

ACADEMIC REGULATIONS COURSE STRUCTURE and DETAILED SYLLABUS

COMPUTER SCIENCE AND TECHNOLOGY

For

B.Tech., FOUR YEAR U.G. COURSE
(Applicable for batches admitted from 2019-2020)



☎08818-284577, 284355 Ext: 321; Fax: 08818-284577

Visit us at: www.srivasaviengg.ac.in

SRI VASAVI ENGINEERING COLLEGE (Autonomous)

(Sponsored by Sri Vasavi Educational Society)

(Approved by AICTE, New Delhi & Permanently affiliated to JNTUK, Kakinada)

(Accredited by NAAC with 'A' Grade, Recognized by UGC under section 2(f) & 12(B))

Pedatadepalli, **TADEPALLIGUDEM – 534 101.W.G.Dist. (A.P)**

Institute Vision and Mission

Vision:

To be a premier technological institute striving for excellence with global perspective and commitment to the nation.

Mission:

- To produce engineering graduates of professional quality and global perspective through Learner Centric Education.
- To establish linkages with government, industry and research laboratories to promote R&D activities and to disseminate innovations.
- To create an eco-system in the institute that leads
- to holistic development and ability for life-long learning.

Department Vision and Mission

Vision:

To evolve as a centre of academic and research excellence in the area of Computer Science and Technology.

Mission :

- To utilize innovative learning methods for academic improvement.
- To encourage higher studies and research to meet the futuristic requirements of Computer Science and Technology.
- To inculcate Ethics and Human values for developing students with good character.

Program Educational Objectives (PEOs)

Graduates of this program will :

PEO 1: Adapt to evolving technology.

PEO 2: Provide optimal solutions to real time problems.

PEO 3: Demonstrate his/her abilities to support service activities with due consideration for Professional and Ethical Values.

Program Specific Outcomes (PSOs)

A graduate of the Computer Science and Technology Program will be able to:

PSO 1: Use Mathematical Abstractions and Algorithmic Design along with Open Source Programming tools to solve complexities involved in Programming. **[K3]**

PSO 2: Use Professional engineering practices and strategies for development and maintenance of software. **[K3]**

Program Outcomes (POs)

Computer Science Technology Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of Mathematics, Science, Engineering Fundamentals and Concepts of Computer Science Technology to the solution of complex Engineering problems. [K3]
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of Mathematics, Natural Sciences and Computer Science. [K4]
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations. [K5]
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. [K5]
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. [K3]
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. [K3]
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. [K3]
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice. [K3]
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. [K6]
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. [K2]
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. [K6]
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. [K1]

**ACADEMIC RULES
AND
REGULATIONS**

Academic Rules and Regulations for B.Tech. Programme
(Applicable to the Batches Admitted in 2019 and onwards)

1.0 All the rules and regulations specified hereafter shall be read as a whole for the purpose of interpretation and when any doubt arises, the decision of the Chairman Academic Council of Sri Vasavi Engineering College is final.

As per the norms, the Principal of the college (Autonomous) shall be the Chairman of Academic Council.

2.0 ADMISSIONS:

ELIGIBILITY:

As per the norms of JAHAWARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA, Kakinada

B.TECH - REGULAR:

For Category – A seats (**Filled by the Convener, AP EAMCET**), a pass in Intermediate/10+2 with a rank in Common Entrance Test, AP EAMCET conducted by APSICHE.

For Category – B seats (**Filled by the College**), a pass (**50% Min aggregate**) in Intermediate/10+2 with or without a rank in AP EAMCET.

B.TECH -LATERAL ENTRY:

Admission under lateral entry is governed by the eligibility norms of JNTUK and Government of Andhra Pradesh.

2.1 ADMISSIONS UNDER SPECIAL CASES:

These may arise in the following situations.

1. When a student gets detained due to academic regulations and re-joins the college to complete the programme in a new regulation.
2. When a student discontinues for some time and re-joins the college to complete the programme in a new regulation.
3. When a student seeks transfer from other colleges to SVEC and intends to pursue B.Tech programme in the eligible branch of study.

