tech - III Semester

L	T	P	C
3	0	0	3

(18PC0503) DATABASE MANAGEMENT SYSTEMS

Course Objectives:

The objective of the course is to present an introduction to database management systems, with an Emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes:

Upon successful completion of this course, students should be able to:

- Explain the basic concepts of relational data model, entity-relationship model, relational Database design, relational algebra and SQL.
- Design ER-models to represent simple database application scenarios
- Convert the ER-model to relational tables, populate relational database and formulate SQL Queries on data.
- Improve the database design by normalization.
- Familiar with basic database storage structures and access techniques: file and page Organizations, indexing methods including B tree, and hashing.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Database Management Systems	CO1	3	1	2	-	-	-	-	-	-	-	-	3
	CO2	3	3	3	2	3	2	-	-	-	-	-	3
	CO3	3	3	3	2	1	1	-	-	-	-	-	-
	CO4	3	3	3	2	-	-	-	-	-	-	-	2
	CO5	3	3	3	-	-	-	-	-	-	-	-	2
		3	**2.6**	**2.8**	**2**	**2**	**1.5**	**-**	**-**	**-**	**-**	**-**	**2.5**

UNIT I:

The Worlds of Database Systems -The Evolution of Database Systems - Overview of a Database Management System.

thr Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).

UNIT II:

E/R Relationship model:

Elements of E/R Model – Design Principles – The Modeling of Constraints – Weak Entity Sets.

The Relational Data Model – Basics of the Relational Model – From E/R Diagrams to Relational Designs – Converting Subclass Structures to Relations.

Relational database design: Domain and data dependency, Normal forms, Dependency preservation, Lossless design.

UNIT-III

The Database Language SQL – Simple Queries in SQL – Queries Involving More than One Relation – Subqueries – Full Relation Operations – Database Modifications – Defining a Relation Schema in SQL – View Definitions Transactions in SQL – Serializability, Atomicity, Transactions, Read only Transactions, Dirty Reads, Other isolation level

UNIT-IV

Representing Data Elements – Data Elements and Fields – Records – Representing Block and Record Addresses – Variable Length Data and Records – Record Modifications.

Index Structures – Indexes on Sequential Files – Secondary Indexes – B-Trees – Hash Tables.

UNIT V:

Coping with System Failures – Issues and Models for Resilient Operation – Undo Logging – Redo Logging – Undo/Redo Logging – Protecting Against Media Failures.

Concurrency Control – Serial and Serializable Schedules – Conflict Serializability – Enforcing Serializability by Locks – Locking Systems with Several Lock Modes -- Concurrency Control by Timestamps – Concurrency Control by Validation.

Text Books:

1. Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F.Kort h, S. Sudarshan, McGraw-Hill.
2. Data base Management Systems‖, Raghu Rama Krishnan, Johannes Gehrke, McGraw
   Hill, 3rd Edition.

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B.Tech - III Semester

L	T	P	C
3	0	0	3

(18ES0405) ANALOG ELECTRONIC CIRCUITS

Course Objectives:

- To give understanding on semiconductor physics of the intrinsic, P and N materials, characteristics of theP-N junction diode.
- To understand the operation of various Electronic devices such as Diodes, BJT, JFET and MOSFET.
- To understand various applications of diode and special purpose electronic devices.
- To understand the design of various biasing circuits of BJT and JFET.

Course Outcomes:

At the end of this course students will demonstrate the ability to

- Understand the principles of semiconductor Physics
- Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems. Design and analyze basic transistor circuits using BJT and FET
- Have strong knowledge on amplifier models and 555 timer IC(Monostable and astable operation) & its applications
- Able to design different amplifiers, differentiators, Integrators using OP-Amps
- Acquire knowledge on the types of modulations and communication systems

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Analog Electronic Circuits	CO1	3	3	2	3	3							3
	CO2	2	3	2	3	3							2
	CO3	3	2	2	2	2							3
	CO4	2	2	3	3	2							2
	CO5	3	2	3	3	2							3
		2.6	2.4	2.4	2.8	2.4							2.6

UNIT-I

Introduction to semiconductors physics, Diode Circuits and small signal switching models, Rectifiers-types and Filters, Avalanche breakdown, Zener diode, Varactor diode, Tunnel Diode Schottky diode, LED, photodiode and solar cell, UJT.

UNIT-II

Bipolar Junction Transistor, I-V characteristics, Ebers-Moll Model, MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, and small signal models of MOS transistor, Biasing schemes for BJT and FET, bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features, Bias compensation, Thermal runaway, Thermal stability.

UNIT- III

Amplifier models: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier, Feedback topologies: Voltage series, current series, voltage shunt, current shunt,

Oscillators:

IC 555 and its applications as astable and mono-stable multi-vibrators Barkhausen's criteria for oscillation, R-C phase shift and Wein bridge oscillator.

UNIT-IV

OP-AMP applications: review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, Instrumentation Amplifier precision rectifier, Schmitt trigger and its applications. **Active filters:** Low pass, high pass, band pass and band stop, design guidelines

UNIT-V

Electronic Communication Systems: The elements of communication system, IEEE frequency
spectrum, Transmission media: wired and wireless, need of modulation, AM and FM modulation
schemes, Mobile communication systems: cellular concept and block diagram of GSM system.

Text Books:

1. J. Millman, C. Halkias, "Electronic Devices and Circuits", Tata Mc-Graw Hill, 4thEdition,2010.
2. R.L. Boylestad and Louis Nashelsky,"Electronic Devices and Circuits",Pearson Publications,,9thEdition,2006.
3. D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (p) Ltd,
4. Simon Haykin, "Communication Systems", Wiley-India edition, 3rd edition, 2010.

References:

1. Jacob Millman, C. Halkies, C.D.Parikh, "Integrated Electronics", Tata Mc-Graw Hill, 2009.
2. BV Rao, KBR Murty, K Raja Rajeswari, PCR Pantulu, "Electronic Devices and Circuits", Pearson, 2nd edition.
3. Salivahanan, Kumar, Vallavaraj, "Electronic Devices and Circuits", Tata Mc-Graw Hill, Second Edition

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B.Tech - III Semester

L	T	P	C
3	1	0	3

(18ES0407) DIGITAL LOGIC DESIGN

Course Outcomes :

- Have basic Knowledge on fundamental concepts used for digital number systems(postulates of Boolean algebra)
- Able to minimize Boolean expressions using K-MAP,Standard forms and canonical forms
- Able to analyze and synthesize combinational circuits like comparators,multipliers,decoders etc,
- Able to analyze and synthesize sequential circuits like latches,Flip Flops,counters shift registers
- Have Knowledge on concepts of programmable logic devices and memory elements

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Digital Logic Design	CO1	3	1	1	1	1							3
	CO2	3	2	2	2	2							3
	CO3	3	2	2	3	2							3
	CO4	3	3	2	2	3							3
	CO5	3	3	3	3	3							3
		3	**2.2**	**2**	**2.2**	**2.2**							**3**

UNIT I

BINARY SYSTEMS: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, **BOOLEAN ALGEBRA AND LOGIC GATES:** Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates.

UNIT II

GATE – LEVEL MINIMIZATION: The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Simplification using Tabular method.

UNIT III

COMBINATIONAL LOGIC: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Binary Multiplier, Decoders, Encoders, Multiplexers.

UNIT IV

SYNCHRONOUS SEQUENTIAL LOGIC: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters.

UNIT V

MEMORY AND PROGRAMMABLE LOGIC: Random access memory, memory decoding, Read-only Memory, Programmable Logic Array, Programmable Array Logic.
DIGITAL LOGIC CIRCUITS: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), CMOS Logic, Comparisons of Logic Families.

TEXT BOOKS:

1. Digital Design, M.Morris Mano & Micheal D. Ciletti, Pearson, 5th Edition, 2013.
2. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012.

REFERENCES:

1. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2. Fundamentals of Logic Design, 5/e, Roth, Cengage
3. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
4. Digital Logic Design, Leach, Malvino, Saha,TMH
5. Modern Digital Electronics, R.P. Jain, TMH

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B.Tech - III Semester

L	T	P	C
0	0	3	1.5

(18PC0504) DATABASE MANAGEMENT SYSTEMS LAB

Course Objectives:

- To create a database and query it using SQL, design forms and generate reports.
- Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

Course Outcomes:

- Design simple databases
- Retrieve information from databases
- Use procedures to program the data access and manipulation
- Create user interfaces and generate reports
- Develop solutions using database concepts for real time requirements
- Follow the ethical principles in implementing the programs
- Do experiments effectively as an individual and as a team member in a group
- Communicate verbally and in written form, the understanding about the experiments
- Continue updating their skill related to integrity constraints, referential integrity constraints,assertions and triggers implementing databases in future

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Database Management Systems Lab	CO1	3	2	3		3									
	CO2	3				3									
	CO3	3	3			3									
	CO4	3	2	2	2	3									
	CO5	3	3	3	3	3									
	CO6								3						
	CO7									2					
	CO8										3				
	CO9												3		
		3	**2.5**	**2.6**	**2.5**	3	-	-	3	2	**3**	-	**3**	**3**	**2**

LIST OF EXPERIMENTS:

1. Practice session: Students should be allowed to choose appropriate DBMS software, install it, configure it and start working on it. Create sample tables, execute some queries, use SQLPLUS features, use PL/SQL features like cursors on sample database. Students should be permitted to practice appropriate User interface creation tool and Report generation tool.

2. A college consists of number of employees working in different departments. In this context, create two tables employee and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed and updated later. Department contains deptno, deptname, and description columns. Deptno is the primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the the database:
   - Create tables department and employee with required constraints.
   - Initially only the few columns (essential) are to be added. Add the remaining columns separately by using appropriate SQL command
   - Basic column should not be null
   - Add constraint that basic should not be less than 5000.
   - Calculate hra,da,gross and net by using PL/SQL program.
   - Whenever salary is updated and its value becomes less than 5000 a trigger has to be raised preventing the operation.
   - The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.
   - The percentage of hra and da are to be stored separately.
   - When the da becomes more than 100%, a message has to be generated and with user permission da has to be merged with basic.
   - Empno should be unique and has to be generated automatically.
   - If the employee is going to retire in a particular month, automatically a message has to be generated.
   - The default value for date-of-birth is 1 jan, 1970.
   - When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped.
   - Display the information of the employees and departments with description of the fields.
   - Display the average salary of all the departments.
   - Display the average salary department wise.
   - Display the maximum salary of each department and also all departments put together.
   - Commit the changes whenever required and rollback if necessary.
   - Use substitution variables to insert values repeatedly.
   - Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value.
   - Find the employees whose salary is between 5000 and 10000 but not exactly 7500.
   - Find the employees whose name contains ‘en’.
   - Try to delete a particular deptno. What happens if there are employees in it and if there are no employees.
   - Create alias for columns and use them in queries.

- List the employees according to ascending order of salary.
- List the employees according to ascending order of salary in each department.
- Use '&&' wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately.
- The retirement age is 60 years. Display the retirement day of all the employees.
- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at retirement time.
- Find the employees who are born in leap year.
- Find the employees who are born on feb 29.
- Find the departments where the salary of atleast one employee is more than 20000.
- Find the departments where the salary of all the employees is less than 20000.
- On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months. Write procedures for it.
- As a designer identify the views that may have to be supported and create views.
- As a designer identify the PL/SQL procedures necessary and create them using cursors.

Use appropriate Visual programming tools like oracle forms and reports, visual basic etc to create
user interface screens and generate reports.
Note: As a designer identify other operations that may be required and add to the above list. The above operations are not in order. Order them appropriately. Use SQL or PL/SQL depending on the requirement.

3. Students may be divided into batches and the following experiments may be given to them to better understand the DBMS concepts. Students should gather the required information, draw ER diagrams, map them to tables, normalize, create tables, triggers, procedures, execute queries, create user interfaces, and generate reports.
    - Student information system
    - APSRTC reservation system
    - Hostel management
    - Library management
    - Indian Railways reservation
    - Super market management
    - Postal system
    - Banking system
    - Courier system
    - Publishing house system

References:

1. "Oracle Database 11g PL/SQL Programming", M.McLaughlin,TMH.
2. "Learning Oracle SQL and PL/SQL", Rajeeb C. Chatterjee, PHI.
3. "Introduction to SQL", Rick F.VanderLans, Pearson education.
4. "Oracle PL/SQL", B.Rosenzweig and E.Silvestrova, Pearson education.

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B.Tech - III Semester

L	T	P	C
0	0	3	1.5

(18ES0406) ANALOG ELECTRONIC CIRCUITS LAB

Course Objectives:

- *This Lab* provides the students to get an electrical model for various semiconductor devices.
- Students can find and plot V_I characteristics of all semiconductor devices. Student learns the practical applications of the devices.
- Students can find and plot Input & Output characteristics of BJT's and FET's
- Students can understand the oscillators and communication systems

Course Outcomes:

- Have Practical Knowledge on r,l,c components(colour codes)testing,identification,Specifications,potentiometers,coils,Gang Condensers,Relay,Bread Boards,bjts,fets,leds,lcds,etc
- Have Knowledge on PN diode,zener diode v-I characteristics ,different rectifiers
- Have practical on BJT characteristics
- Able to verify applications of various oscillators
- Able to experience real time behaviour of analog modulation schemes

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Analog Electonic Circuits Lab	CO1	3	3	3		3				2			3		
	CO2	3	3	3	2	3							3		
	CO3	3	3	3	2	3				2			3		
	CO4	3	2	3	2	3				3					
	CO5	3				3									
	CO6														
	CO7														
	CO8														
	CO9														
		3	2.2	3	2	3	-	-	-	2.3	-	-	3	3	2

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs,.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: List of Experiments

(For Laboratory Examination-Minimum of Eight Experiments)

1. P-N Junction Diode Characteristics (Forward bias & Reverse bias)
2. Zener Diode Characteristics (Forward bias & Reverse bias)
3. Half-wave Rectifier & Full-wave Rectifier (without and with filter)
4. BJT Input & Output Characteristics (CE Configuration)
5. FET Transfer & Output Characteristics (CS Configuration)
6. Transistor Biasing
7. Transistor acts as a switch
8. CRO Operation and its Measurements
9. RC Oscillator
10. LC Oscillator
11. FM Modulation & Demodulation

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B.Tech - III Semester

L	T	P	C
0	0	2	1

(18HSBH03) SOFT SKILLS
(Common to all)

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts

Course Objectives:

- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking and interviews and group discussion

Course Outcomes:

- Become active participants in the learning process and acquire proficiency in spoken English
- Speak with clarity and confidence thereby enhances employability skills.
- Apply Time management in real life.
- Prepare effective presentations in professional and personal life also.
- Inculcate leadership skills in ones personality.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Soft Skills	CO1	3	2	2									3
	CO2	3	2	2									3
	CO3	3	2	2									3
	CO4	3	2	3									3
	CO5	3	2	3									3
		3	2	2.6									3

UNIT – I

1. Communication skills
2. Introducing yourself
3. Story telling
4. Telephonic communication

UNIT – II

1. Writing skills
2. Narrating an images
3. Business letters
4. E-mail writing
5. Report writing

UNIT – III

1. Time Management and Goal setting

UNIT – IV

1. Making effective presentations
2. Speaking on various occasions
3. Resume preparations

UNIT – V

1. Group discussions
2. Interview skills
3. Leaderships skills

Sugested Software:

1. K – Van Advanced Communication Skills
2. Globareena Communication skills Software

References:

1. D. Sudha Rani, A Manual for English language Laboratory, Pearson Education.
2. D. Sudha Rani, Advanced Communication Skills Laboratory, Pearson Education.
3. R. Manivannan and G.Immanueal, Communication Skills Laboratory, VK .Publications
4. Nira Kumar, English Language laboratories, PHI Learning Pvt.Ltd.New Delhi.

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B.Tech - III Semester

L	T	P	C
0	0	0	0

(18MCBH03) CONSTITUTION OF INDIA

Course Objectives:

Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes:

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.
- Know about articles and can utilize them for the betterment of human life.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Constitution of India	CO1	3	2	2			2		3				3
	CO2	3	2	2			2		3				3
	CO3	3	2	2			2		3				3
	CO4	3	2	2			2		3				3
	CO5	3	2	2			2		3				3
		3	**2**	**2**			**2**		**3**				**3**

UNIT-I

- Meaning of the Constitution Law

UNIT-II

- Historical Perspective of the Constitution of India
- Salient features and characteristics of the Constitution of India

UNIT-III

- Scheme of the fundamental rights
- The scheme of the Fundamental Duties and its legal status
- The Directive Principles of State Policy – Its importance and implementation
- Federal structure and distribution of legislative and financial powers between the Union and the States

UNIT-IV

- Parliamentary Form of Government in India – The constitution powers and status of the President of India.
- Amendment of the Constitutional Powers and Procedure.
- The historical perspectives of the constitutional amendments in India.
- Emergency Provisions : National Emergency, President Rule, Financial Emergency

UNIT-V

- Local Self Government – Constitutional Scheme in India.
- Scheme of the Fundamental Right to Equality.
- Scheme of the Fundamental Right to certain Freedom under Article 19

- Scope of the Right to Life and Personal Liberty under Article 21

Text Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Framing of Indian Constitution, Dr. S. N. Busi, Dr. B. R. Ambedkar 1st Edition, 2015

Reference Books:

1. Indian Constitution Law, M. P. Jain 7th Edn., Lexis Nexis, 2014.
2. Introduction to the Constitution of India, D.D. Basu, Lexis Nexis, 2015.