These admissions may be permitted by the College Academic Council as per the norms stipulated by the statutory bodies and the Government of Andhra Pradesh from time-to-time.

In all such cases for admission if necessary permissions from the statutory bodies are to be obtained and the programme of study at the college will be governed by the transitory regulations stipulated in 9.10.

An undertaking from the students is to be taken at the time of admission stating that they would abide by the transitory regulations specified by the authorities if there is any change in the regulations.

3.0 DURATION OF THE PROGRAM AND MEDIUM OF INSTRUCTION:

The duration of the B.Tech program is four academic years comprising two semesters in each academic year. **The medium of instruction and examination is English.**

S.No	Activity	Description
1	Number of Semesters in an Academic year.	Two
2	Regular Semester duration in Weeks.	21 Weeks

3.1 Academic Activities Schedule:

1	Instruction	Starts from the date commencement of the semester as specified in the academic calendar.
2	1 st Mid Examinations	During the 9 th week from the date of commencement of the semester.
3	2 nd Mid Examinations	During the 17 th week from the date of commencement of the semester
4	Comprehensive Test	During the 18 th week from the date of commencement of the semester
5	Practical Examinations	1 Week
6	End Semester Examinations	2 Weeks

3.2 EVALUATION:**For Theory Courses:**

Continuous Internal evaluation (CIE) for 40 marks and Semester End Examinations (SEE) for 60 marks of the student's performance.

For Laboratory course:

40 marks for Continuous Internal Evaluation (CIE) and 60 Marks for the Semester End Examinations (SEE).

4.0 PROGRAMS OF STUDY IN B.TECH:

4.1 The four year B.Tech programme is offered in the following branches of study at present:

S.No	Title of the UG Programme	Program Code
1.	Civil Engineering	CE
2.	Electrical and Electronics Engineering	EEE
3.	Mechanical Engineering	ME
4.	Electronics and Communication Engineering	ECE
5.	Computer Science & Engineering	CSE

4.2 Structure of the programme:

4.2.1 Each B.Tech programme of study shall consist of:

1. General courses in Basic Sciences, Basic Engineering Sciences, Social Sciences & Humanities.
2. Interdisciplinary courses in Engineering to impart the fundamentals of Engineering to the student.
3. Program core courses to impart broad based knowledge needed in the branch of study concerned.
4. Program elective courses from the discipline and open elective courses from interdisciplinary areas to be chosen by the student based on his/her interest and specialization preferred.

5. Laboratory courses
6. Projects, seminars and internships.
7. Every programme of study shall be designed to have 45-50 theory courses and 15-20 laboratory courses and the percentage distribution of the credits among different types of courses is as follows.

Humanities, Social Sciences, Basic Sciences and Engineering Science courses	35-40%
Professional core courses	30-40%
Professional and open elective courses	10-15%
Major project, Seminar, Employability skills and etc.,	10-15%

4.2.2 Contact hours:

Depending on the requirements of the programme, the number of contact hours per week is normally between 25 to 30.

4.2.3 Credits:

Credits are assigned to each course as per the norms as shown below:

Theory Course:	1 hour per week	-	1 credit
Laboratory Course:	1 hour per week	-	0.5 credit

4.3 Curriculum for programme of study:

1. The curriculum of B.Tech programme in any branch of Engineering is formulated based on the guidelines mentioned in 4.2, (to be recommended by the Board of Studies concerned and approved by the Academic Council).
 2. (After getting approval from the Academic Council, a copy of the curriculum along with rules and regulations for the programme shall be made available to all the students.)
- The following table shows a typical curriculum frame work for the B.Tech programme.

S.No	Course Area	Typical no of credits for a total of 160 credits
1.	Humanities & Social Sciences	10-15
2.	Basic Sciences	20-25
3.	Engineering Sciences	20-25
4.	Professional Core	45-60
5.	Professional Electives	12-18
6.	Major Project/Seminar, etc.,	10-15
7.	Open Electives	6-12

4.4 Maximum duration permitted to pursue the programme and cancellation of admission:

4.4.1 The maximum duration permitted to successfully complete the four year B.Tech. Programme of study shall be:

1. Eight academic years in sequence from the year of admission for a normal student admitted into the first year of the Programme.
2. Six academic years in sequence from the year of admission for a lateral entry student admitted into the second year of the Programme.