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18BSBH07) DISCRETE MATHEMATICS

Course Objectives:

Throughout the course, students will be expected to demonsrate their understanding Disctrete Mathematics by being able to do each of the following:

- Use mathematically correct terminology and notation.
- Construct correct direct and indirect proofs.
- Use division into cases in a proof.
- Use counterexamples.
- Apply logical reasoning to solve a variety of problems.

Out comes:

- For a given logic sentence express it in terms of predicates, quantifiers,and logical connectives
- Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
- For a given a mathematical problem, classify its algebraic structure
- For a given a problem, derive the solution using logic and prove the solution based on logical inference
- Develop the given problem as graph network and solve with techniques of graph theory

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Discrete Mathematics	CO1	3	2	2	1	-	-	-	-	-	-	-	-
	CO2	3	2	2	1	-	-	-	-	-	-	-	-
	CO3	3	2	2	1	-	-	-	-	-	-	-	-
	CO4	3	2	3	2	-	-	-	-	-	-	-	-
	CO5	3	2	2	1	-	-	-	-	-	-	-	-
		3	**2**	**2.2**	**1.2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Unit - I: Sets, Relations and Functions

Sets : The Concepts of a Set- The Cardinality of a Set- Operations with Sets- Computer Operations with Sets- Recursively Defined Sets.

Relations: Relations and Digraphs - Computer Representations of Relations- Properties of Relations - Operations on Relations- Transitive Closure- Equivalence Relations- Partial and Total Ordering.

Functions: The concept of Function- Special Functions-Properties of Functions - The Pigeonhole principle

The Language of Logic: Propositions - Logical Equivalences – Quantifiers- Arguments- Proof methods.

Unit – II: Algebraic Structures

tAlgebraic Systems- Semi groups and Monoids- Groups- Subgroups Normal Subgroups and Homomorphisms.

Lattices & Boolean Algebra: Lattices as Partially Ordered Sets- Properties of Lattices- Lattices as Algebraic Systems- Sub lattices- Direct Product and Homomorphism- Boolean algebra- Boolean Functions

Unit – III: Combinatorics:

The Fundamental Counting Principles – Permutations- Derangements- Combinations- Permutations and Combinations with Repetitions- The Binomial Theorem- The Generalized Inclusion- Exclusion Principle.

Unit -IV: Induction and Algorithms: The Division Algorithm- Divisibility Properties- Non decimal Bases- Mathematical Induction - Algorithm Correctness- The Growth Functions- Complexity of Algorithms.

Recursion: Recursively Defined Functions- Solving Recurrence Relations- Generating Functions-Recursive Algorithms- Correctness of Recursive Algorithms- Complexities of Recursive Algorithms.

Unit – V: Graphs: Graphs- Isomorphic Graphs- Paths- Cycles- and Circuits- Eulerian and Hamiltonian Graphs Planar Graphs- Graph Coloring- Digraphs- Computer Representation of Graphs – DAGs- Weighted Digraphs- DFS and BFS Algorithms.

Trees: Trees- Spanning Trees- Minimal Spanning Trees-Kruskal‘s and Prim‘s Algorithm- Rooted Trees- Binary Trees- and Binary Search Trees.

.**Text Books:**

1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier Academic Press.
2. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, TMH

Reference Books:

1. Discrete and Combinatorial Mathematics, Fifth Edition, R. P. Grimaldi, B.V. Ramana, Pearson
2. Discrete Mathematics Theory and Applications, D.S Malik and M.K. Sen, Cengage Learning
3. J .L.Mott, A.Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and

Mathematicians, second edition 1986, Prentice Hall of India
4. C.L.Liu, Elements of Discrete Mathematics, Second Edition 1985, McGraw-Hill Book Company. Reprinted 2000
5. Discrete Mathematics, Norman L. Biggs, Second Edition, OXFORD Indian Edition.
6. K.H.Rosen, Discrete Mathematics and applications, 5th Edition 2003, TataMcGrawHill publishing Company
7. Graph Theory with Applications to Engineering & Computer Science: NarsinghDeo, PHI (2004)
8. Discrete Mathematical Structures‖ JayantGanguly, Sanguine

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18PC0505) COMPUTER ORGANIZATION

Prerequisite:

- Knowledge in Digital Logic Design.

Course Objectives:

- To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design.
- To make the students understand the structure and behavior of various functional modules of a computer.
- To understand the techniques that computers use to communicate with I/O devices.
- To study the concepts of pipelining and the way it can speed up processing.
- To understand the basic characteristics of multiprocessors.

COURSE OUTCOMES:

- Ability to use memory and I/O devices effectively.
- Able to explore the hardware requirements for cache memory and virtual memory.
- Able to CPU organization, assess its performance, and apply design techniques to enhance performance.
- Able to design logic for arithmetic units.
- Ability to design algorithms to exploit pipelining and multiprocessors.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Computer Organization	CO1	3	2	-	-	-	-	-	-	-	-	-	-
	CO2	3	2	-	-	-	-	-	-	-	-	-	-
	CO3	3	1	-	-	-	-	-	-	-	-	-	-
	CO4	3	1	3	-	-	-	-	-	-	-	-	-
	CO5	3	2	2	-	-	-	-	-	-	-	-	-
		3	**1.6**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I:

Basic Structure of Computer: Computer Types, Functional Units, Basic Operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations.

UNIT II:

Arithmetic: Addition and Subtraction of Signed Numbers, Design and Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, Multiprogrammed Control.

UNIT III:

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

Register Transfer: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations

UNIT IV:

Input/output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

UNIT V:

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Parallel Processing: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose Multiprocessors, Interconnection Networks

OR

Embedded Systems: Examples of Embedded Systems, Processor Chips for Embedded Applications, A Simple Micro Controller, I/O Device Timing Constraint.

Text Books:

1."Computer Organization", Carl Hamacher, ZvonkoVranesic, SafwatZaky, McGraw Hill Education, 5th Edition, 2013**.**

2.Computer System Architecture, M.Morris Mano, Pearson Education, 3rd Edition, 2007

References:

1.Computer Organization and Architecture, Themes and Variations, Alan Clements, CENGAGE Learning.

2.Computer Organization and Architecture, Smruti Ranjan Sarangi, McGraw Hill Education.

3.Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18PC0506) DESIGN AND ANALYSIS OF ALGORITHMS

Prerequisite:

- Knowledge in Programming Language Like C
- Knowledge in Data Structures

Course Objectives:

- To know the importance of the complexity of a given algorithm.
- To study various algorithm design techniques.
- To utilize data structures and/or algorithmic design techniques in solving new problems.
- To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
- To study some techniques for solving hard problems.

Course Outcomes:

- Analyze the complexity of the algorithms
- Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
- Employ graph algorithms to model engineering problems, when appropriate.
- Able to prove that a certain problem is NP-Complete.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Design and Analysis of Algorithms	CO1	3	2	-	-	-	-	-	-	-	-	-	-
	CO2	3	-	3	3	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	2
		3	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

UNIT I

Introduction: What is an Algorithm, Algorithm specification, Performance Analysis.

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Stassen's matrix multiplication.

UNIT II

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.

Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

UNIT III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8 – Queens Problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles, Knapsack Problem.

UNIT IV

Branch and Bound: The General method, Travelling salesperson, 0/1 Knapsack problem, Efficiency Considerations.

Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure.

UNIT V

NP – Hard and NP – Complete Problems: Basic Concepts- The Classes NP-Hard and NP-Complete, Cook's Theorem. NP Hard Scheduling Problems,

Text Book:

1. Fundamentals of Computer Algorithms‖, Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press.2014.

References:

1. Design and Analysis of Algorithms‖, Parag Himanshu Dave, Himanshu Bhalchandra Dave, Pearson Education, Second Edition, 2009.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein,
PHI Pvt. Ltd. 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. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
5. Design and Analysis of algorithms‖, Aho, Ullman and Hopcroft,Pearson education.
6. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18PC0507) OOPS USING JAVA

Course Objectives:

- Understand the need of object oriented programming
- Understand the basic object oriented programming concepts and apply them in problem solving.
- Illustrate inheritance concepts for reusing the program.
- Demonstrate on the multi-tasking by using multiple threads
- Understand the basics of java console and GUI based programming

Course Outcomes:

- Understand the basics of computer programming. The problem solving approaches in different programming languages, variables, operators
- Understand the purpose of control statements: selection and looping statements
- Analyze the usefulness of Inheritance paradigm. To identify Inheritance relationship in any problem statement
- Use multithreading concepts to develop inter process communication.
- Build the internet-based dynamic applications using the concept of applets.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
OOPS Using Java	CO1	3	-	-	-	-	-	-	-	-	-	-	-
	CO2	3	2	2	-	2	-	-	-	-	-	-	-
	CO3	3	2	2	-	2	-	-	-	-	-	-	-
	CO4	3	2	3	-	3	-	-	-	-	-	-	3
	CO5	3	2	3	-	3	-	-	-	-	-	-	3
		3	**2**	**2.5**	**-**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

UNIT I: An Overview of Java:
Evolution of java, Object Oriented Programming,, Using blocks of codes, Lexical issues, the java class Libraries.
Arrays and Variables:
Data types, Type conversion and casting, Automatic Type Promotion in Expressions, Arrays, strings,

UNIT II: Operators:
Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logic operators, The assignment operator, The ? Operator, Operator Precedence, Using Parentheses.
Control Statements: Java's selection Statements, Iteration statements, Jump Statements**.**
Introducing Classes: Class Fundamentals, Declaring Objects, Assuming Object reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The Finalize() method,
Stack class. Overloading Methods, Using Object as Parameter, Argument Passing, Returning Objects, Recursion, Introducing Access control, Understanding static, Introducing Nested and Inner classes, Exploring the String class, Using Command line Arguments

UNIT III: Inheritance:
Basics, Using super, creating a multi-level hierarchy, when constructors are executed, method overriding, dynamic method dispatch, using abstract class, using final with inheritance, the object class.
Packages and Interfaces:
Packages, Access protection, Importing Packages, Interfaces, Default Interfaces, Default interface methods, Use static methods in an Interface, Final thoughts on Packages and interfaces.

UNIT-IV: Exception Handling:
Exception handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java Built-in Exceptions, Creating your own exception subclasses, Chained Exceptions, Three Recently added Exceptions features, Using Exceptions.
Multithreaded Programming:
The java Thread Model, The main thread , Creating Thread, Creating Multiple Threads, Using is Alive() and join(), Thread Priorities, Synchronization, Inter thread Communication, Suspending, resuming and stopping threads, Obtaining a thread state, Using Multithreading.

UNIT-V: I/O, Applets, and generics:
I/O basics, Reading Console input, Writing console Output, The Print Writer class, Reading and writing files, automatically closing a file, Applet fundamentals, Enumerations type wrappers auto boxing annotations, Generics: The general form of a Generics class, creating a generic method, generics interfaces.
Introduction the AWT: Working with windows, graphics and Text:
AWT classes, window fundamentals, working with frame windows, creating a frame window in a an AWT Based applet, creating a window program, displaying information within a window, Graphics, working with color, setting the paint mode, working with fonts, managing text output using font metrics,.

Text Books:

1."Java The Complete Reference", Herbert Schildt, MC GRAW HILL Education, 9th Edition,2016.

References:

1. "Programming with Java" T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2."Java Fundamentals - A Comprehensive Introduction", Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3."Java – How to Program", Paul Deitel, Harvey Deitel, PHI.
4."Core Java", NageswarRao, Wiley Publishers.
5."Thinking in Java", Bruce Eckel, Pearson Education.
6."A Programmers Guide to Java SCJP", Third Edition, Mughal, Rasmussen, Pearson.
7."Head First Java", Kathy Sierra, Bert Bates, O'Reilly "SCJP – Sun Certified Programmer for Java
8.Study guide" – Kathy Sierra, Bert Bates, McGrawHill

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18PC0508) SOFTWARE ENGINEERING

Course Objectives:

- Understand the need of object oriented programming
- Understand the basic object oriented programming concepts and apply them in problem solving.
- Illustrate inheritance concepts for reusing the program.
- Demonstrate on the multi-tasking by using multiple threads
- Understand the basics of java console and GUI based programming

Course Outcomes:

- Demonstrate knowledge on fundamentals of software engineering methods and software process models.
- Identify software requirements and design SRS document by analyzing the data flows.
- Design class based components and conduct component level design based on architectural styles and patterns
- Identify various types of testing and development metrics for various phases of software development
- Identify the software risks and analyze the quality assurance activities

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Software Engineering	CO1	3	2	-		-	-	-	-	-	-	-	-
	CO2	3	-	3	3	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	-
		3	2	3	2.5	-	-	-	-	-	-	-	-

UNIT - I :

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive
Process Models, Specialized Process Models, The Unified Process, Personal and Team Process
Models, Process Terminology, Product and Process.

UNIT – II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterise of a Design?, Layered Arrangement of Modules, Approaches to Software Design.

UNIT – III :

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis,
Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review,
Over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User
Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT – IV :

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing,

UNIT – V :

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

TEXT BOOKS :

1.Software Engineering A practitioner‘s Approach, Roger S. Pressman, Seventh Edition, McGrawHill International Edition.
2.Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.

REFERENCES:

1.Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
2.Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3.Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
4.Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

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B.Tech - IV Semester

L	T	P	C
0	0	3	1.5

(18PC0509) OOPS USING JAVA LAB

Course Objectives:

- Learn to use object orientation to solve problems and use java language to implement them.
- To experiment with the syntax and semantics of java language and gain experience with java programming

Course Outcomes:

- Ability to write portable programs which work in all environments
- Ability to create user friendly interfaces
- Ability to solve the problem using object oriented approach and design solutions which are robust
- Able to write multithreaded programs and event handling programs
- Able to write programs for real time applications.
- Follow the ethical principles in implementing the programs
- Do experiments effectively as an individual and as a team member in a group
- Communicate verbally and in written form, the understanding about the experiments
- Continue updating their skill related to oops concepts, threads,applet and interfaces implementing programs in future

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
JAVA PROGRAMMING LAB	C228.1	3	2	3		3									
	C228.2	3	2	3		3									
	C228.3	3	2	3											
	C228.4	3	2		3	3									
	C228.5	3	2												
	C228.6								3						
	C228.7									2					
	C228.8										3				
	C228.9												3		
	C228	3	2	3	3	3	-	-	3	2	3	-	3	3	2

LIST OF EXPERIMENTS

1) Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and dbmadestructors. Learn to compile, debug and execute java programs.

2) Write Java program(s) on use of inheritance, preventing inheritance using final, abstract classes.

3) Write Java program(s) on dynamic binding, differentiating method overloading and overriding.

4) Write Java program(s) on ways of implementing interface.

5) Write a program for the following
   i. Develop an applet that displays a simple message.
   ii. Develop an applet for waving a Flag using Applets and Threads.

6) Write Java program(s) which uses the exception handling features of the language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions

7) Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.

8) Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads

9) Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.

10) Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure.
The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.

11) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds

12) Design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.

13) Write a java program to handle mouse events

14) Write a java program to handle keyboard events

15) Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in
the form of the message.

16) Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.

17) Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice.

18) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

19) Write a java program to find and replace pattern in a given file.

20) Use inheritance to create an exception super class called Exception A and exception sub classes Exception B and Exception C, where Exception B inherits from Exception A and Exception C inherits from Exception B. Write a java program to demonstrate that the catch block for type Exception A catches exception of type Exception B and Exception C.

22. Create an interface for stack with push and pop operations. Implement the stack in two ways: fixed size stack and Dynamic stack (stack size is increased when stack is full).

23) Create multiple threads to access the contents of a stack. Synchronize thread to prevent simultaneous access to push and pop operations.

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B.Tech - IV Semester

L	T	P	C
0	0	3	1.5

(18PC0510) CASE TOOLS LAB

Course Objectives:

- Practice the notation for representing various UML diagrams
- Analyze and design the problem by representing using UML diagrams
- Become familiar with all phases of OOAD

Course Outcomes:

- Find solutions to the problems using object oriented approach
- Represent using UML notation and interact with the customer to refine the UML diagrams
- Use UML diagrams like Use Case diagram , Class diagram for solving problems.
- Use UML diagrams like Sequence diagram , Collaboration diagram for solving problems.
- Use UML diagrams like Sequence diagram , Collaboration diagram for solving problems.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Case Tools Lab	CO1	3	2	3		3									
	CO2	3	2	3		3									
	CO3	3	2	3		3									
	CO4	3	2	3		3									
	CO5	3	2	3		3									
	CO6					3			3						
	CO7					3				2					
	CO8					3					3				
	CO9					3							3		
		3	**2**	**3**		3	-	-	3	2	**3**	-	**3**	**3**	**2**

LIST OF EXPERIMENTS:

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

Problems that may be considered are

1. College information system
2. Hostel management
3. ATM system

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B.Tech - IV Semester

L	T	P	C
3	0	0	3

(18MCBH04) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

COURSE OBJECTIVES:

The course aims at imparting basic principles of thought process, reasoning and inference. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. The course focuses on introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Essence of Indian Tradition	CO1	3	2	-		-	3	-	3	-	-	-	3
	CO2	3	-	2		-	3	-	3	-	-	-	3
	CO3	3	2	2		-	3	-	3	-	-	-	3
	CO4	3	2	-		-	3	-	3	-	-	-	3
	CO5	3	-	-		-	3	-	3	-	-	-	3
		3	**2**	**2**		**-**	**3**	**-**	**3**	**-**	**-**	**-**	**3**

UNIT-I
- Basic structure of Indian Knowledge System: AstadashVidya- 4 ved
- 4 Upaved (Ayurved, Dhanurved, GandharvaVed&SthapthyaAdi.,)

UNIT-II
- 6 Vedanga (Shisha, Kalppa, Nirukha, VYkaran, Jyothish& Chand)
- 4 Upanga (Dharma Shastra, Meemamsa, Purana&TharkaShastra)

UNIT-III
- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case studies

UNIT-IV
- Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec,Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain &Boudh
- Indian Linguistic Tradition –(Phonology, morphology, syntax and semantics)

UNIT-V
- Indian Artistic Tradition - Chitrakala, Moorthikala, Vasthukala , Sthapthya, Sangeetha, NruthyaYevamSahithya
- Case studies

Text Books:

1. Cultural Heritage of India-course material, V. Sivaramakrishnan (Ed.), BharatiyaVidyaBhavan, Mumbai. 5th Edition, 2014
2. Modern Physics and Vedant, Swami Jitatmanand, BharatiyaVidyaBhavan, 2011

References:

1. Tao of Physics, Fritzof Capra, 2012
2. Holistic Science and Vedant, Swami JitatmanandBharatiyaVidyaBhavan, 2012

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B.Tech - V Semester

L	T	P	C
3	0	0	3

(18PC0511) ARTIFICIAL INTELLIGENCE

Course Objectives:

- To learn the basics of designing intelligent agents that can solve general purpose problems.
- Represent and process knowledge, plan and act.
- Describe and implement several of the major approaches to classical planning
- Reason under uncertainty and can learn from experiences.
- Given a real world supervised learning problem, choose and implement appropriate learning algorithms such as decision trees, support vector machines, and boosting.

Course Outcomes:

- Select a search algorithm for a problem and estimate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem
- Possess the ability to apply AI techniques to solve problems of game playing
- Design appropriate Bayes Nets corresponding to the causal relationships and conditional independence of a real world situation
- Given a real world supervised learning problem, choose and implement appropriate learning algorithms such as decision trees, support vector machines

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Artificial Intelligence	CO1	3	2	2	2	-	-	-	-	-	-	-	2
	CO2	3	3	2	2	-	-	-	-	-	-	-	2
	CO3	3	3	2	3	-	-	-	-	-	-	-	2
	CO4	3	2	3	3	-	-	-	-	-	-	-	3
	CO5	3	2	3	3	-	-	-	-	-	-	-	3
		3	2.4	2.4	2.6	-	-	-	-	-	-	-	2.4

UNIT- I

Introduction: What is AI – The foundations of Artificial Intelligence – The history of AI; Intelligent Agent: Agents and Environment – Nature of Environment – The structure of Agents; Problem solving: Problem solving agents – Example Problems – Uninformed search Strategies – Informed Search Strategies – Heuristic Functions.

UNIT - II

Knowledge, reasoning and planning: Logical Agents: Knowledge based Agents – The wumpus World – Propositional Logic – Agents based on Propositional Logic;
First Order Logic: Syntax and Semantics of First Order Logic – Using FOL – Knowledge Engineering in FOL; Inference in FOL: Propositional vs. FOL – Unification and Lifting – Forward Chaining – Backward Chaining – Resolution.

UNIT - III

Planning: Classical Planning: Definition of Classical Planning – Algorithms: for Planning as State Space Search – planning Graphs – Planning and Acting in the real world Time, Schedules and Resources – Hierarchical Planning – Planning and Acting in Nondeterministic Domains – Multi-agent Planning.

UNIT- IV

Uncertain knowledge and reasoning: Quantifying Uncertainty: Acting under uncertainty – Basic probability notation – Inference using full joint distributions –Bayes' rule and its use – The wumpus world revisited; Probabilistic Reasoning: Representing knowledge in an uncertain domain – The semantics of Bayesian networks – Exact inference in Bayesian networks – Approximate inference in Bayesian Networks; probabilistic Reasoning over time: Time and uncertainty – inference in temporal models - Hidden Markov models.

UNIT - V

Learning: Learning from Examples: forms of learning – supervised learning – Learning Decision Trees–Learning and choosing the best hypothesis – The theory of learning – Regression and classification with linear models - observation – support vector machines – Practical machine learning; Knowledge in Learning: A logical formulation of learning – knowledge in learning – Decision trees – Explanation based learning – Robotics: Robot Hardware – Robotic Perception – Planning to Move – Planning uncertain Movements – Moving – Robotic Software Architectures – Application Domains.

Text Books:

1.S.Russel and P. Norvig, ―Artificial Intelligence – A Modern Approach, Third Edition, Pearson Education, 2010.

References:

1. David Poole, Alan Mackworth, Randy Goebel, ‖Computational Intelligence: a logical approach, Oxford University Press, 2004.
2. G. Luger, ―Artificial Intelligence: Structures and Strategies for complex problem solving‖, Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, ―Artificial Intelligence: A new Synthesis‖, Elsevier Publishers, 1998.

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B.Tech - V Semester

L	T	P	C
3	0	0	3

(18PC0513) FORMAL LANGUAGE AND AUTOMATA THEORY

Course Objectives:

- To give an overview of the theoretical foundations of computer science from the perspective of formal languages
- To illustrate finite state machines to solve problems in computing
- To explain the hierarchy of problems arising in the computer sciences.
- To familiarize Regular grammars, context free grammar.

Course Outcomes:

At the end of the course students will be able to:

- To use basic concepts of formal languages of finite automata techniques
- To Design Finite Automata for different Regular Expressions and Languages
- To Construct context free grammar for various languages
- To solve various problems of applying normal form techniques, push down automata and Turing Machines
- Design a mathematical model for a regular language.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Formal Language and Automata Theory	CO1	3	2	2	-	-	-	-	-	-	-	-	-
	CO2	3	1	3	2	-	-	-	-	-	-	-	-
	CO3	3	1	3	2	-	-	-	-	-	-	-	-
	CO4	3	1	3	1	-	-	-	-	-	-	-	-
	CO5	3	1	2	1	-	-	-	-	-	-	-	-
		3	1.2	2.6	1.2	-	-	-	-	-	-	-	-

UNIT I

Finite automata (FA): Introduction, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)- Definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion.

UNIT II

Regular Expressions (RE): Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions.

Regular Grammars: Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, and Closure properties of regular languages.

UNIT III

Context free grammer (CFG): Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG's, Minimization of CFG's, CNF, GNF, Pumping Lemma for CFL's, Enumeration of Properties of CFL (Proof's omitted).

UNIT IV

Pushdown automata: Definition, Model, Acceptance of CFL, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA.TURING MACHINES (TM): Formal definition and behaviour, Languages of a TM, TM as accepters,and TM as a computer of integer functions, Types of TMs.

UNIT V

Recursive and recursively enumerable languages (rel): Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP.

Text Books:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and Computation, 3rdedition, Pearson Education, India.

References:

1. K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India

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B.Tech - V Semester

L	T	P	C
3	0	0	3

(18PC0512)OPERATING SYSTEMS

Course Objectives:

- To understand the basic operating system functions and services.
- To understand the process and synchronization concepts.
- To understand the memory management concepts.
- To understand the file system and directory implementation.
- To understand the protection and security concepts.
-

Course Outcomes:

- Able to use different operating systems effectively.
- Able to implement process synchronization concepts.
- Able to implement different memory management techniques.
- Able to implement files and directories.
- Able to provide different protection and security measures.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Operating Systems	CO1	3	-	2	-	-	-	-	-	-	-	-	2
	CO2	3	3	1	-	-	-	-	-	-	-	-	2
	CO3	3	3	2	-	-	-	-	-	-	-	-	2
	CO4	3	3	2	-	-	-	-	-	-	-	-	2
	CO5	3	2	1	-	-	-	-	-	-	-	-	2
		3	2.75	1.6	-	-	-	-	-	-	-	-	2

UNIT I

Operating systems Overview: Operating systems functions, Operating systems structure, operating systems operations, protection and security, computing environments, open-source operating systems.

System Structures: Operating systems Services, User and Operating systems Interface, System calls, Types of system calls, system programs, Operating systems design structure, debugging, system boot.

UNIT II

Processes: Process concept, process scheduling, operations on processes, IPC, Examples of IPC systems.

Process Synchronization: The critical-section problem, Peterson's Solution, Synchronization Hardware, Synchronization Software, Semaphores, Classical problems of synchronization, Monitors, Synchronization examples.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms- FCFS, Priority, SJF-Preemptive and Non-Preemptive, Round Robin.

Threads: Overview, Multithreading Models, Threading Issues.

UNIT III

Deadlocks: System Model, Deadlock characterization, Deadlock Handling Methods, Deadlock prevention, Deadlock Avoidance, Deadlock Detection and recovery.

Memory Management: Swapping, Contiguous Memory Allocation, Fragmentation, Segmentation, paging.

Virtual memory: Demand Paging, Page replacement Algorithms-FIFO, Optimal, LRU, Allocation of Frames, Thrashing.

UNIT IV

Mass-storage structure: Overview of Mass-Storage Structure, Disk structure, Disk scheduling Algorithms, RAID Structure.

File System Interface: Concept of File, File Access Methods, Directory Structure, File System Mounting, File Sharing.

File system implementation: File system structure, File System Implementation, Directory implementation, Allocation Methods, Free-Space Management.

UNIT V

Protection: Goals of Protection, Principles of Protection, Protection Domain, Protection Access matrix, Implementation of Protection Matrix- ACL, C-List.

Security: The Security Problem, Program threats, System and Network threats, Cryptography as a Security tool, User Authentication, Firewalling to protect system and networks, Computer-Security classifications**.**

Text Books:

1.Operating Systems Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley, 8th Edition, 2014.

References:

1. Modern Operating Systems –by Andrew S Tanenbaum, 2nd edition, PHI.

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B.Tech - V Semester

L	T	P	C
3	0	0	3

(18PC0514) PYTHON PROGRAMMING

Course Objectives:

- Introduction to Scripting Language.
- Exposure to various problems solving approaches of computer science.

Course Outcomes:

- Making Software easily right out of the box.
- Experience with an interpreted Language.
- To build software for real needs.
- Prior Introduction to testing software
- Apply object oriented python programming for real world problems.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Python Programmiing	CO1	3	2	-		-	-	-	-	-	-	-	-
	CO2	3	-	3	3	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	-
		3	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT II

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass.

UNIT III

Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

UNIT IV

Functions: Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

Modules: Creating modules, import statement, from. Import statement, name spacing.

Python packages: Introduction to PIP,

, Using Python Packages.

UNIT V

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding,

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions.

Text Books :

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
2. Learning Python, Mark Lutz, Orielly.

References:

1. Think Python, Allen Downey, Green Tea Press.
2. Core Python Programming, W.Chun, Pearson.
3. Introduction

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B.Tech - V Semester

L	T	P	C
3	0	0	3

(18PC0515) COMPUTER NETWORKS

Course Objectives:

- To understand the concepts of computer networks fundamentals
- Study the concepts of computer networks from a layered perspective.
- Illustrate the issues open for research in computer Networks.

Course Outcomes:

- Ability to select transmission media for effective communication.
- Develop applications using computer networks.
- Able to configure a computer network logically.
- Ability to design new protocols for computer networks.
- Able to provide services by using various applications

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Computer Networks	CO1	3	3	2	-	-	-	-	-	-	-	-	-
	CO2	3	3	2	-	-	-	-	-	-	-	-	-
	CO3	3	2	2	-	-	-	-	-	-	-	-	2
	CO4	3	2	3	-	-	-	-	-	-	-	-	2
	CO5	3	-	1	-	-	-	-	-	-	-	-	2
		3	**2.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

UNIT I

Introduction: Networks, Network Types, Internet History, Standards and Administration, Protocol Layering, TCP/IP Protocol Suite, OSI Model

Transmission Media: Guided and Unguided Media, Switching: Circuit Switching, Packet Switching, Structure of a Switch.

UNIT II

Data link layer: Introduction, Link-Layer Addressing, Error detection and Correction: Cyclic codes, Checksum, Forward Error Correction.

Data Link Control: DLC Services, Data Link Layer Protocols, HDLC, Point to Point Protocol, Media Access Control: Random Access, Controlled Access, and Channelization.

UNIT-III

Network layer: Network Layer Design Issues, Network Layer Services, Routing Algorithms, Congestion Control, IPV4 Addressing, IPV6 Addressing, IPV6 Protocol,Routing Information Protocol, OSPF,BGP, IGMP.

UNIT IV

Transport layer: Introduction, Transport-Layer Protocols, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Cryptography and Network Security: Introduction, Confidentiality, Aspects of Security.

UNIT V

Application layer: Introduction, Client-server Programming, WWW and HTTP, FTP, E-Mail, TELNET, Secure Shell, Domain name system, SNMP.

Text Books:

1. Data communications and networking‖, Behrouz A. Forouzan, McGraw Hill Education, 5th edition, 2012.

2. “Computer Networks” Andrew S.Tanenbaum, Wetherill, Pearson,5th edition,2010.

References:

1. Data Communication and Network, Bhusan Trivedi, Oxford

2. “Internetworking with TCP/IP-Principles, Protocols and architecture – volume 1, Douglas E. Comer, 5th edition, PHI

3.“Computer Networks”, 5E , Peterson ,Davie, Elsevier.

4.“Introduction to Computer Networks and Cyber Security”, Chawan –Hwa Wu, Irwin, CRC Publications.

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B.Tech - V Semester

L	T	P	C
3	0	0	3

PROFESSIONAL ELECTIVE-1

(18PE0501) CRYPTOGRAPHY AND NETWORK SECURITY

Course Objective:

- Understanding the various attacks, security mechanisms and services.
- Understanding the various cryptographic algorithms and implementation of the same.
- To understand various protocols for network security to protect against the threats in the networks.
- To study about message authentication and hash functions.

Course Outcomes:

Completion of this course will enable the students to:

- Describe network security services and mechanisms.
- Protect the network from both internal and external attacks.
- Evaluate the authentication and hash algorithms.
- Understand and implement various public and private key cryptographic algorithms.
- Basic concepts of system level security and summarize the intrusion detection and its solutions to overcome the attacks.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Cryptography and Network Security	CO1	3	2	-		-	-	-	-	-	-	-	-
	CO2	3	-	3	3	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	-
		3	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Computer Security concepts, The OSI Security Architecture, Security attacks, Security services and Security mechanisms, A model for Network Security, Classical encryption techniques- symmetric cipher model, substitution ciphers, transposition ciphers, Steganography.

Modern Block Ciphers: Block ciphers principles, Data encryption standard (DES), Strength of DES, linear and differential cryptanalysis, block cipher modes of operations, AES.

UNIT II

Introduction to Number theory: Modular Arithmetic, GF (2n) Fields, Primarily Testing, The Euclidean Algorithm, Chinese remainder Theorem, Quadratic Congruence.

Public-key cryptography: Principles of public-key cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, ELGamal cryptographic system, Elliptic Curve Arithmetic, Elliptic curve cryptography, Stream ciphers, RC4.

UNIT III

Cryptographic Hash functions: Applications of Cryptographic Hash functions, Requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)

Message Authentication Codes: Message authentication Requirements, Message authentication functions, Requirements for Message authentication codes, security of MACs, HMAC, and MACs based on Block Ciphers, Authenticated Encryption.

Digital Signatures: RSA with SHA & DSS

UNIT IV

Key Management and distribution: Symmetric key distribution using Symmetric and Asymmetric Encryption, Distribution of Public keys, X.509 Certificates, Public key Infrastructure.

User Authentication: Remote user Authentication Principles, Remote user Authentication using Symmetric and Asymmetric encryption, Kerberos.

Electronic mail security: Pretty Good Privacy (PGP), S/MIME.

UNIT V

Security at the Transport Layer (SSL and TLS): SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security, HTTPS, SSH**.**

Wireless Network Security: IEEE 802.11Wireless LAN Security, Wireless Application Protocol Overview.

System Security: Intruders, Intrusion Detection System (IDS), Firewalls, Types of Malicious Software, worms, viruses.

Text Books:

1. Cryptography and Network Security: Principals and Practice, William Stallings, Fifth Edition,

References:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr TRPadmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley Ind

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B.Tech - V Semester

L	T	P	C
3	0	0	3

PROFESSIONAL ELECTIVE-1
(18PE0502) SOFTWARE PROJECT MANAGEMENT

Course Objectives:

- Prescribe the conventional and evolution of software.
- Understanding the basic infrastructure competences (e.g., process modeling and measurement).
- Describe the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality.
- Describe the process automation, process management and its Discriminates.

Course Outcomes:

- Develop the model from the conventional software product to the modern.
- Acquire the knowledge of managing, economics for conventional, modern principles and future software projects.
- Sketch various artifacts sets for better understanding of software development.
- Apply schedule and cost estimation for project monitoring including process automation.
- Have an exposure for organizing and managing a software project.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Software Project Management	CO1	3	2	-	2	-	-	-	-	-	-	-	-
	CO2	3	-	-	2	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	3	2	-	-	-	-	-	-	-	-
	CO5	3	2	3	2	-	-	-	-	-	-	-	-
		3	2	3	2	-	-	-	-	-	-	-	-

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

UNIT III

Life Cycle Phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. **Model based software architectures**: A Management perspective and technical perspective.

UNIT IV

Work flows of the process: Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Pragmatic planning.

Process Automation: Automation Building Blocks, The Project Environment.

UNIT V

Project control and process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example.

Future Software Project Management: Modern Project Profiles Next generation Software economics, modern Process transitions.