4.4.2 In case, any student fails to meet the applicable conditions for the eligibility of degree in the maximum stipulated period as mentioned in **4.4.1** his/her admission stands cancelled.

5.0 EXAMINATION SYSTEM AND EVALUATION:

5.1. The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute marks basis. However, for the purpose of reporting the performance of candidate, letter grades and grade points will be awarded. The performance of the student in each theory course is assessed through

1. Mid Semester Examinations
2. Comprehensive tests and
3. End Semester Examinations

For each theory/design and/or drawing course there shall be a Semester End Examination of three hours duration at the end of each semester, except where stated otherwise in the detailed scheme of instruction.

5.2. The distribution of marks between continuous internal evaluation (CIE) and semester end examination (SEE) will be as follows:

Nature of the course	CIE	SEE
Theory Courses	40	60
Drawing	40	60
Practical	40	60
Seminar Presentation/Comprehensive Viva	50	-
Project work Part-A	50	
Project work Part-B	50	150
Mandatory course	40	60

5.3. Continuous Internal Evaluation (CIE) in Theory and Drawing Courses:

For theory Courses the distribution for 40 marks under CIE will be as follows:

Two Mid semester examinations	-	25 marks each
Comprehensive test	-	10 marks
Assessment through Alternate assessment tool (AAT)		
2 times in a Semester	-	05 marks each

CIE is computed as follows.

Two Mid Semester Examinations will be conducted, each for 25 marks. In order to encourage the students to appear for both examinations, weighted average of both exams will be taken as follows:

$$\text{CIE} = 0.8 \times \text{Best performance in MID exam} + 0.2 \times \text{Next best performance in MID exam} + \frac{(\text{AAT1} + \text{AAT2})}{2} + \text{Performance in comprehensive test}$$

Comprehensive test in the total syllabus will be conducted at the end of the instruction.

The alternate assessment tool with detailed modality of evaluation for each course shall be specified by the teacher concerned at the beginning of the course with the permission of HOD concerned and the Principal.

The Mid Semester Examination is conducted in the regular mode according to a schedule which will be specified in the academic calendar.

The said examination consists of Part-A and Part-B, Part-A being objective type for 10 marks and Part-B being a written examination for 15 marks.

Engineering Graphics:

The internal evaluation for 40 marks will be done as follows:

- | | |
|--|------------------|
| 1. Each student has to submit 6 drawing assignments - | 6 x 5 = 30 marks |
| 2. Two mid examinations each for 10 marks with weighted average as specified above | =10 marks |
| Total- | 40 marks |

5.4. Semester End Examination Evaluation:

5.4.1 For each theory, design and/or the drawing course there shall be a semester end examination of three hours duration at the end of each semester for 60 marks unless stated otherwise in the detailed scheme of instructions.

The end semester examination is conducted for 60 marks covering the total syllabus.

There will be 6 questions with internal choice (One from each Unit). The student has to answer all the 6 questions which carry a weightage of 10 marks each.

5.4.2 For practical Courses there shall be continuous evaluation during the semester for 40 internal marks and semester end examination for 60 marks. The 40 marks under CIE shall be awarded as follows:

Day to day work -15 marks, Record-10 marks and internal laboratory test (to be conducted towards the end of the semester)-15 marks.

The Semester end examination in practical course shall be conducted by the teacher concerned and an external examiner.

5.4.3 For the seminar, the student shall collect the information on a specified topic and prepare a technical report and has to make an oral presentation showing his understanding over the topic to be evaluated by the Departmental committee consisting of **Head of the**

department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

Project Part-A: The student will make literature survey, identify a problem and prepare a plan for the execution of the proposed project work. Evaluation will be done by the departmental committee consisting of Head of the Department, Project In-charge and a senior faculty member. The evaluation will be done for 50 marks based on the report submitted and a seminar/viva-voce.