Text Books:

1. Software Project Management, Walker Royce, Pearson Education.

References:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012

2. Robert K. Wysocki “Effective Software Project Management” – Wiley Publication, 2011.

3. Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth

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B.Tech - V Semester

L	T	P	C
3	0	0	3

PROFESSIONAL ELECTIVE-1
(18PE0503) STORAGE AREA NETWORKS

Course Objectives:

- To understand the basic components of Storage System Environment.
- To understand the Storage Area Network Characteristics and Components.
- To examine emerging technologies including IP-SAN.
- To describe the different backup and recovery topologies and their role in providing disaster recovery and business continuity capabilities.
- To understand the local and remote replication technologies.

Course Outcomes:

On Successful completion of the course, Students will be able to :

- Understand the logical and physical components of a Storage infrastructure.
- Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS.
- Understand the various forms and types of Storage Virtualization.
- Describe the different roles in providing disaster recovery and business continuity capabilities.
- Describe the benefits of the different network storage options for different application environments.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Storage Area Networks	CO1	3	2	-		-	-	-	-	-	-	-	-
	CO2	3	-	3	3	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	-
		3	2	3	2.5	-	-	-	-	-	-	-	-

UNIT I

Storage systems: Introduction to Information Storage and Management: Information Storage, Evolution of Storage Technology and Architecture, Data Center Infrastructure, Key Challenges in Managing Information, Information Lifecycle.

Storage System Environment: Components of the Host.

RAID: Implementation of RAID, RAID Array Components, RAID Levels, RAID Comparison, RAID Impact on Disk Performance, Hot Spares.

Intelligent Storage System: Components, Intelligent Storage Array.

UNIT II

Storage Networking Technologies: Direct-Attached Storage and Introduction to SCSI: Types of DAS, DAS Benefits and Limitations, Disk Drive Interfaces, Introduction to Parallel SCSI, SCSI Command Model.

Storage Area Networks: Fiber Channel, SAN Evolution, SAN Components, Fiber Channel Connectivity, Fiber Channel Ports, Fiber Channel Architecture, Zoning, Fiber Channel Login Types, Fiber Channel Topologies.

Network Attached Storage: Benefits of NAS, NAS File I/Components of NAS, NAS Implementations, NAS-Implementations, NAS File Sharing Protocols, NAS I/O Operations.

UNIT III

Advanced storage networking and virtualization ip san: iSCSI, FCIP.**Content-Addressed Storage:** Fixed Content and Archives, Types of Archives, Features and Benefits of CAS, CAS Architecture, Object Storage and Retrieval in CAS, CAS Examples.

Storage Virtualization: Forms of Virtualization, NIA Storage Virtualization Taxonomy, Storage Virtualization Configurations, Storage Virtualization Challenges, Types of Storage Virtualization.

.

UNIT IV

Business continuity: Introduction to Business Continuity: Information Availability, BC Terminology, BC Planning Lifecycle, Failure Analysis, Business Impact Analysis, BC Technology Solutions.

Backup and Recovery: Backup Purpose, Considerations, Granularity, Recovery Considerations, Backup Methods and Process, Backup and Restore Operations, Backup Topologies, Backup in NAS Environments, Backup Technologies.

UNIT V:

Replication: Local Replication: Source and Target, Uses of Local Replicas, Data Consistency, Local Replication Technologies, Restore and Restart Considerations, Creating Multiple Replicas, Management Interface. **Remote Replication:** Modes of Remote Replication and its Technologies, Network Infrastructure.

Text books:

1. EMC Corporation, Information Storage and Management, Wiley, India.

References:

1. Robert Spalding, ―Storage Networks: The Complete Reference ―, Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, ―Building Storage Networks‖, Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Networks Fundamentals, Pearson Education Limited, 2002.

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B.Tech - V Semester

L	T	P	C
0	0	3	1.5

(18PC0516) OPERATING SYSTEMS LABORATORY

Course Objectives:

- To understand the design aspects of operating systems.
- To solve various synchronization problems.
- To implement various Memory management Techniques.
- To implement various File System and Directory Implementation Techniques.

Course Outcomes:

- Ensure the development of applied skills in operating systems related areas.
- Able to write software routines modules or implement various concepts of operating systems.
- Able to provide good security and Protection concepts.
- Analyze to simulate file organization techniques
- Develop to analyze virtual to physical address
- Follow the ethical principles in implementing the programs
- Do experiments effectively as an individual and as a team member in a group.
- Communicate verbally and in written form, the understanding about the experiments
- Analyze the prediction of deadlock in operating system

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Operating Systems Lab	CO1	3	3	2											
	CO2	3	3	3		3									
	CO3	3	3			3									
	CO4	3	2		3	3									
	CO5	3	3												
	CO6								3						
	CO7									2					
	CO8										3				
	CO9												3		
		3	2.8	2.5	3	3	-	-	3	2	3	-	3	3	2

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
   a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT.
4. Simulate all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance.
6. Simulate Bankers Algorithm for Dead Lock Prevention.
7. Simulate all page replacement algorithms
   a) FIFO b) LRU c) LFU
8. Simulate Paging Technique of memory management.
9. Control the number of ports opened by the operating system with
   a) Semaphore b) monitors
10. Simulate how parent and child processes use shared memory and address space.
11. Simulate sleeping barber problem.
12. Simulate dining philosopher‘s problem.
13. Simulate producer and consumer problem using threads (use java).
14. Simulate little‘s formula to predict next burst time of a process for SJF scheduling algorithm.
15. Develop a code to detect a cycle in wait-for graph.
16. Develop a code to convert virtual address to physical address.
17. Simulate how operating system allocates frame to process.
18. Simulate the prediction of deadlock in operating system when all the processes announce their resource requirement in advance.

References:

1. Operating System Concepts‖, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Modern Operating Systems‖, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems‖, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.2013-2014

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B.Tech - V Semester

L	T	P	C
0	0	3	1.5

(18PC0517) PYTHON PROGRAMMING LABORATORY

Course Objectives :

- To learn and understand Python programming basics and paradigm.
- To learn and understand python looping, control statements and string manipulations.
- Students should be made familiar with the concepts of GUI controls and designing GUI applications.
- To learn and know the concepts of file handling, exception handling.

Course Outcomes :

- Define and demonstrate the use of built-in data structures “lists” and “dictionaries”.
- Design and implement a program to solve a real world problem.
- Design and implement GUI applications and how to handle exceptions and files.
- Make database connectivity in python programming language.
- Design and implement a program using object oriented programming.
- Follow the ethical principles in implementing the programs
- Do experiments effectively as an individual and as a team member in a group
- Communicate verbally and in written form, the understanding about the experiments
- Apply the concepts of python programming in real world problems.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Python Programming Lab	CO1	3	3	2											
	CO2	3	3	3		3									
	CO3	3	3			3									
	CO4	3	2		3	3									
	CO5	3	3												
	CO6								3						
	CO7									2					
	CO8										3				
	CO9												3		
		3	2.8	2.5	3	3	-	-	3	2	3	-	3	3	2

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script.

b) Write a program to purposefully raise Indentation Error and correct it.

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).

b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is an even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,1/10.

c) Write a program using a for loop that loops over a sequence. What is the sequence?

d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Exercise 4 - Control Flow - Continued

a) Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89,...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise - 5 - DS

a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure

b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Exercise - 6 DS - Continued

a) Write a program combining lists that combines these lists into a dictionary.

b) Write a program to count the frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise - 7 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

a) Write a function ball collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius

If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.

Exercise - 9 Functions - Continued

a) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.

b) Write a function dups to find all duplicates in the list.

c) Write a function unique to find all the unique elements of a list.

Exercise - 10 - Functions - Problem Solving

a) Write a function cumulative product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write a function to compute gcd,lcm of two numbers. Each function shouldn't exceed one line.

Exercise 11 - Multi-D Lists

a) Write a program that defines a matrix and prints.

b) Write a program to perform addition of two square matrices.

c) Write a program to perform multiplication of two square matrices.

Exercise - 12 - Modules

a) Install packages requests, flask and explore them using (pip).

b) Write a script that imports requests and fetches content from the page Eg. (Wiki).

c) Write a simple script that serves a simple HTTP Response and a simple HTML Page.

References:

1. Think Python, Allen Downey, Green Tea Press.
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage.

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B.Tech - VI Semester

L	T	P	C
3	0	0	3

(18PC0518) COMPILER DESIGN

Course Objectives:

- To learn the various phases of compiling.
- To learn the various parsing techniques.
- To understand intermediate code generation and run-time environment.
- To learn to implement the front-end of the compiler.
- To learn to implement code generators.

Course Outcomes:

By the end of the course, the successful student will be able to do:

- To realize basics of compiler design and apply for real time applications.
- To introduce different translation languages
- To understand the importance of code optimization
- To know about compiler generation tools and techniques
- To learn working of compiler and non compiler applications ← Design a compiler for a simple programming language

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Compiler Design	CO1	3	3	3	-	-	-	-	-	-	-	-	-
	CO2	3	2	3	-	-	-	-	-	-	-	-	-
	CO3	3	2	2	3	-	-	-	-	-	-	-	-
	CO4	3	3	-	3	-	-	-	-	-	-	-	-
	CO5	3	3	-	-	-	-	-	-	-	-	-	-
		3	2.6	2.7	3	-	-	-	-	-	-	-	-

UNIT I

Introduction: Compilers – Analysis of source program – Phases of a compiler – cousins of compiler – Grouping of phases – compiler construct on tools. **Lexical analysis**: Introduction– definition of lexical analyzer – Input Buffering – specification of Tokens – Recognition of tokens – Lex Tool

UNIT II

Syntax analysis: Role of Parser – Grammars – Error Handling – Context-free grammars – Writing a grammar – Top Down Parsing – General Strategies Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item, Construction of SLR Parsing Table -Introduction to LALR Parser – Error Handling and Recovery in Syntax Analyzer-YACC.

UNIT III

Intermediate code generation :Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate Languages: Syntax Tree, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking.

UNIT IV

Runtime environment and code generation: Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management – Issues in Code Generation – Design of a simple Code Generator.

UNIT V

Code optimization: Principal Sources of Optimization –Peep-hole optimization – DAG-Optimization of Basic Blocks-Global Data Flow Analysis – Efficient Data Flow Algorithm.

Text Books:

1. Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman, “Complier Principles Techniques and Tools”, Pearson Education, 2008.

References:

1. Dr. R. Venkatesh, Dr. N. Uma Maheswari and Ms. S. Jeyanthi, “Compiler Design”, Yes Dee Publishing Ltd., 2015.
2. S.GodfreyWinster, S. Arunadevi, R.Sujatha, “Compiler Design,” Yesdee Pub., 2016
3. Kenneth C. Louden, “Compiler Construction, Principles and Practice”, Thomson Learning Inc, 2007.

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B.Tech - VI Semester

L	T	P	C
3	0	0	3

(18PC0519) WEB AND INTERNET TECHNOLOGIES

Course Objectives:

- To introduce client side scripting with JavaScript and DHTML.
- To introduce server side programming with Java servlets, JSP and PHP.
- To learn the basic web concepts and Internet protocols.

Course Outcomes:

- Ability to create dynamic and interactive web sites
- Gain knowledge of client side scripting using java script and DHTML.
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servlets, JSP and PHP.
- Able to design rich client presentation using AJAX.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Web and Internet Technologies	CO1	3	2	2	-	-	-	-	-	-	-	-	2
	CO2	3	2	2	2	-	-	-	-	-	-	-	2
	CO3	3	2	3	1	-	-	-	-	-	-	-	2
	CO4	3	2	3	1	-	-	-	-	-	-	-	2
	CO5	3	2	3	1	-	-	-	-	-	-	-	2
		3	**2**	**2.6**	**1.25**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

UNIT I

Introduction to Web Technologies: Introduction to Web servers like Apache 1.1, IIS XAMPP(Bundle Server), WAMP(Bundle Server),Handling HTTP Request and Response, installations of above servers, HTML and CSS: HTML 5.0 , XHTML, CSS 3.

UNIT II

Java Script: An introduction to JavaScript–JavaScript DOM Model- Date and Objects,-Regular Expressions- Exception Handling- Validation-Built-in objects-Event Handling- DHTML with JavaScript.

Servlets: Java Servlet Architecture-Servlet Life Cycle- Form GET and POST actions-Session Handling- Understanding Cookies.

Installing and Configuring Apache Tomcat Web Server- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

UNIT III

Introduction to PHP: The problem with other Technologies (Servlets and JSP), Downloading, installing, configuring PHP, Programming in a Web environment and The anatomy of a PHP Page. Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions. PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating Users, Using Environment and Configuration Variables, Working with Date and Time.

UNIT IV

Creating and Using Forms: Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form. XML: Basic XML- Document Type Definition XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT V

AJAX: Ajax Client Server Architecture-XML Http Request Object-Callback Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)- Consuming a web service, Database Driven web service from an application – SOAP.

Text Books:

1. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech.).

2. PHP5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

3. Deitel and Nieto, “Internet and World Wide Web - How to Program”, Prentice Hall, 5th Edition, 2011.

References:

1. Web Programming, building internet applications, Chris Bates 2nd edition, wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D. Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson

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B.Tech - VI Semester

L	T	P	C
3	0	0	3

OPEN ELECTIVE-1
(18OE0404) MICROPROCESSOR AND INTERFACING

Course Objectives:

- To develop an understanding of the operations of microprocessors and microcontrollers; machine language programming and interfacing techniques.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

Have strong Knowledge on microprocessors and microcontrollers architectures

- Have strong Knowledge on 8051 architecture,Memory organization and their timing diagrams.
- Have strong Knowledge on instruction set addressing modes
- Able to understand memory states and input output interfacing devices
- Able to understand interfacing to protocols like bluetooth and Zigbee

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Microprocessor and Interfacing	CO1	3	2	2	2	1	-	-	-	-	-	-	3
	CO2	2	2	2	2	2	-	-	-	-	-	-	2
	CO3	3	2	2	2	2	-	-	-	-	-	-	2
	CO4	3	2	3	2	3	-	-	-	-	-	-	2
	CO5	2	2	2	3	2	-	-	-	-	-	-	1
		2.6	**2**	**2.2**	**2.2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

UNIT I

Fundamentals of Microprocessors: Fundamentals of Microprocessor Architecture, 8-bit microprocessor and Microcontroller architecture, Comparison of 8-bit microcontrollers, 16-bit and 32-bit microcontrollers. Definition of embedded system and its characteristics, Role of microcontrollers in embedded Systems, Overview of the 8051 family.

UNIT II

The 8051 Architecture: Internal Block Diagram, CPU, ALU, address, data and control bus, Working registers, SFRs, Clock and RESET circuits, Stack and Stack Pointer, Program Counter, I/O ports, Memory Structures, Data and Program Memory, Timing diagrams and Execution Cycles.

UNIT III

Instruction Set and Programming: Addressing modes: Introduction, Instruction syntax, Data types, Subroutines Immediate addressing, Register addressing, Direct addressing, Indirect addressing, Relative addressing, Indexed addressing, Bit inherent addressing, bit direct addressing. 8051 Instruction set, Instruction timings. Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs. Assemblers and compilers. Programming and debugging tools.

UNIT IV

Memory and I/O Interfacing: Memory and I/O expansion buses, control signals, memory wait states. Interfacing of peripheral devices such as General Purpose I/O, ADC, DAC, timers, counters, memory devices

.

UNIT V

External Communication Interface Synchronous and Asynchronous Communication. RS232, SPI, I2C. Introduction and interfacing to protocols like Blue-tooth and Zigbee.LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing. Text /

Text Books:

1. M. A.Mazidi, J. G. Mazidi and R. D. McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”,Pearson Education, 2007.
2. K. J. Ayala, “8051 Microcontroller”, Delmar Cengage Learning,2004.
3. R. Kamal, “Embedded System”, McGraw Hill Education,2009.

References:

1. R. S. Gaonkar, “, Microprocessor Architecture: Programming and Applications with the 8085”, Penram International Publishing, 1996
2. D.A. Patterson and J.H. Hennessy, "Computer Organization and Design: The Hardware/Software interface”, Morgan Kaufman Publishers, 2013.
3. D. V. Hall, “Microprocessors & Interfacing”, McGraw Hill Higher Education, 1991.

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B.Tech - VI Semester

L	T	P	C
3	0	0	3

OPEN ELECTIVE-1
(18PC0421) EMBEDDED SYSTEMS

Course Objectives:

The course will provide the student:

- To know the fundamental concepts of embedded systems.
- To study state machine models and concurrent process models.
- To study processor peripherals and communication interfaces.
- To learn the kernel, RTOS.

Course Outcomes:

On completion of the course the student will

- Understand the fundamental concepts of Embedded systems.
- Know the state machine models and concurrent process models.
- Know the watchdog timer, real time clock and communication interfaces.
- Understand the RTOS and Kernel.
- Understand the hardware and software design.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Embedded Systems	CO1	3	2	2	3	3	-	-	-	-	-	-	-
	CO2	3	3	3	3	3	-	-	-	-	-	-	-
	CO3	3	3	3	3	3	-	-	-	-	-	-	-
	CO4	3	2	2	2		-	-	-	-	-	-	-
	CO5	3	2			3	-	-	-	-	-	-	-
		3	**2.4**	**2.5**	**2.8**	**3.0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Introduction to ASIP & DSP Processors: Embedded systems overview, design challenge, processor technology, embedded hardware units, embedded software in a system, embedded system on chip (SOC), design process, classification of embedded systems General Purpose Processors - Basic architecture, operation- Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

UNIT II

State machine and concurrent process models: Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems

UNIT III

Standard single purpose processors: peripherals: Timers, counters and watch dog timers, real time clock. Communication Interface - Need for communication interfaces, RS232 / UART, RS422/ RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

UNIT IV

Survey of software architecture: Round robin, round robin with interrupts, function queue scheduling architecture, selecting an architecture saving memory space

EMBEDDED SOFTWARE DEVELOPMENT TOOLS: Host and target machines, linkers, locations for embedded software, getting embedded software into target system, debugging technique

UNIT V

Embedded / RTOS Concepts: Architecture of the Kernel, Tasks and Task scheduler, Interrupt service routines, Semaphores, Mutex. Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem, Embedded operating systems- Embedded Linux, Real-time operating systems- RT Linux, Handheld operating

systems- Windows CE.