Project Part-B: Out of a total of 200 marks for the project work-Part B, 50 marks shall be for Internal Evaluation and 150 marks for the Semester End Examination. The Semester End Examination (Viva – Voce) shall be conducted by a committee consisting of an external examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of VIII semester. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project and evaluated by an internal committee.

5.4.4 A minimum of 21 marks (35%) are to be secured exclusively in the semester end examination of theory/drawing course and a minimum total of 40 marks in SEE and CIE put together (40%) in a theory/drawing course is to be secured in order to be declared as passed in that course and for award of the grade in that course.

6.0 ATTENDANCE REQUIREMENTS:

A student is eligible to write the semester end examinations (SEE) if he/she acquires a minimum of 75% of attendance in aggregate of all the courses of that semester put together.

6.1 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a given semester may be granted by the College Academic Committee on medical grounds provided the student has submitted the application for medical leave along with medical certificate from a Registered medical practitioner within three days from reporting to the class work after the expiry of the medical leave.

6.2 A student representing the college in approved extracurricular activities such as sports, games, cultural meets, seminars, workshops and conferences shall be considered as on duty provided he/she has obtained prior written permission from the head of the department concerned and also submitted the certification of participation from the organizer of the event within three days after the completion of the event. However,

this period of absence shall be counted as present for the purpose of computation of attendance only.

- 6.3 A stipulated fee shall be payable towards condonation of shortage of attendance.
- 6.4 Attendance below 65% in aggregate shall not be condoned under any circumstances.
- 6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their semester end examinations.
- 6.6 A student who is short of attendance in a semester may seek re-admission into that semester when offered again, within 1 week from the date of the commencement of class work.
- 6.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester and the credit requirements specified under 7.0.
- 6.8 If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
- 6.9 A student is permitted to avail the condonation of shortage of attendance as mentioned above for a maximum of three times only during the total duration of the programme.

7.0 CONDITIONS FOR PROMOTION:

Minimum academic requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in **item no.6.0**.

- 7.1 A student is deemed to have satisfied the minimum academic requirements if he/she has earned the credits allotted to each theory/practical/design/drawing/laboratory course/project and secures not less than 35% of marks in the semester end examination and minimum 40% of marks in the sum total of the internal marks and semester end examination marks.
- 7.2 A student shall be promoted from first year to second year if he/she fulfills the minimum attendance requirement.
- 7.3 A student shall be promoted from II year to III year if he/she earns 50% of the total credits specified up to and including II year II semester.
- 7.4 A student shall be promoted from III year to IV year only if he earns 50 % of the credits specified up to and including III year I semester

8.0 GRADING SYSTEM:

8.1 Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each course. The letter grades and the corresponding grade points are as given in the table.

TABLE: GRADES & GRADE POINTS

Grade	Grade Points	% of marks
S	10	≥ 90
A	9	$\geq 80 - < 90$
B	8	$\geq 70 - < 80$
C	7	$\geq 60 - < 70$
D	6	$\geq 50 - < 60$
E	5	$\geq 40 - < 50$
F	0 (Failed)	< 40
	0 (Absent)	—

8.2 A student who earns a minimum of 5 grade points (E grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course.

However, it should be noted that a pass in any course/term paper/project shall be governed by the rules mentioned in 5.0.

8.3 For Mandatory Courses: The evaluation will be done based on CIE and SEE with weightage as given in 5.2. These courses will not carry any credits. The performance will be graded as pass/fail. The grades obtained in these courses will not affect the grade point average; however, they will appear on the grade sheet.

8.4 Award of Degree

A student shall register and put up minimum attendance in all 160 credits and earn all 160 credits and also should secure a pass in all the mandatory courses to become eligible for the award of the degree.

A student who fails to satisfy the above criteria as indicated in the course structure within eight academic years from the year of his/her admission, shall forfeit his/her seat in B.Tech. programme and his/her admission stands cancelled.