Text Books:

1. Frank Vahid,TonyD.Givargis, “Embedded System Design – A Unified Hardware/Software Introduction”, John Wiley, 2002.
2. KVKK Prasad, “Embedded / Real Time Systems”, Dreamtech Press, 2005.

References:

1. Jonathan W. Valvano, Brooks / Cole, “Embedded Microcomputer Systems”, Thompson Learning.
2. David E. Simon, “An Embedded Software Primer”, Pearson Ed., 2005.
3. Raj Kamal, “Introduction to Embedded Systems”, TMS, 2002
4.Embedded real time systems programming-sri ram V Iyer, pankajgupta, TMH, 2004
5. Embedded system design- A unified hardware/software introduction- frank vahid, tony D.Givargis, John Willey, 2002

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B.Tech - VI Semester

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OPEN ELECTIVE-1
(18PC0402) SIGNALS & SYSTEMS

Course Objectives:

- To study signals and systems.
- To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
- To understand the stability of systems through the concept of ROC.
- To know various transform techniques in the analysis of signals and systems.

Course Outcomes:

At the end of this course students will demonstrate the ability to:

- Analyze different types of signals.
- Represent continuous and discrete systems in time and frequency domain using different transforms.
- Investigate whether the system is stable.
- Sampling and reconstruction of a signal.
- Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Signals and Systems	CO1	3	2	1	2	2	2	-	-	-	-	-	-
	CO2	3	3	2	2	1	2	-	-	-	-	-	-
	CO3	3	3	2	3	2	2	-	-	-	-	-	-
	CO4	2	2	2	2	2	2	-	-	-	-	-	-
	CO5	3	3	3	2	2	1	-	-	-	-	-	-
		2.8	2.6	2	2.2	1.8	1.8	-	-	-	-	-	-

UNIT I

Introduction to signals and systems signal: Definition, basic elementary signals, operations on signals, classification of signals. Related problems Systems: Definition, Classification of systems System properties, related problems, stability of systems Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis, Impulse response and step response.

UNIT II

Fourier series & Fourier Transforms: Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients.

Fourier Transform: Transform of basic elementary signals Properties & Signal representation. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT).

UNIT III

Laplace Transforms: Laplace Transform-Definition, transform of basic elementary signals, Analysis of Laplace transforms for continuous time signals and systems, system functions, poles and zeros of system functions and signals.

UNIT IV

Z-Transforms: Z transform definition,transform of basic signals, Review of the z-Transform for discrete time signals and systems,ROC, system functions, poles and zeros of systems and sequences, z-domain analysis.

UNIT V

Sampling and Reconstruction: The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects. Relation between continuous and discrete time systems.

Text/Reference Books:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, “Signals and systems”, Prentice Hall India,1997.
2. J. G. Proakis and D. G. Manolakis, “Digital Signal Processing: Principles, Algorithms, and Applications”, Pearson, 2006.
3. H. P. Hsu, “Signals and systems”, Schaum’s series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, “Signals and Systems”, John Wiley and Sons, 2007.
5. A. V. Oppenheim and R. W. Schafer, “Discrete-Time Signal Processing”, Prentice Hall, 2009.

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B.Tech - VI Semester

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PROFESSIONAL ELECTIVE -2
(18PE0504) HIGH PERFORMANCE COMPUTING

Course Objectives:

The objectives of this course are:

- Students are able to distinguish between the different High Performance Computing architectures
- Students can design algorithms specifically for any given architecture.
- Students learn Parallel programming

Course Outcomes:

After completion of the course, the student will be able to:

- Describe the High performance computing environments like Parallel, Distributed, Clusters, etc.
- Compare the Static as well as Dynamic Interconnection networks for Parallel Computing.
- Create new algorithms for real-life problems for any given High Performance architecture.
- Apply the algorithms using MPI/ Open MPI and Compute the efficiency of the designed algorithm.
- Able to develop parallel programs by exploiting parallel programming patterns

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
High Performance Computing	CO1	3	2	3	2	2	-	-	-	-	-	-	-
	CO2	3	3	3	2	3	-	-	-	-	-	-	-
	CO3	3	3	2	2	3	-	-	-	-	-	-	-
	CO4	3	3	3	3	3	-	-	-	-	-	-	-
	CO5	3	3	2	2	2	-	-	-	-	-	-	-
		3	2.8	2.6	2.2	2.6	-	-	-	-	-	-	-

UNIT I

Overview of Grid Computing Technology, History of Grid Computing, High Performance Computing, Cluster Computing. Peer-to-Peer Computing, Internet Computing, Grid Computing Model and Protocols, Types of Grids: Desktop Grids, Cluster Grids, Data Grids, High- Performance Grids, Applications and Architectures of High Performance Grids, High Performance Application Development Environment.

UNIT II

Open Grid Services Architecture, Introduction, Requirements, Capabilities, Security Considerations, GLOBUS Toolkit.

UNIT III

Overview of Cluster Computing, Cluster Computer and its Architecture, Clusters Classifications, Components for Clusters, Cluster Middleware and SSI, Resource Management and Scheduling, Programming, Environments and Tools, Cluster Applications, Cluster Systems.

UNIT IV

Beowulf Cluster: The Beowulf Model, Application Domains, Beowulf System Architecture, Software Practices, Parallel Programming with MPL, Parallel Virtual Machine (PVM).

UNIT V

Overview of Cloud Computing, Types of Cloud, Cyber infrastructure, Service Oriented Architecture Cloud Computing Components: Infrastructure, Storage, Platform, Application, Services, Clients, Cloud Computing Architecture.

Textbooks/References:

1. Laurence T.Yang, Minyi Guo – High Performance Computing Paradigm and Infrastructure John Wiley
2. Ahmar Abbas, “Grid Computing: Practical Guide to Technology & Applications”, Firewall Media, 2004.
3. Joshy Joseph and Craig Fellenstein, “Grid Computing” Pearson Education, 2004.
4. lan Foster, et al.,“The Open Grid Services Architecture”, Version 1.5 (GFD.80). Open Grid Forum, 2006.
5. Ian Foster. Globus Tool kit Version 4: Software for Service-Oriented Systems. IFIP International Conference on Network and Parallel Computing, Springer- Verlag LNCS 3779, pp 2-13,2006.

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B.Tech - VI Semester

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PROFESSIONAL ELECTIVE -2
(18PE0505) CLOUD COMPUTING

Course Objectives:

- To understand the concept of cloud computing.
- To appreciate the evolution of cloud from the existing technologies.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- Learn the key and enabling technologies that help in the development of cloud.
- Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
- Explain the core issues of cloud computing such as resource management and security.
- Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Cloud Computing	CO1	3	3	-	3	-	-	-	-	-	-	-	-
	CO2	3	-	2	-	-	-	-	-	-	-	-	-
	CO3	3	-	-	-	-	-	-	-	-	-	-	-
	CO4	3	-	3	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	-	-	-	-	-	-	-	-	-
		3	3	2.5	3	-	-	-	-	-	-	-	-

UNIT I

Introduction: Introduction to Cloud Computing – Definition of Cloud – Evolution of Cloud Computing – Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning.

UNIT II

Cloud Enabling Technologies: Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish-Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery.

UNIT III

Cloud Architecture, Services and Storage: Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds – laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.

UNIT IV

Resource Management and Security in Cloud: Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud Resources – Security Overview – Cloud Security Challenges – Software-as-a-Service Security – Security Governance – Virtual Machine Security – IAM – Security Standards.

UNIT V

Cloud Technologies and Advancements: Hadoop – Map Reduce – Virtual Box — Google App Engine – Programming Environment for Google App Engine — Open Stack – Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation.

Text Books:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
2. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

References:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing – A Practical Approach, Tata Mcgraw Hill, 2009.
3. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice), O'Reilly, 2009.

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B.Tech - VI Semester

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PROFESSIONAL ELECTIVE -2
(18PE0506) INTERNET OF THINGS

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web-based services on IoT devices.

Course Outcomes:

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Internet of Things	CO1	3	3	3	3	2	3	-	-	-	-	-	-
	CO2	3	3	3	1	-	2	-	-	-	-	-	-
	CO3	3	2	1	1	-	-	-	-	-	-	-	-
	CO4	3	2	3	3	-	-	-	-	-	-	-	3
	CO5	3	1	-	-	-	-	-	-	-	-	-	3
		3	**2.2**	**2.5**	**1.6**	**2**	**2.5**	**-**	**-**	**-**	**-**	**-**	**3**

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT. Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER.

UNIT III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling. Python packages - JSON, XML, HTTP Lib, URL Lib, SMTP Lib.

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI - Interfaces (serial, SPI, I2C). Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs. Webserver – Web server for IoT, Cloud for IoT, Python web application framework. Designing a RESTful web API. Case studies illustrating IoT Design.

Text Books

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

References:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry,"IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)

2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

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B.Tech - VI Semester

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PROFESSIONAL ELECTIVE -3
(18PE0507) SCRIPTING LANGUAGES

Course Objectives:

At the end of the course, the students will be able to:

- Understand the concepts of scripting languages for developing web based projects.
- Illustrates object oriented concepts like PHP, PYTHON, PERL.
- Create database connections using PHP and build the website for the world.
- Demonstrate IP address for connecting the web servers.
- Analyze the internet ware application, security issues and frame works for application.

Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

- Ability to understand the differences between scripting languages
- Identify PHP encryption functions and Mcrypt Package. Understand PHP Authentication and Methodologies
- Understand applications internet aware Nuts and Bolts Internet Programming
- Able to gain some fluency programming in Ruby, JavaScript, Perl, Python, and related languages.
- Master an understanding of python especially the object oriented concepts.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Scripting Languages	CO1	3	2	2	2	2	-	-	-	-	-	-	-
	CO2	3	3	2	2	3	-	-	-	-	-	-	-
	CO3	3	2	2	2	3	-	-	-	-	-	-	-
	CO4	3	3	3	3	3	-	-	-	-	-	-	-
	CO5	3	3	3	2	2	-	-	-	-	-	-	-
		3	2.6	2.4	2.2	2.6	-	-	-	-	-	-	-

UNIT I

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT II

Advanced PERL: Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues. PHP Basics: PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming: PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT IV

TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python: Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling. Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

Text Books:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3 rd Edition, Jason Gilmore, Apress Publications (Dream tech.).

References:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pea

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B.Tech - VI Semester

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PROFESSIONAL ELECTIVE -3
(18PE0508) SERVICE ORIENTED ARCHITECTURE

Course Objectives:

- Understand SOA and evolution of SOA.
- Understand web services and primitive, contemporary SOA.
- Understand various service layers.
- Understand service-oriented analysis and design based on guidelines

Course Outcomes:

- Model service candidate derived from existing business documentation.
- Design the composition of SOA.
- Design application services for technology abstraction
- Design and analyze various SOA patterns and techniques.
- Compare and evaluate best strategies and practices of SOA

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Service Oriented Architecture	CO1	3	2	2	2	-	-	-	-	-	-	-	-
	CO2	3	2	2	2	-	-	-	-	-	-	-	-
	CO3	3	2	2	3	-	-	-	-	-	-	-	-
	CO4	3	2	3	3	-	-	-	-	-	-	-	-
	CO5	3	2	2	3	-	-	-	-	-	-	-	-
		3	**2**	**2.2**	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common Tangible, Benefits of SOA.

The Evolution of SOA: An SOA Timeline, The Continuing Evolution of SOA, The Roots of SOA.

UNIT II

Web Services and Primitive SOA: Web Services Framework, Services, Service Descriptions, Messaging. **Web Services and Contemporary SOA (Part-I):** Message Exchange Patterns, Service Activity, Coordination, Atomic Transactions, Business Activities, Orchestration, Choreography.

UNIT III :

Web Services and Contemporary SOA (Part-II): Addressing, Reliable Messaging, Correlation, Policies, Metadata Exchange, Security, Notification and Eventing.

UNIT IV:

Principles of Service-Orientation: Service-Orientation and the Enterprise, Anatomy of Service-Oriented Architecture, Common Principles of Service-Orientation, How Service-Orientation Principles Inter-relate, Service-Orientation and Object-Orientation, Native Web Service Support for Service-Orientation Principles.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer Abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services.

UNIT V:

Service-Oriented Analysis: Introduction to Service-Oriented Analysis, Benefits of a Business-Centric SOA, Deriving Business Services, Service Modeling, Service Modeling Guidelines.

Service-Oriented Design: Introduction to Service-Orientated Design, WSDL-related XML Schema Language Basics, WSDL Language Basics, SOAP Language Basics, Service Interface Design Tools.

Text Books :

1. Service Oriented Architecture: Concepts, Technology, and Design, Thomas Erl, Pearson Education.

References:

1. SOA using Java Web Services, Mark D Hansen, Prentice Hall Publication.
2. Applied SOA, Michael Rosen & et al., Wiley Publication.
3. SOA based Enterprise Integration, Roshen, TMH Publication.
4. Service Oriented Computing, Muninder Singh & Michael Huhns, Wiley Publication.
5. Implementing SOA Using Java EE, B.V.Kumar, Prakash Narayan & Tony Ng, Pearson Education
6. XML and Web Services, Ron Schmelzer et al. Pearson Education.
7. SOA Governance, William A. Brown, Robert G. Laird, Clive Gee & Tilak Mitra, Pearson Education

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B.Tech - VI Semester

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PROFESSIONAL ELECTIVE -3
(18PE0509) COMPUTER VISION

Course Objectives:

- To review image processing techniques for computer vision.
- To understand shape and region analysis.
- To understand Hough Transform and its applications to detect lines, circles, ellipses.
- To understand three-dimensional image analysis techniques.
- To understand motion analysis.
- To study some applications of computer vision algorithms.

Course Outcomes:

Upon completion of this course, the students should be able to

- Implement fundamental image processing techniques required for computer vision
- Implement boundary tracking techniques.
- Apply chain codes and other region descriptors.
- Apply Hough Transform for line, circle, and ellipse detections.
- Apply 3D vision techniques.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Computer Vision	CO1	3	2	2	2	-	-	-	-	-	-	-	-
	CO2	3	2	2	3	-	-	-	-	-	-	-	-
	CO3	3	2	2	3	-	-	-	-	-	-	-	-
	CO4	3	2	3	3	-	-	-	-	-	-	-	-
	CO5	3	2	2	2	-	-	-	-	-	-	-	-
		3	2	2.2	2.6	-	-	-	-	-	-	-	-

UNIT I

Image Processing Foundations: Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture.

UNIT II

Shapes and regions: Binary shape analysis – connectedness – object labeling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments.

UNIT III

Hough transform: Line detection – Hough Transform (HT) for line detection – foot-of normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection – accurate center location – speed problem – ellipse detection – Case study: Human Iris location – hole detection – generalized Hough Transform (GHT) – spatial matched filtering – GHT for ellipse detection – object location – GHT for feature collation.

UNIT IV

3D Vision and Motion: Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – spline-based motion – optical flow – layered motion.

UNIT V

Applications: Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foreground-background separation – particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians.

Textbooks/References:

1. D. L. Baggio et al., ―Mastering OpenCV with Practical Computer Vision Projects‖, Packt Publishing, 2012.
2. E. R. Davies, ―Computer & Machine Vision‖, Fourth Edition, Academic Press, 2012.
3. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms for analyzing images‖, O'Reilly Media, 2012.
4. Mark Nixon and Alberto S. Aquado, ―Feature Extraction & Image Processing for Computer Vision‖, Third Edition, Academic Press, 2012.
5. R. Szeliski, ―Computer Vision: Algorithms and Applications‖, Springer 2011.

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B.Tech - VI Semester

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OPEN ELECTIVE –2
(s)MANAGEMENT SCIENCE

Course Objectives:

- To understand the concept of management, administration, organization, objectives, nature, scope, role, responsibilities & approaches of a management.
- To understand the concept & importance of OFC & different types of organization structures.
- To Study the PPC through PERT/CPM, Estimate Time/Costs & resource leveling & smoothing.

Course Outcomes:

- Able to apply the concepts & principles of management in real life industry.
- Able to design & develop organization charts & structure for an enterprise.
- Able to apply PPC techniques, Quality Control, Work-study principles in real life industry
- Able to apply the concepts of HRM in Recruitment, Selection, Training & Development
- Able to maintain Materials departments,& Determine EOQ Able to identify Marketing Mix Strategies for an enterprise.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Management Science	CO1	3	2	-	-	-	-	-	-	-	-	-	-
	CO2	3	-	3	3	-	-	-	-	-	-	-	-
	CO3	3	2	3	2	-	-	-	-	-	-	-	-
	CO4	3	2	-	3	-	-	-	-	-	-	-	-
	CO5	3	-	-	2	-	-	-	-	-	-	-	-
		3	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Meaning and nature of organizational behavior: Introduction to concept and importance of OB in Modern management Individual Behavior – Personality – values – Attitudes - Perception, Learning, Emotions-emotional intelligence & emotional Labor.

UNIT II

Designing and Developing HR systems: Human Resource Planning, Job Analysis, Job Evaluation, Job Design, Job Enlargement, Job Rotation, Job Enrichment, Recruitment & Selection, Placement, Induction, Transfer and Promotion, Separation.

UNIT III

Human Resource Development: Concepts, Development Function, Training and Development, Performance Appraisal & Career Planning and Development.

UNIT IV

Understanding Marketing Management: Concepts of marketing, Role of Marketing, Marketing Process, Marketing Environment, Consumer Behavior-decision process.

UNIT V

Strategic Management: Concepts in Strategic Management - Strategic Management Process - Environmental Scanning - Industry and Competitive analysis - Core competencies - Competitive Advantage.

Textbooks:

1. Personnel and Human Resource Management – Text and cases, P. Subbarao, Himalaya.
2. Human Resource Management, Noe A.Raymond, John Hollenbeck, Barry Gerhart and Patrick Wright, Tata McGraw Hill.

References

1 .Human Resource Management, Aswathappa, 4th Edition, TMH 2006.
2 .Human Resource Management, Ian Beardwell & Len Holden-Macmillan India Ltd.
3 .Managing Human Resources: Productivity, quality of work life, profits- Wayne F.

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B.Tech - VI Semester

L	T	P	C
3	0	0	3

OPEN ELECTIVE –2
(S)INTELLECTUAL PROPERTY RIGHTS

Course Objectives:

This course introduces the student to the basics of Intellectual Property Rights, CopyRight Laws, Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations.

Course Outcomes:

On completion of this course, the student will have an understanding of the following:

- Intellectual Property Rights and what they mean
- TradeMarks and Patents and how to register them
- Laws Protecting the TradeMarks and Patents
- CopyRight and laws related to it.
- Identify procedures to protect different forms of IPRs national and international level.

Course / PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Intellectual Property Rights	CO1	3	2	2	-	-	-	-	-	-	-	-	3
	CO2	3	2	2	-	-	-	-	-	-	-	-	3
	CO3	3	2	2	-	-	-	-	-	-	-	-	3
	CO4	3	2	2	-	-	-	-	-	-	-	-	3
	CO5	3	2	2	-	-	-	-	-	-	-	-	3
		3	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

UNIT I

Introduction to Intellectual Property: Introduction, Types Of Intellectual Property, International Organizations, Agencies And Treaties, Importance Of Intellectual Property Rights.

UNIT II

Trade Marks: Purpose And Function Of Trade Marks, Acquisition Of Trade Mark Rights, Protectable Matter, Selecting And Evaluating Trade Mark, Trade Mark Registration Processes.

UNIT III

Law Of Copy Rights : Fundamental Of Copy Right Law, Originality Of Material, Rights Of Reproduction, Rights To Perform The Work Publicly, Copy Right Ownership Issues, Copy Right Registration, Notice Of Copy Right, International Copy Right Law.

UNIT IV

Trade Secrets: Trade Secrete Law, Determination Of Trade Secrete Status, Liability For Misappropriations Of Trade Secrets, Protection For Submission, Trade Secrete Litigation..

UNIT- V

New Developments Of Intellectual Property: New Developments In Trade Mark Law ; Copy Right Law, Patent Law, Intellectual Property Audits.
International Overview On Intellectual Property, International – Trade Mark Law, Copy Right Law, International Patent Law, International Development In Trade Secrets Law.

Text Books & References:

1. Intellectual Property Rights, Deborah. E. Bouchoux, Cengage Learing.
2. Intellectual Property Rights– Unleashmy The Knowledge Economy, Prabuddha Ganguli, Tate Mc Graw Hill Publishing Company Ltd.,

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B.Tech - VI Semester

L	T	P	C
3	0	0	3

OPEN ELECTIVE –2
ENTREPRENEURSHIP

Course Objectives:

- Understanding basic concepts in the area of entrepreneurship.
- Understanding the role and importance of entrepreneurship for economic development, developing personal creativity and entrepreneurial initiative.
- Understanding the stages of the entrepreneurial process and the resources needed for the successful development of entrepreneurial ventures

Course Outcomes:

- Analyze the business environment in order to identify business opportunities
- Identify the elements of success of entrepreneurial ventures
- Consider the legal and financial conditions for starting a business venture
- Evaluate the effectiveness of different entrepreneurial strategies
- Explore entrepreneurial leadership and management style

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Entrepreneurship	CO1	3	2		-	-	-	-	3	-	-	-	3
	CO2	3	2		-	-	-	-	2	-	-	-	3
	CO3	3	2		-	-	-	-	3	-	-	-	3
	CO4	3	3		-	-	-	-	3	-	-	-	2
	CO5	3	3		-	-	-	-	2	-	-	-	2
		3	2.4		-	-	-	-	2.6	-	-	-	2.6

UNIT I

Nature of Entrepreneurship: Features - Forms of Entrepreneurship**:** Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, important features of various types of businesses - corporate entrepreneurship, entrepreneurship - Role of Government in the promotion of Entrepreneur, State Enterprises in India.

UNIT II

Aspects of Promotion: Idea generation – opportunities - SWOT Analysis - patents and trademarks, Intellectual Property Rights. Financial Aspects of the Entrepreneurship**:** Source of Capital, Debt capital, seed capital, venture.

UNIT III

Project Planning and Feasibility Studies: The Concept of Project, Project Life Cycle - Project Planning, Feasibility – Project proposal & report preparation.

UNIT IV

Entrepreneurial Strategy: Generation of new entry opportunity, Decisions under uncertainty, entry strategy, new entry exploitation, environmental instability and First-Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness.

UNIT V

Women Entrepreneurship: Scope of entrepreneurship among women, promotional efforts supporting women entrepreneurs in India - Successful cases of women entrepreneurs.Rural Entrepreneurship and EDPs.

Text Books:

1. The Dynamics of Entrepreneurial Development and Management, Vasanth Desai, Himalaya.
2. Entrepreneurship Development & Small Business Enterprises – Second Edition, Poornima M.Charantimath, Pearson.

References:

1 .Entrepreneurial Development, S. Chand and Company Limited, S.S. Khanka.
2. Fundamentals of Entrepreneurship, H. Nandan, PHI.
3 .Entrepreneurship, 6/e, Robert D Hisrich, Michael P Peters, Dean A Shepherd, TMH.
4 .Entrepreneurship – New venture Creation, Holt, PHI.
5. Entrepreneurship- Successfully Launching New Ventures, Barringer, Ireland, Pearson.
6. Entrepreneurship, Roy, Oxford.

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B.Tech - VI Semester

L	T	P	C
0	0	3	1.5

(18PC0520) WEB AND INTERNET TECHNOLOGIES LAB

Course Objectives:

- To introduce client side scripting with Javascript and DHTML
- To introduce server side programming with Java servlets, JSP and PHP.
- To learn the basic web concepts and Internet protocols

Course Outcomes:

- Ability to create dynamic and interactive web sites.
- Gain knowledge of client side scripting using javascript and DHTML.
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servlets, JSP and PHP.
- Able to design the websites effectively.
- Follow the ethical principles in implementing the programs
- Do experiments effectively as an individual and as a team member in a group.
- Communicate verbally and in written form, the understanding about the experiments
- Able to use the concepts of HTML , Javascript for real world designing.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Web and Internet Technologies Lab	CO1	3	3	3											
	CO2	3	3	3											
	CO3	3	2												
	CO4	3	3		3										
	CO5	3	3												
	CO6								3						
	CO7									3					
	CO8										3				
	CO9												3		
		3	2.8	3	3	-	-	-	3	3	3	-	3	3	2

1. To create a simple student bio-data form using html5 . It should contain the following name (text box), address (multiline text box), gender (radio button male, female),skill sets known (check boxes – c, c++, java, C# etc), extra curricular activities (text box), nationality (combo box), submit and reset button.
2. To create an html page with different types of frames such as floating frame, navigation frame & mixed frame.
3. Design the webpage by applying the different styles using inline, external & internal style sheets.
4. Write a java script program to read .XML file and display data in a neat format.
5. To write a Javascript program to define a user defined function for sorting the values in an array. Use HTML5 for user interface.
6. To create an html page to demonstrate exception handling in javascript

   Create an html page named as —"exception.htm" and do the following.
   i. Within the script tag write code to handle exception
      a) define a method RunTest () to get any string values(str) from the user and call the method Areletters(str).
      b) In Areletters(str) method check whether str contain only alphabets (a-z, AZ), if not throw exception.
      c) Define a exception method Input Exception(str) to handle the exception thrown by the above method.
   ii. Within the body tag define a script tag to call Runtest() method define.
7. Write a jsp servlet program to implement the single text field calculator.
8. To create a php program to demonstrate the different predefined function in array, Math, Data & Regular Expression.

   Procedure:
   - Create php file named as Regularexpression.php
   - for demonstrating the method for handling various strings with regular expression Array.php
   - for demonstrating the methods for handling the array values ← Math_function.php
   - to demonstrate the predefined in math objects. Date_time.php to demonstrate ← the predefined function in date subject
9. Write a program in PHP for a simple email processing with attachment using forms
10. Write a program for PHP for a login script ; create a login database and store username and password
11. Write a program in PHP to add, update and delete using student database
12. Create a DTD to describe a library. Library has one or more books, members and staffs.
    - Each book has BookID(Attribute), Title, one or more Authors, Publisher Year of Publication, ISBN and Price.
    - Each Member has MemberID (Attribute), Name, Address, and Phone number.
    - Each Staff has StaffID (Attribute), Name, Address, and Phone number.
    - Each Author has AuthorID (Attribute), Name, Address, and Phone number.
    - Each Publisher has PublisherID (Attribute), Name, Address, and Phone number.

    Use it in a XML document.
13. Create a Schema to describe a Computer. Use the previous question's details and show an instance XML document.

14. Create a Schema to describe a library. Library has one or more - books, members and staffs.
    - Each book has BookID(Attribute), Title, one or more Authors, Publisher Year of Publication, ISBN and Price.
    - Each Member has Member ID(Attribute), Name, Address, Phone number.
    - Each Staff has StaffID(Attribute), Name, Address, Phone number.
    - Each Author has AuthorID(Attribute), Name, Address, Phone number.
    - Each Publisher has PublisherID(Attribute), Name, Address, Phone number.

    Use the above DTD in a sample XML document.

15. Create Schema describe a bank that has one or more customers, accounts or depositors. Use the previous questions details. Also show a sample instance XML document.

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B.Tech - VI Semester

L	T	P	C
0	0	3	1.5

(18PC0521) COMPILER DESIGN LAB

Course Objectives:

- Be exposed to compiler writing tools.
- Learn to implement the different Phases of compiler
- Be familiar with control flow and data flow analysis
- Learn simple optimization techniques

Course Outcomes:

- At the end of the course, the student should be able to
- Implement the different Phases of compiler using tools
- Analyze the control flow and data flow of a typical program
- Optimize a given program
- Generate an assembly language program equivalent to a source language program

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Compiler Design Lab	CO1	3	3	2											
	CO2	3	3	3		3									
	CO3	3	3			3									
	CO4	3	2		3	3									
	CO5	3	3												
	CO6								3						
	CO7									2					
	CO8										3				
	CO9												3		
		3	**2.8**	**2.5**	**3**	3	-	-	3	2	**3**	-	**3**	**3**	**2**

LIST OF EXPERIMENTS

1. Design a lexical analyzer for given language and the lexical analyser should ignore redundant spaces, tabs and new lines. it should also ignore comments. although the syntax specification states those identifiers can be arbitrarily long, you may restrict the length to some reasonable value. Simulate the same in c language.
2. Write a c program to identify whether a given line is a comment or nImprove the database design by normalization.
3.
4. Generate yacc specification for a few syntactic categories:
   a)Program to recognize a valid arithmetic expression that uses operator +, – , * and /.
   b) Program to recognize a valid variable which starts with a letter followed by any number of letters or digits.
   c)implementation of calculator using lex and yacc
5. Implement the lexical analyzer using lex, flex or other lexical analyzer generating tools.
6. a)*write a c program for constructing of ll (1) parsing.
   b)*write a c program for constructing recursive descent parsing.
7. Write a c program to implement lalr parsing.
8. Construction of operator precedence parsing table.
9. a)*write a c program to implement operator precedence parsing.
   b)*write a c program to implement program semantic rules to calculate the expression that takes an expression with digits, +and * and computes the value.
10. Implementation of code optimization techniques.

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B.Tech - VII Semester

L	T	P	C
3	0	0	3

(18PC0522) BIG DATA ANALYTICS USING R

Course Objectives:

- To learn to analyze big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts.

Course Outcomes:

On completion of this course the student will able to

- Analyze the big data analytics techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
- Explore big data applications using Pig and Hive.
- Manipulate data using R on a Big Data Platform

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Big Data Analytics using R	CO1	3	-	3	-	3	-	-	-	-	-	-	-
	CO2	3	3	3	-	3	-	-	-	-	-	-	-
	CO3	3	3	3	3	3	-	-	-	-	-	-	-
	CO4	3	3	-	3	3	-	-	-	-	-	-	-
	CO5	3	3	3	3	3	-	-	-	-	-	-	-
		3	3	3	3	3	-	-	-	-	-	-	-

UNIT I

Introduction to Big Data : Introduction to Big Data Platform – Challenges of Conventional System – Intelligent data analysis – Nature of Data – Analytic Processes and Tool – Analysis vs Reporting – Modern Data Analytic Tool – Statistical Concepts: Sampling Distributions – Re-Sampling – Statistical Inference – Prediction Error.

UNIT II

Mining Data Streams: Introduction To Stream Concepts – Stream Data Model and Architecture - Stream Computing – Sampling Data in a Stream – Filtering Stream – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) Applications – Case Studies – Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III

Hadoop: History of Hadoop- The Hadoop Distributed File System – Components of Hadoop – Analyzing the Data with Hadoop – Scaling Out – Hadoop Streaming – Design of HDFS-Java interfaces to HDFS Basics- Developing a Map Reduce Application – How Map Reduce Works – Anatomy of a Map Reduce Job run – Failures – Job Scheduling – Shuffle and Sort – Task Execution – Map Reduce Types and Formats – Map Reduce Features.

UNIT IV

Hadoop Environment: Setting up a Hadoop Cluster – Cluster specification – Cluster Setup and Installation –Hadoop Configuration – Security in Hadoop – Administering Hadoop – HDFS – Monitoring – Maintenance – Hadoop Benchmarks – Hadoop in the Cloud.

UNIT V

Frameworks: Applications on Big Data Using Pig and Hive – Data Processing operators in Pig – Hive Services – Hive QL – Querying Data in Hive – fundamentals of HBase and Zookeeper – IBM Info Sphere Big Insights and Streams. Visualization - Visual data analysis techniques, interaction techniques; Systems and applications.

Text Books:

1. Michael Berthold, David J.Hand, Intelligent Data Analysis, Spingers, 2007.
2.Tom White, Hadoop: The Definitive Guide Third Edition, O'reilly Media, 2012.
3.Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGrawHill Publishing, 2012.
4.Anand Rajaraman and Jeffrey David UIIman, Mining of Massive Datasets Cambridge University Press, 2012.

References:

1.Bill Franks, Taming the big Data tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, John Wiley & sons, 2012.
2.Glenn J. Myatt, Making Sense of Data , John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011.
3. Jiawei Han, MichelineKamber, Data Mining Concepts and Techniques, Second Edition.
4. Elsevier, Reprinted 2008. Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, Intelligent Data Mining, Springer, 2007.
5. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, Harness the Power of Big Data the IBM Big Data Platform, Tata McGraw Hill Publications, 2012.
6.Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author), Big Data, BigAnalytics.

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B.Tech - VII Semester

L	T	P	C
3	0	0	3

(18PC0523) MOBILE APPLICATION DEVELOPMENT

Course Objectives:

- To understand the android Programming
- To understand the components, views to creating android applications
- To understand android operating system

Course Outcomes:

- To implement skills Android Software development tools.
- Develop Applications using services and publishing android applications
- Create applications and send intercepting SMS.
- Program mobile applications for the Android operating system that use basic and advanced phone features.
- Deploy applications to the Android marketplace for distribution

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Mobile Application Development	CO1	3	2	3	-	3	-	-	-	-	-	-	-
	CO2	3	2	3	-	3	-	-	-	-	-	-	2
	CO3	3	-	3	-	3	-	-	-	-	-	-	2
	CO4	3	2	2	-	3	-	-	-	-	-	-	3
	CO5	3	2	3	-	3	-	-	-	-	-	-	3
		3	2	2.8	-	3	-	-	-	-	-	-	2.5

UNIT I

Understanding the Android Software Stack, Creating Android Virtual Devices, Creating the First Android Project, Using the Text view Control, Using the Android Emulator, The Android Debug Bridge(ADB), Launching Android Applications on a Handset.

UNIT II

Understanding the utility of Android API, Overview of the Android Project Files , Understanding Activities, Role of the Android Manifest File, Creating the User Interface, Commonly Used Layouts and Controls, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons.

UNIT III

Linear Layout, Relative Layout, Absolute Layout, Using Image View, Frame Layout, Table Layout,Grid Layout. Creating Values Resources, Using Drawable Resources, Switching States with Toggle Buttons, Scrolling Through Scroll View, Playing Audio and Video, Displaying Progress with Progress Bar and Assets.

UNIT IV

Using List View, Using the Spinner Control, Using the GridView Control, Using the Debugging Tool: Dalvik Debug Monitor Service (DDMS) , Debugging Application, Using the Debug Perspective.