9.0 GRADE POINT AVERAGE:**9.1 Computation of SGPA and CGPA:**

The following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- i. The 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

$$\text{SGPA (Si)} = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

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. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\text{CGPA} = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

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 places and reported in the transcripts.

Illustration for Computation of SGPA and CGPA:**Computation of SGPA at the end of 1st Semester****Illustration No.1:**

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade)
Course 1	3	A	9	3 x 9 = 27

Course 2	3	C	7	$3 \times 7 = 21$
Course 3	3	B	8	$3 \times 8 = 24$
Course 4	3	S	10	$3 \times 10 = 30$
Course 5	3	D	6	$3 \times 6 = 18$
Course 6	3	C	7	$3 \times 7 = 21$
Course 7	2	A	9	$2 \times 9 = 18$
Course 8	2	C	7	$2 \times 7 = 14$
Total	22			173

Thus, **SGPA at the end of 1st Semester = $173/22=7.86$**

Illustration No.2 (with one failure)

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade)
Course 1	3	A	9	$3 \times 9 = 27$
Course 2	3	C	7	$3 \times 7 = 21$
Course 3	3	B	8	$3 \times 8 = 24$
Course 4	3	S	10	$3 \times 10 = 30$
Course 5	3	F	0	$3 \times 0 = 00$
Course 6	3	C	7	$3 \times 7 = 21$
Course 7	2	A	9	$2 \times 9 = 18$
Course 8	2	C	7	$2 \times 7 = 14$
Total	22			155

Thus, **SGPA = $155/22=7.04$**

Illustration No.2 (a)

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade)
Course 5	3	D	6	$3 \times 6 = 18$
Total Credits of the	22			Ci (First Attempt)155 + Ci (subsequent attempt) 18= 173

Thus, re-calculated **SGPA** after clearing the course= **$173/22=7.86$**

Illustration No.3

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade)
Course 1	3	A	9	3 x 9 = 27
Course 2	3	C	7	3 x 7 = 21
Course 3	3	B	8	3 x 8 = 24
Course 4	3	S	10	3 x 10 = 30
Course 5	3	A	9	3 x 9 = 27
Course 6	3	C	7	3 x 7 = 21
Course 7	2	A	9	2 x 9 = 18
Course 8	2	C	7	2 x 7 = 14
Total	22			182

Performance in Second semester

SGPA of 2nd Semester = $182/22=8.27$

Thus, CGPA at the end of II semester: $CGPA = \frac{22*7.86+22*8.27}{44} = 8.06$

CGPA calculation after Final Semester:

Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6	Sem-7	Sem-8
Credit : 16 SGPA: 7	Credit: 20 SGPA: 8.5	Credit : 22 SGPA: 9.2	Credit : 22 SGPA: 6.86	Credit : 20 SGPA: 8.18	Credit : 20 SGPA: 7.73	Credit : 20 SGPA: 8.68	Credit : 20 SGPA: 9.4

Thus, overall CGPA = $\frac{16*7+20*8.5+22*9.2+22*6.86+20*8.18+20*7.73+20*8.68+20*9.4}{160} = 8.21$

9.2 Eligibility for Award of B.Tech. Degree:

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

1. Registered and successfully completed all the components prescribed in the Programme of study to which he/she is admitted.
2. Obtained CGPA greater than or equal to 5 (Minimum requirements for Pass), Has no dues to the Institute, hostels, Libraries etc., and
3. No disciplinary action is pending against him/her.

9.3 Award of Class:

A candidate who becomes eligible for the award of B.Tech degree shall be placed in one of the following classes based on CGPA.

TABLE: CGPA REQUIRED FOR AWARD OF DEGREE

Distinction	≥7.75*
First Class	≥6.75
Second Class	≥5.75
Pass	≥5.00

*In addition to the required CGPA of 7.75, the student must have necessarily passed all the courses of every semester **in the minimum stipulated period for the programme.**

9.4 Improvement of Class:

A candidate, after becoming eligible for the award of the degree, may reappear for the Semester End Examination in any two (maximum) of the theory courses as and when conducted, for the purpose of improving the aggregate and the class. But this reappearance shall be within a period of one academic year after becoming eligible for the award of the Degree.