Fragments, Creating Fragments with Java Code, What are Dialogs?, Creating Special Fragments.

UNIT V

Creating Interface Menus and Action Bars, Menus and their Types, Creating Menus through Coding, Using the Action Bar, Creating a Tabbed Action Bar, Creating a drop-Down List Action Bar.

Using SQLiteOpenHelperclass, Accessing Databases with the ADB, Creating a Data Entry Form.Sending SMS Messages with Java Code, Receiving SMS Messages, Sending Email. Understanding Broadcast Receivers.

Text Books

1. Android Programming by B.M. Harwani, Pearson Education , 2013.

References:

1.Android application Development for Java Programmers, James, C Sheusi, Cengage Learning.

2.Android in Action by w.Frank Ableson, Robi Sen, Chris King, C. Enrique Ortiz,Dreamtech.

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B.Tech - VII Semester

L	T	P	C
3	0	0	3

PROFESSIONAL ELECTIVE-4
(18PE0510) MACHINE LEARNING

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understand the issues raised by current **research.**

Course Outcomes:

- The student will be able evaluate and compare the performance or, other qualities, of algorithms for typical learning problems.
- The student will be able to design a supervised or unsupervised learning system.
- Effectively use machine learning toolboxes.
- Understand the concept behind neural networks for learning non-linear functions
- Understand and apply unsupervised algorithms for clustering

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Machine Learning	CO1	3	3	2	-	-	-	-	-	-	-	-	-
	CO2	3	3	2	-	-	-	-	-	-	-	-	-
	CO3	3	2	2	-	-	-	-	-	-	-	-	-
	CO4	3	2	2	-	-	-	-	-	-	-	-	-
	CO5	3	3	2	-	-	-	-	-	-	-	-	-
		3	**2.6**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Introduction: Well-posed learning problems, Designing a learning system, Perspectives and issues in machine 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 II

Decision Tree learning : Introduction, 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

Artificial Neural Networks: Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT III

Bayesian learning: Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm. **Computational learning theory –** Introduction, 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, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

Genetic Algorithms-Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithm.

UNIT IV

Learning Sets of Rules: Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control knowledge.

UNIT V

Combining Inductive and Analytical Learning: Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators,

Reinforcement Learning: Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming.

Text Books:

1. Machine Learning – Tom M. Mitchell, - MGH.

References:

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)
2. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
3.Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001
4. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.
5. Machine Learning by Peter Flach,Cambridge.
6.http://www.cs.cmu.edu/~tom/mlbook-chapter-slides.html

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B.Tech - VII Semester

L	T	P	C
3	0	0	3

PROFESSIONAL ELECTIVE-4
(18PE0511)DATA MINING AND DATA WAREHOUSING

Course Objectives:

- To understand the Classification of Data Mining Systems.
- To understand the Mining Frequent Pattern.
- To understand Mining Streams.

Course Outcomes:

- Demonstrate Data Warehouse and Data Mining using in real world.
- Implementing Data Warehouse in real world
- Methods to uses of Data Cube and Data Generalization

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Data mining and Data ware housing	CO1	3	-	-	-	-	-	-	-	-	-	-	-
	CO2	3	2	2	-	-	-	-	-	-	-	-	-
	CO3	3	3	-	-	-	-	-	-	-	-	-	-
	CO4	3	-	-	3	-	-	-	-	-	-	-	-
	CO5	3	2	-	3	-	-	-	-	-	-	-	-
		3	**2.3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Fundamentals of Data Mining, Data Mining Functionalities, 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, Data Preprocessing**:** Need for Preprocessing the Data, Data Cleaning, Data Integration.

UNIT II

Data Warehouse and OLAP Technology for Data Mining, Data Warehouse, Multidimensional Data Model, Data Ware Architecture, From Data Warehousing to Data Mining, Data Cube Computation and Data Generalization, OLAP Technology, Attribute-Oriented Induction

UNIT III

Mining Frequent Patterns, Classification and Prediction: Issues Regarding Classification and Prediction, Mining various kinds of Association Rules, Classification by Decision Tree Induction, Bayesian Classification, Support Vector Machines, Associative Classification, Lazy Learners, Constraint Based Association.

UNIT IV

Cluster Analysis Introduction, A Categorization of Major Clustering Methods, Density Based Methods, Grid Based Methods, Types of Data in Cluster Analysis, Clustering High Dimensional Data, Outlier Analysis, Constraint-Based Cluster Analysis, Partitioning Methods, Hierarchical Methods.

UNIT V

Mining Streams, Mining Time Series Data, Mining Sequence Patterns in Transactional Databases, Graph Mining, Social Network Analysis and Multi relational Data Mining, Mining Object ,Spatial ,Multimedia ,Text and Web Data, Spatial Data Mining ,Multimedia Data Mining, Text Mining ,Mining the World Wide Web.

Text Books:

1. Data Mining**:** Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kautmann Publishers, Elsevier ,Second Edition ,2006.

References:

1 .Data Mining Techniques, Arun KPujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory & Dennis Murray Pearson EdnAsia

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B.Tech - VII Semester

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PROFESSIONAL ELECTIVE-4
(18PE0512) DISTRIBUTED SYSTEMS

Course Objectives:

- To understand the concepts involved in process and resource management.
- To understand the concepts in system level and support required for distributed system.
- To introduce the concept of peer to peer services.
- To understand the foundations of distributed systems.

Course Outcomes:

- Able to design process and resource management systems.
- Able to apply Remote Method Invocation.
- Able to apply network virtualization.
- Able to discuss trends in distributed systems.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Distributed Systems	CO1	3	-	-	-	-	-	-	-	-	-	-	-
	CO2	3	2	2	-	-	-	-	-	-	-	-	-
	CO3	3	3	-	-	-	-	-	-	-	-	-	-
	CO4	3	-	-	3	-	-	-	-	-	-	-	-
	CO5	3	2	-	3	-	-	-	-	-	-	-	-
		3	**2.3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

UNIT I

Characterization of Distributed System: Introduction, Examples of Distributed Systems – Trends in Distributed Systems – Resource sharing, Challenges.
Case study: World Wide Web.

UNIT II

Communication in Distributed System: Inter process Communication: Introduction, The API for internet protocols, External data representation and Marshalling, Client-Server Communication, Case study: Inter process Communication in UNIX.
Distributed Objects and Remote Invocation: Communication between distributed objects, Remote Procedure call, Events and notifications, Case Study- Java RMI.

UNIT III

Distributed File Systems: Introduction, File service architecture, Sun Network File system, Andrew File system.
Name Services: Introduction, Name services and the Domain name system, Directory and discovery services. Case study: Global name service.

UNIT IV

Time and Global states: Introduction - Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Global states, Distributed Debugging.
Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication.
Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Atomic Commit protocols, Distributed deadlocks.

UNIT V

Replication: Introduction, System model and Group communication, Fault-Tolerant Services, Transactions with replicated data.Distributed shared Memory.
Case Study: CORBA- RMI, Services. MACH

Text Books:

1. George Coulouris, Jean Dollimore and Tim Kindberg,―Distributed Systems Concepts and Design‖, Fifth Edition, Pearson Education, 2012.

References:

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Systems: Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education

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B.Tech - VII Semester

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PROFESSIONAL ELECTIVE-5
(18PE0513) NATURAL LANGUAGE PROCESSING

Course Objectives:

- To learn the fundamentals of natural language processing
- To understand the use of CFG and PCFG in NLP
- To understand the role of semantics of sentences and pragmatics
- To apply the NLP techniques to IR applications

Course Outcomes:

Upon completion of the course, the students will be able to:

- To tag a given text with basic Language features
- To design an innovative application using NLP components
- To implement a rule based system to tackle morphology/syntax of a language
- To design a tag set to be used for statistical processing for real-time applications
- To compare and contrast the use of different statistical approaches for different types of NLP applications.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Natural Language Processing	CO1	3	2	2	-	-	-	-	-	-	-	-	-
	CO2	3	3	2	-	-	-	-	-	-	-	-	-
	CO3	3	2	2	-	-	-	-	-	-	-	-	-
	CO4	3	3	3	-	-	-	-	-	-	-	-	-
	CO5	3	3	3	-	-	-	-	-	-	-	-	-
		3	2.6	2.4	-	-	-	-	-	-	-	-	-

UNIT I

Introduction: Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM – Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

UNIT II

Word level analysis: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT III

Syntactic Analysis: Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures

.

UNIT IV

Semantics and Pragmatics: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation,WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT V

Discourse analysis and lexical resources : Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

Text Books:

1. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
2.Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python, First Edition, OReilly Media, 2009.

References:

1. Breck Baldwin, —Language Processing with Java and Ling Pipe Cookbook, Atlantic Publisher, 2015.
2. Richard M Reese, —Natural Language Processing with Java, OReilly Media, 2015.
3.Nitin Indurkhya and Fred J. Damerau, —Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
4.Tanveer Siddiqui, U.S. Tiwary, —Natural Language Processing and Information Retrieval, Oxford University Press, 2008.

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B.Tech - VII Semester

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PROFESSIONAL ELECTIVE-5
(18PE0515) SOFTWARE TESTING

Course Objectives:

- Fundamentals for various testing methodologies.
- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods
- Acts as the reference for software testing techniques and strategies

Course Outcomes:

- Understand the basic testing procedures.
- Able to support in generating test cases and test suites.
- Able to test the applications manually by applying different testing methods and automation tools
- Apply tools to resolve the problems in real time environment
- Discuss about the functional and system testing methods.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Software Testing	CO1	3	2	2	-	-	-	-	-	-	-	-	-
	CO2	3	2	2	-	-	-	-	-	-	-	-	-
	CO3	3	2	2	-	-	-	-	-	-	-	-	-
	CO4	3	3	3	-	-	-	-	-	-	-	-	-
	CO5	3	1	3	-	-	-	-	-	-	-	-	-
		3	2	2.4	-	-	-	-	-	-	-	-	-

UNIT I

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs. Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT II

Transaction Flow Testing & Dataflow Testing: Transaction Flows, Transaction Flow Testing Techniques. Basics of Dataflow Testing. Strategies in Dataflow Testing, Application of Dataflow Testing.

UNIT III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.

UNIT IV

Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.
Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts.

UNIT V

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips. Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Mini Project - conducting tests.

Text Books:

1. Software testing techniques – Boris Beizer, Dreamtech, Second Edition.

References:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing- Yogesh Singh, Camebridge
3. Software Testing, 3 rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
4. Software Testing, N.Chauhan, Oxford University Press.
5. Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ. Press.
6. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
7. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.

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B.Tech - VII Semester

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(18PC0524) R PROGRAMMING LAB

Course Objectives:

Data Science is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions. This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication.

Course Outcomes:

- Demonstrate mastery of a body of knowledge that includes recent developments in computer science and information technology;
- Understand and use appropriate and relevant, fundamental and applied mathematical and statistical knowledge, methodologies and modern computational tools;
- Recognise and use research principles and methods applicable to data science.
- Extract an interpretation of data using exploratory data analysis
- Visualize and plot graphical representations of data.

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
R Programming Lab	CO1	3	3	3											
	CO2	3	3	3		3									
	CO3	3	3			3									
	CO4	3	2		3	3									
	CO5	3	3												
	CO6								3						
	CO7									2					
	CO8										3				
	CO9												3		
		3	**2.8**	**3**	**3**	3	-	-	3	2	**3**	-	**3**	**3**	**2**

Task1: Basic Statistics, Visualization, and Hypothesis Tests

1. Reload data sets into the R statistical package
2. Perform summary statistics on the data
3. Remove outliers from the data
4. Plot the data using R
5. Plot the data using lattice and ggplot
6. Test a hypothesis about the data

Task 2: Linear Regression

1. Use the R -Studio environment to code OLS models
2. Review the methodology to validate the model and predict the dependent variable for a set of given independent variables
3. Use R graphics functions to visualize the results generated with the model

Task 3: Logistic Regression

1. Use R -Studio environment to code Logistic Regression models
2. Review the methodology to validate the model and predict the dependent variable for a set of given independent variables
3. Use R graphics functions to visualize the results generated with the model

Task 4: Hadoop, HDFS, Map Reduce and Pig Purpose

1. Run Hadoop and Hadoop fs and collect help information
2. Run a shell script to perform a word count activity
3. Run a Map Reduce job to produce similar output
4. Investigate the UI for Map Reduce/HDFS components to track system behavior
5. Run "Pig" statements to execute the same tasks done with Map Reduce

References

- R Commands - Quick Reference
- Surviving LINUX - Quick Reference
- Hadoop Commands
- HDFS Commands

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B.Tech - VII Semester

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(18PC0524) MOBILE APPLICATION DEVELOPMENT LAB

Course Objectives:

- To understand fundamentals of android operating systems.
- Illustrate the various components, layouts and views in creating android.
- To understand fundamentals of android programming.

Course Outcomes:

- Create data sharing with different applications and sending and intercepting SMS.
- Develop applications using services and publishing android applications.
- To demonstrate their skills of using Android software development tools
- Supporting different devices, localizations, orientations, API levels, and resolutions.
- Launching Activities and passing information between Activities

CO-PO Mapping

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
Mobile Application Development Lab	CO1	3	3	2		3									
	CO2	3	3	3		3									
	CO3	3	3			3									
	CO4	3	3		3	3									
	CO5	3	3			3									
	CO6					3			3						
	CO7					3				2					
	CO8					3					3				
	CO9					3							3		
		3	**3**	**3**	**3**	3	-	-	3	2	**3**	-	**3**	**3**	**2**

1. Create "Hello World" Application
1.1 Create a new Android Project
1.2 Run "Hello World" on the Emulator
1.3 On a Physical Device
1.4 Greeting the User

2. Create Application by Using Widgets
2.1 Creating the Application by using the Activity class
(i) onCreate ()
(ii) onStart ()
(iii) onResume()
(iv) onPause ()
(v) onStop()
(vi) onDestroy ()
(vii) OnRestart ()
2.2 Creating the Application by using Text Edit control.
2.3 Creating the Application Choosing Options
(i) CheckBox
(ii) RadioButton
(iii) RadioGroup
(iv) Spinner

3. Create Application by Using Building Blocks for Android Application Design
3.1 Design the Application by using
(i) Linear Layout
(ii) Relative Layout
(iii) Absolute Layout
3.2 Create the Application to play the Audio and Video clips.
4. Create Application by Using Building Menus and Storing Data
4.1 Design the Application for Menus and Action Bar
4.2 Design the application to display the Drop-Down List Action Bar
5. Implement an application that creates an alert upon receiving a message.

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B.Tech - VIII Semester

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PROFESSIONAL ELECTIVE-6
(18PE0516)UNIX INTERNALS

Course Objectives:

Students undergoing this course are exposed to:

- Get a thorough understanding of the kernel.
- Understand the file organization and management.
- Enhance knowledge about various system calls.
- Have knowledge of process architecture, process control & scheduling and memory management.

Course Outcomes:

- Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.
- Effectively use the UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.
- Monitor system performance and network activities.
- Effectively use software development tools including libraries, preprocessors, compilers, linkers, and make files.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Unix Internals	CO1	3	2	2	-	-	-	-	-	-	-	-	-
	CO2	3	2	2	-	-	-	-	-	-	-	-	-
	CO3	3	3	3	-	-	-	-	-	-	-	-	-
	CO4	3	2	3	-	-	-	-	-	-	-	-	-
	CO5	3	2	3	-	-	-	-	-	-	-	-	-
		3	2.2	2.6	-	-	-	-	-	-	-	-	-

UNIT I

Introduction to UNIX: History, need of change, Standards The process and the kernel: Mode, space and context, Process abstraction, executing in kernel mode, synchronization by blocking interrupts, process scheduling, signals, process creation, termination, awaiting process termination, zombie processes

UNIT II

Buffer and Inode: The Buffer Cache-Headers-Buffer Pool-Buffer Retrieval-Reading and Writing Disk Blocks – Advantages and Disadvantages. Internal Representation of Files-Inodes Structure-Directories-Path Name to Inode- Super Block-Inode Assignment-Allocation of Disk Blocks –Other File Types.

UNIT III

File System Interface and Framework: The user interface to files, File systems, Special files, File system framework, The Vnode/Vfs architecture, Implementation Overview, File System dependent objects, Mounting a file system, Operations on files.

UNIT IV

Inter Process Communication: Process Tracing – System V IPC – Network Communications – Sockets – Messages – Message Data Structures – Message Passing Interface – Ports – Name Space – Data Structures – Port Translations – Message Passing Process Scheduling and Time: Process scheduling – System calls for Time – Clock – Scheduler goals – Process priorities – Scheduler Implementation – Run Queue Manipulation – The SVR4 Scheduler; Memory Management Policies: Swapping – Demand Paging – A Hybrid System with swapping and demand paging.

UNIT V

UNIX Tools and Programming : Shell programming – UNIX commands – Text processing – sed and awk utilities – grep utility – Introduction to Lex, Yacc utilities – Introduction to Perl programming.

Text Books

1. Maurice J. Bach, “The Design of the Unix Operating System”, Pearson Education,2002.

References:

1. UreshVahalia, “UNIX Internals: The New Frontiers”, Prentice Hall, 2000.
2. John Lion, “Lion’s Commentary on UNIX”, 6 th edition, Peer-to-Peer Communications, 2004.

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B.Tech - VIII Semester

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PROFESSIONAL ELECTIVE-6
(18PE0517) SOFT COMPUTING

Course Objectives:

- To learn the basic concepts of Soft Computing
- To become familiar with various techniques like neural networks, genetic algorithms and fuzzy systems.
- To apply soft computing techniques to solve problems.

Course Outcomes:

Upon completion of this course, the students should be able to

- Apply suitable soft computing techniques for various applications.
- Integrate various soft computing techniques for complex problems.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Soft Computing	CO1	3	3	3	-	-	-	-	-	-	-	-	-
	CO2	3	3	3	-	-	-	-	-	-	-	-	-
	CO3	3	3	2	-	-	-	-	-	-	-	-	-
	CO4	3	2	2	-	-	-	-	-	-	-	-	-
	CO5	3	2	2	-	-	-	-	-	-	-	-	-
		3	2.6	2.4	-	-	-	-	-	-	-	-	-

UNIT I

Introduction to Soft Computing: Introduction-Artificial Intelligence-Artificial Neural Networks-Fuzzy Systems-Genetic Algorithm and Evolutionary Programming-Swarm Intelligent Systems-Classification of ANNs-McCulloch and Pitts Neuron Model-Learning Rules: Hebbian and Delta- Perceptron Network-Adaline Network-Madaline Network.

UNIT II

Artificial Neural Networks**:** Back propagation Neural Networks – Kohonen Neural Network -Learning Vector Quantization -Hamming Neural Network – Hopfield Neural Network-

Bi-directional Associative Memory -Adaptive Resonance Theory Neural Networks- Support Vector Machines – Spike Neuron Models.

UNIT III

Fuzzy Systems: Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets – Classical Relations and Fuzzy Relations -Membership Functions -Defuzzification – Fuzzy Arithmetic and Fuzzy Measures -Fuzzy Rule Base and Approximate Reasoning – Introduction to Fuzzy Decision Making.

UNIT-IV:

Genetic Algorithms: Basic Concepts- Working Principles -Encoding- Fitness Function – Reproduction -Inheritance Operators – Cross Over – Inversion and Deletion -Mutation Operator – Bit-wise Operators -Convergence of Genetic Algorithm.

UNIT V:

Hybrid Systems: Hybrid Systems -Neural Networks, Fuzzy Logic and Genetic -GA Based Weight Determination – LR-Type Fuzzy Numbers – Fuzzy Neuron – Fuzzy BP Architecture – Learning in Fuzzy BP- Inference by Fuzzy BP – Fuzzy ArtMap: A Brief Introduction – Soft Computing Tools – GA in Fuzzy Logic Controller Design – Fuzzy Logic Controller

Text Books:

1. N.P.Padhy, S.P.Simon, “Soft Computing with MATLAB Programming”, Oxford University Press, 2015.
2. S. N.Sivanandam, S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt.Ltd., 2nd Edition, 2011.
3. S.Rajasekaran, G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm, Synthesis and Applications ", PHI Learning Pvt.Ltd, 2017.

References:

1.Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, ―Neuro-Fuzzy and Soft Computing‖, Prentice-Hall of India, 2002.
2. Kwang H.Lee, ―First course on Fuzzy Theory and Applications‖, Springer, 2005.
3. George J. Klir and Bo Yuan, ―Fuzzy Sets and Fuzzy Logic-Theory and Applications‖, Prentice Hall, 1996.
4. James A. Freeman and David M. Skapura, ―Neural Networks Algorithms, Applications, and Programming Techniques‖, Addison Wesley, 2003.

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B.Tech - VIII Semester

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PROFESSIONAL ELECTIVE-6
(18PE0518) DATA SCIENCE

Course Objectives:

- To understand the Data Analysis
- To understand the Data Processing
- To understand the Data Deployment

Course Outcomes:

- To implement data from business perspective
- Big Data from Technology
- Create in data in Data Flow
- Execute statistical analyses with professional statistical software
- Demonstrate skill in data management

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Data Science	CO1	3	3	2	-	-	-	-	-	-	-	-	-
	CO2	3	3	2	-	-	-	-	-	-	-	-	-
	CO3	3	2	2	-	-	-	-	-	-	-	-	-
	CO4	3	2	2	-	-	-	-	-	-	-	-	-
	CO5	3	2	3	-	-	-	-	-	-	-	-	-
		3	2.4	2.2	-	-	-	-	-	-	-	-	-

UNIT I

Introduction to Data Science: Introduction of Data Science – Basic Data Analytics using R – R Graphical User Interfaces – Data Import and Export – Attribute and Data Types – Descriptive Statistics – Exploratory Data Analysis – Visualization Before Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables – Data Exploration Versus Presentation.

UNIT II

Advanced analytical theory and methods: Overview of Clustering – K-means – Use Cases – Overview of the Method – Perform a K-means Analysis using R – Classification – Decision Trees – Overview of a Decision Tree – Decision Tree Algorithms – Evaluating a Decision

Tree – Decision Tree in R – Bayes Theorem – Naïve Bayes Classifier – Smoothing – NaïveBayes in R.

UNIT III

Big data from different perspectives: Big data from business Perspective: Introduction of big data-Characteristics of big data-Data in the warehouse and data in Hadoop- Importance of Big data- Big data Use cases: Patterns for Big data deployment. Big data from Technology Perspective: History of Hadoop-Components of Hadoop-Application Development in Hadoop-Getting your data in Hadoop-other Hadoop Component.

UNIT IV

Hadoop distributed file system architecture: HDFS Architecture – HDFS Concepts – Blocks – Name Node – Secondary Name Node – Data Node – HDFS Federation – Basic File System Operations – Data Flow – Anatomy of File Read – Anatomy of File Write.

UNIT V

Processing your data with Map Reduce: Getting to know MapReduce – MapReduce Execution Pipeline – Runtime Coordination and Task Management – MapReduce Application – Hadoop Word Count Implementation.

Text Books

1. Noreen Burlingame and Lars Nielsen, "A Simple Introduction to DATA SCIENCE", 2012.

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B.Tech - VIII Semester

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3	0	0	3

OPEN ELECTIVE-3
(S) HUMAN COMPUTER INTERACTION

Course Objectives:

- Gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing
- Become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans
- Be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation
- Be familiar with a variety of both conventional and non-traditional user interface paradigms

Course Outcomes:

- Find innovative ways of interacting with computers
- Help the disabled by designing non-traditional ways of interacting
- Use cognitive psychology in the design of devices for interaction
- Apply Information Systems tools to prototype the end-user design.
- Develop end-user interfaces incorporating problem solving solutions in HCI

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Human Computer Vision	CO1	3	2	3	-	-	-	-	-	-	-	-	-
	CO2	3	2	3	-	-	-	-	-	-	-	-	-
	CO3	3	2	3	-	-	-	-	-	-	-	-	-
	CO4	3	2	3	-	-	-	-	-	-	-	-	-
	CO5	3	2	3	-	-	-	-	-	-	-	-	-
		3	2	3	-	-	-	-	-	-	-	-	-

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II

Design process: Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – statistical graphics – Technological consideration in interface design.

UNIT III

Windows –New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT IV

Software tools –Specification methods, interface – Building Tools.

UNIT V

Interaction Devices –Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

Text Books:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

References:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, RussellBealg, Pearson Education.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human –Computer Interaction, D.R.Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith – Atakan, Cengage Learning.

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B.Tech - VIII Semester

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OPEN ELECTIVE-3
(S) COMPUTER GRAPHICS

Course Objectives:

- To provide students with an understanding of the algorithms and theories that form the basis of computer graphics and modeling.
- To give students skills necessary in the production of 2D &3D models.

Course Outcomes:

- Acquire familiarity with the relevant mathematics of computer graphics.
- Be able to design basic graphics application programs, including animation
- Be able to design applications that display graphic images to given specifications
- Be able to apply 3D geometric transformations to given specifications.
- Be able to apply computer animation languages.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Computer Graphics	CO1	3	2	3	-	-	-	-	-	-	-	-	-
	CO2	3	2	3	-	-	-	-	-	-	-	-	-
	CO3	3	2	3	-	-	-	-	-	-	-	-	-
	CO4	3	2	3	-	-	-	-	-	-	-	-	-
	CO5	3	3	2	-	-	-	-	-	-	-	-	-
		3	2.2	2.8	-	-	-	-	-	-	-	-	-

UNIT I

Introduction:

Application areas of Computer Graphics, Overview of graphics systems: video-display devices, raster-scan systems, random scan systems, graphics monitors and workstations and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms .Filled area primitives, Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT II

2-D Geometrical Transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing

functions, Cohen-Sutherland and Liang-Barsky line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT III

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Illumination Models: Basic illumination models, polygon rendering methods.

UNIT IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT V

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area subdivision and octree methods Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Text Books:

1.“Computer Graphics C version”, Donald Hearn and M. Pauline Baker, 2nd edition, Pearson education.

References:

1.“Procedural elements for Computer Graphics”, David F Rogers, Tata Mc Graw hill, 2nd edition.
2.“Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.
3.Computer Graphics,F.S.Hill,S.M.Kelley,PHI.
4. Computer Graphics & Animation,M.C.Trivedi,Jaico Publishing House.
5.Computer Graphics,Rajesh K.Maurya,Wiley India.

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B.Tech - VIII Semester

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OPEN ELECTIVE-3
(S) REAL TIME SYSTEMS

Course Objectives:

- To impart knowledge real time systems and its applications
- Be exposed to the basic concepts of real time system.
- To make the student gain proficiency in analyzing Real Time Systems.

Course Outcomes:

- Conceptualize the system from given requirements.
- Analyze real time system requirements and design real time models.
- Design and develop algorithms for RTS
- Able to apply the fault tolerance techniques to real time models.
- Able to apply non fault- tolerant synchronization algorithms to real time systems.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Real Time Systems	CO1	3	-	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	3	2	-	-	-	-	-	-	-	-
	CO3	3	3	3	2	-	-	-	-	-	-	-	-
	CO4	3	3	3	2		-	-	-	-	-	-	-
	CO5	3	2	2	2	-	-	-	-	-	-	-	-
		3	2.7	2.7	2	-	-	-	-	-	-	-	-

UNIT I

Introduction: Issues in Real Time Computing, Structure of a Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment and Scheduling - Classical Uniprocessor scheduling algorithms, UniProcessor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

UNIT II

Programming Language and Tools: Desired Language characteristics, Data Typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run-time (Exception) Error handling, Overloading and Generics, Multitasking, Low Level programming, Task scheduling, Timing Specifications, Programming Environments, Run-time Support.

UNIT III

Real time Databases: Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.

UNIT IV

Real-Time Communication: Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques - Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

UNIT V

Reliability Evaluation Techniques: Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error models. Clock Synchronization - Clock, A Non Fault-Tolerant Synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software

Text Books:

1. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, McGraw-Hill International Editions, 1997.

References:

1. Stuart Bennett, “Real Time Computer Control-An Introduction”,Second edition Perntice Hall PTR, 1994.
2. Peter D. Lawrence, “Real time Micro Computer System Design – An Introduction”, McGraw Hill, 1988.
3. S.T. Allworth and R.N. Zobel, “Introduction to real time software design”, Macmillan, II Edition, 1987.
4. R.J.A Buhur, D.L. Bailey, “An Introduction to Real-Time Systems”, Prenticeall International, 1999.
5. Philip.A.Laplante “Real Time System Design and Analysis” PHI , III Edition, April 2004.

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B.Tech - VIII Semester

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OPEN ELECTIVE-4
(S) DESIGN PATTERNS

Course Objectives:

- Understand the concept of Design patterns and its importance.
- Understand the behavioral knowledge of the problem and solutions.
- Relate the Creational, Structural ,behavioral Design patterns.
- Apply the suitable design patterns to refine the basic design for given context.

Course Outcomes:

- Identify the appropriate design patterns to solve object oriented design problems.
- Develop design solutions using creational patterns.
- Apply structural patterns to solve design problems.
- Construct design solutions by using behavioral patterns.
- Apply the design solutions to a problem.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Design Patterns	CO1	3	2	3	-	-	-	-	-	-	-	-	-
	CO2	3	2	3	-	-	-	-	-	-	-	-	-
	CO3	3	2	3	-	-	-	-	-	-	-	-	-
	CO4	3	2	3	-	-	-	-	-	-	-	-	-
	CO5	3	2	3	-	-	-	-	-	-	-	-	-
		3	2	3	-	-	-	-	-	-	-	-	-

UNIT I

Introduction to Design Patterns: Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

UNIT II

Designing A Document Editor: A Case Study Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT III

Structural Patterns-1: Adapter, Bridge, Composite. Structural Patterns-2: Decorator, Façade, Flyweight, Proxy, Discuss of Structural Patterns.

UNIT IV

Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator. All Behavioral Patterns-2: Mediator, Memento, Observer.

UNIT V

Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

Text Books:

1. Design Patterns By Erich Gamma, Pearson Education**.**

References:

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley Dream Tech.
2. Pattern's in JAVA Vol – II BY Mark Grand, Wiley Dream Tech.
3. JAVA Enterprise Design Patterns Vol – III By Mark Grand, Wiley Dream TECH.
4. Head First Design Patterns By Eric Freeman – Oreilly – spd.
5. Peeling Design Patterns, Prof Meda Srinivasa Rao, Narsimha Karumanchi, and Career Monk Publication.
6. Design Patterns Explained By Alan Shallowy, Pearson Education.
7. Pattern Oriented Software Architecture, af.Buschman & others, John Wiley & Sons.

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B.Tech - VIII Semester

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OPEN ELECTIVE-4
(S) CYBER SECURITY

Course Objectives:

- Appraise the current structure of cyber security roles across the DoD enterprise, including the roles and responsibilities of the relevant organizations.
- Evaluate the trends and patterns that will determine the future state of cyber security

Course Out comes:

- To develop an excellent understanding of current cyber security issues (Computer Security Incident) and analyzed the ways that exploits in securities.
- Analyze threats and risks within context of the cyber security architecture.
- Appraise cyber security incidents to apply appropriate response.
- Evaluate decision making outcomes of cyber security scenarios.
- Able to apply social media marketing.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Cyber Security	CO1	3	3	2	-	-	-	-	-	-	-	-	-
	CO2	3	3	2	-	-	-	-	-	-	-	-	-
	CO3	3	2	3	-	-	-	-	-	-	-	-	-
	CO4	3	2	3	-	-	-	-	-	-	-	-	-
	CO5	3	2	2	-	-	-	-	-	-	-	-	-
		3	2.4	2.4	-	-	-	-	-	-	-	-	-

UNIT I

Introduction to Cybercrime: Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT II

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT IV

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT V

Cyber Security: Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Nina Godbole & Sunit Belapure “Cyber Security”, Wiley India, 2012.

References

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group.
3. Harish Chander, “cyber laws & IT protection”, PHI learning pvt.ltd, 2012.

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B.Tech - VIII Semester

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OPEN ELECTIVE-4
(S) PARALLEL ALGORITHMS

Course Objectives

The objective of the course is to make the students:

- To unders
- tand the basics behind on implementing efficient parallel algorithms.
- Familiar with the fundamentals of discrete probability theory.
- To understand the parallel algorithms related to many areas of expression computing, graph problems, sorting etc.
- Able to analyze the randomized algorithms & to understand the selected randomized data structures.
- Familiar with the theory of Markov chains and their algorithm.

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following

- Can able to analyze different randomized algorithms.
- Can be able to resolve the issues in implementing efficient parallel algorithms.
- Explain the different ways to analyze the parallel algorithms.
- Compare between different randomized algorithms.
- Analyze worst-case running times of algorithms using asymptotic notations.
- Explain the correctness of algorithms using inductive proofs and invariants.

Course	PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Parallel Algorithms	CO1	3	3	3	-	-	-	-	-	-	-	-	-
	CO2	3	3	3	-	-	-	-	-	-	-	-	-
	CO3	3	2	3	-	-	-	-	-	-	-	-	-
	CO4	3	2	3	-	-	-	-	-	-	-	-	-
	CO5	3	2	2	-	-	-	-	-	-	-	-	-
		3	2.4	2.8	-	-	-	-	-	-	-	-	-

UNIT I

Fundamentals of Efficient Parallel Algorithms, sequential model, need of an alternative model, PRAM, LMCC, Hypercube, cube connected cycle, Butterfly, Perfect shuffle computers Tree model, Pyramid model, fully connected model, PRAM-CREW, EREW models, simulation of one model from another one.

UNIT II

Performance Measures of Parallel Algorithms, speed-up and efficiency of Parallel Algorithms, Cost-optimality Cost optimality algorithms with the illustration of examples-Such as Summation, Min/Max on various models.

UNIT III

Parallel Sorting Networks on CREW/EREW/MCC, Parallel Merging Algorithms on CREW/EREW/MCC, linear array Parallel Searching Algorithm, Parallel Matrix, Transportation and Multiplication Algorithm on PRAM, MCC, Vector Matrix Multiplication, Solution of Linear Equation ,Root Finding

.

UNIT IV

Randomized Algorithms, Randomized Quick sort and Mincut Algorithms, Moments and Deviations Markov and Chebyshev Inequalities , Chernoff Bounds, Martingales , Markov Chains and Random Walks.

UNIT V

Randomized Data Structures, Randomized Search Tress, Game Tree, Hashing, Random Graphs, Random Walks in Graph, Derandomization.

Text Books:

1. Designing Efficient Algorithms for Parallel Computer, M.J. Quinn, and McGrawHill.
2. Probability and Computing: Randomized algorithm sand Probabilistic Analysis, Michael Mitzen macher and Eli Upfal. Cambridge University Press, 2005

References :

1.The Design and Analysis of Parallel Algorithms, S.G.Akl, PHI, 1989.
2. Design and Analysis of Randomized Algorithms: Introduction to Design Paradigms .Juraj Hromkovic Springer,2005