However, this facility shall not be availed of by a candidate who has taken the Provisional Certificate. Such candidates shall not be permitted to reappear either for CIE in any course or for Semester End Examination (SEE) in laboratory courses (including project Viva-voce) for the purpose of improvement.

9.5 Supplementary Examination:

In addition to the Regular End Examinations held at the end of each semester, Supplementary End Examinations will be conducted during the Semester break. A Student can appear for any number of supplementary examinations till he clears all courses which he could not clear in the first attempt. However, the maximum stipulated period shall not be relaxed under any circumstances.

9.6 Malpractices:

The Principal shall refer the cases of malpractices in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to an Enquiry Committee constituted by him. The committee will submit a report on the malpractice allegedly committed by the student to the Principal.

Rules pertaining to the punishments in the case of Malpractice are given in Annexure-I

9.7 Additional Academic Regulations:

- i. Any Attempt to impress upon the teachers, examiners, faculty and staff of examinations, bribing for either marks or attendance will be treated as malpractice.
- ii. When a student is absent for final examination, he is treated as to have appeared and obtained zero marks in that component and Grade is awarded accordingly.
- iii. When a component of Continuous Internal Evaluation (CIE) or Semester End Examination (SEE) is cancelled as a penalty, he is awarded zero marks in that component.
- iv. **Grade Sheet:** A grade sheet (memorandum) will be issued to each student indicating his/her performance in all courses taken in that semester and also indicating the grades and SGPA.
- v. **Transcripts:** After successful completion of the total programme of study, a Transcript containing performance of all academic years will be issued as a final record. Candidates shall be permitted to apply for recounting/revaluation within the stipulated period with payment of prescribed fee.
- vi. **The Academic Council has to approve and recommend to the JNTUK, Kakinada for the award of a degree to any student.**

9.8 Withholding of Results:

If the Student has not paid the dues, if any, or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

9.9 Transitory Regulations:

For students admitted under special cases (mentioned in 2.1) these transitory regulations will provide the modus operandi.

At the time of such admission, based on the Programme pursued (case by case):

1. Equivalent courses completed by the student are established by the BOS concerned.
2. Marks/Credits are transferred for all such equivalent courses and treated as successfully cleared in the Programme of study prescribed by SVEC.

3. A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuit at SVEC.
4. Marks obtained in the previous system if the case be, are converted to grades and CGPA is calculated accordingly.

All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is included into.

Regarding the students who were admitted under JNTU, Kakinada regulations for affiliated colleges:

If they happen to join and study along with their juniors at SVEC, the transitory regulations to be specified by JNTU, Kakinada for such students have to be followed.

10.0 GENERAL:

- a) Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- b) The Academic regulations should be read as a whole for the purpose of any interpretation.
- c) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.
- d) The Academic Council reserves the right to revise, amend, change or nullify the Regulations, Schemes of Examinations and/or Syllabi or any other matter depending on the needs of the students, society and industry.

11.0 B.Tech - LATERAL ENTRY SCHEME:

The B.Tech Degree of Sri Vasavi Engineering College (Autonomous), Pedatadepalli, Tadepalligudem under Jawaharlal Nehru Technological University Kakinada, Kakinada shall be conferred on candidates who are admitted into the second year of the programme and fulfill the requirements for the award of the Degree.

Applicable for the students admitted into II year B. Tech. (LES) from the Academic Year 2019-20 and onwards.

AWARD OF B. Tech. DEGREE – LES

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

- ❖ Having admitted into the second year of the programme, a student shall be declared eligible for the award of the B. Tech Degree (LES), if he/she pursues a course of study in not less than three academic years and not more than six academic years.
- ❖ The candidate shall register for all the courses as specified for the program of study from second year to fourth year. (As per the present curriculum, the candidate shall register for 124 credits and secure all the 124 credits to become eligible for the award of the degree).
- ❖ All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

Annexure-I**MALPRACTICES**

S.No	Nature of Malpractices/Improper Conduct	Punishment
1 (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he 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 subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(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 exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he 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 subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.

COURSE STRUCTURE

B.Tech. CST Programme Course Structure
(With Effect From 2019-20 Admitted Batch Onwards)

I SEMESTER

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT01	English – I	2	-	-	MNC
2	V18MAT01	Engineering Mathematics – I	3	1	-	4
3	V18PHT02	Semiconductor Physics And Opto-Electronic Devices	3	1	-	4
4	V18EET01	Basic Electrical and Electronics Engineering	3	1	-	4
5	V18CHT02	Environmental Studies	3	-	-	MNC
6	V18ENL01	English Communication Skills Lab – I	-	-	2	MNC
7	V18MEL01	Engineering& IT Workshop	-	-	3	1.5
8	V18EEL01	Basic Electrical and Electronics Engineering Lab	-	-	3	1.5
9	V18PHL02	Opto-Electronics and Semiconductors Lab	-	-	3	1.5
Total			14	3	11	16.5

Total Contact Hours: 28

II SEMESTER

S. No	Course Code	Course Name	L	T	P	C
1	V18ENT02	English – II	2	-	-	2
2	V18MAT02	Engineering Mathematics – II	3	1	-	4
3	V18CHT01	Engineering Chemistry	3	1	-	4
4	V18CST01	Programming in 'C' for problem Solving	3	-	-	3
5	V18MET01	Engineering Graphics	1	-	3	2.5
6	V18ENL02	English Communication Skills Lab – II	-	-	2	1
7	V18CSL01	Programming Lab in 'C' for problem Solving	-	-	3	1.5
8	V18CHL01	Engineering Chemistry Lab	-	-	3	1.5
Total			12	2	11	19.5

Total Contact Hours: 25

III B.TECH

S.No.	III - Semester					
	Course Code	Course	L	T	P	C
1	V18MAT04	Probability & Statistics	3	1	0	4
2	V18ECT06	Digital Electronics	3	0	0	3
3	V18CST02	Data Structures and Algorithms	3	0	0	3
4	V18CST03	Discrete Mathematics	3	0	0	3
5	V18CST04	Object Oriented Programming for problem Solving	3	0	0	3
6	V18ECL04	Digital Electronics Lab	0	0	2	1
7	V18CSL02	Data Structures and Algorithms Lab	0	0	3	1.5
8	V18CSL03	Object Oriented Programming for problem Solving Lab	0	0	3	1.5
9	V18ENT03	Professional Communication Skills –I	3	0	0	MNC
10	V18CST60	Technical Skills-I	4	0	0	MNC
Total			22	1	8	20

Total Contact Hours: 31**IV - Semester**

S.No.	Course Code	Course	L	T	P	C
1	V18CST05	Computer Organization	3	0	0	3
2	V18CST06	Software Engineering	3	0	0	3
3	V18CST07	Formal Languages and Automata Theory	3	0	0	3
4	V18CST08	Java Programming	3	0	0	3
5	V18CST09	Python Programming	3	0	0	3
6	V18MBET51	Managerial Economics and Financial Analysis	3	0	0	3
7	V18CSL04	Java Programming Lab	0	0	3	1.5
8	V18CSL05	Python Programming Lab	0	0	3	1.5
9	V18ENT11	Constitution of India	2	0	0	MNC
10	V18ENT04	Professional Communication Skills–II	3	0	0	MNC
11	V18CST61	Technical Skills -II	4	0	0	MNC
Total			27	0	6	21

Total Contact Hours: 33

III B.TECH**V - Semester**

S.No	Course Code	Course	L	T	P	C
1	V18CST10	Database Management Systems	3	0	0	3
2	V18CST11	Computer Networks	3	0	0	3
3	V18CST12	Operating Systems	3	0	0	3
4	V18CST13	Design and Analysis of Algorithms	3	0	0	3
5	V18CST14	Unix Programming	3	0	0	3
6	Elective – I		3	0	0	3
	V18CST15	1.Advanced Computer Architecture				
	V18CST16	2.Advanced Data Structures				
	V18CST17	3.Artificial Intelligence				
	V18CST18	4.Computer Graphics				
7	V18MBET53	Organizational Behavior	3	0	0	3
8	V18CSL06	Database Management Systems Lab	0	0	3	1.5
9	V18CSL07	Operating System and Unix Lab	0	0	3	1.5
10	V18ENT05	Professional Communication Skills -III	4	0	0	MNC
11	V18CST62	Technical Skills-III	4	0	0	MNC
Total			29	0	6	24

Total Contact Hours: 35**VI - Semester**

S.No.	Course Code	Course	L	T	P	C
1	V18CST19	Compiler Design	3	0	0	3
2	V18CST20	Data Mining	3	0	0	3
3	V18CST21	Object Oriented Analysis and Design through UML	3	0	0	3
4	V18CST22	Cryptography & Network Security	3	0	0	3
5	Elective - II		3	0	0	3
	V18CST23	1. Software Testing Methodologies				
	V18CST24	2. Principles of Programming Languages				
	V18CST25	3. Machine Learning				
	V18CST26	4. Image Processing				
6	Open Elective – I (Interdisciplinary)	OPE I(1-3)	3	0	0	3
7	V18CSL08	Object Oriented Analysis and Design through UML Lab	0	0	3	1.5
8	V18CSL09	Data Mining Lab	0	0	3	1.5
9	V18CSMPS	Mini Project with Seminar	0	0	4	2
10	V18ENT06	Professional Communication Skills -IV	4	0	0	MNC
11	V18CST63	Technical Skills-IV	4	0	0	MNC
Total			26	0	10	23

Total Contact Hours: 36

IV B.TECH

VII - Semester

S.No	Course Code	Course	L	T	P	C
1	V18CST27	Advanced Java and Web Technologies	3	0	0	3
2	V18MBT52	Management Science	3	0	0	3
3	Elective – III		3	0	0	3
	V18CST28	1. Advanced Operating Systems				
	V18CST29	2. Statistics with R Programming				
	V18CST30	3. Information Retrieval Systems				
	V18CST31	4 Human Computer Interaction				
4	Elective – IV		3	0	0	3
	V18CST32	1.Distributed Systems				
	V18CST33	2.Scripting Languages				
	V18CST34	3.Deep Learning				
	V18CST35	4.Social Networks and semantic web				
5	Open Elective – II (Interdisciplinary)	OPE II(1-3)	3	0	0	3
6	V18CSL10	Advanced Java and Web Technologies Lab	0	0	2	1
7	V18CSP01	Project Work (Part-A)	0	0	6	3
Total			15	0	9	19

Total Contact Hours: 24

VIII - Semester

S.No.	Course Code	Course	L	T	P	C
1	Elective – V		3	0	0	3
	V18CST36	1. Software Project Management				
	V18CST37	2. Big Data Analytics				
	V18CST38	3. Soft Computing				
	V18CST39	4. Cloud Computing				
2	Elective – VI		3	0	0	3
	V18CST40	1. Software Architecture and Design Patterns				
	V18CST41	2. Middleware Technologies				
	V18CST42	3. Natural Language Processing				
	V18CST43	4. Cyber Security				
3	Open Elective – III (Interdisciplinary)	OPE III(1-3)	3	0	0	3
4	V18CSP02	Project Work (Part-B)	0	0	16	8
Total			9	0	16	17

Total Contact Hours: 25

Open Electives Offered CIVIL Department

Open Elective 1	VI Sem	1. Repair and Rehabilitation of Structures 2. Remote Sensing and GIS	V18CEOE1 V18CEOE2
Open Elective 2	VII Sem	1. Environmental Pollution and Control 2. Disaster Management	V18CEOE03 V18CEOE04
Open Elective 3	VIII Sem	1. Solid Waste Management 2. Water Quality and Conservation	V18CEOE05 V18CEOE06

Open Electives Offered EEE Department

Open Elective 1	VI Sem	Energy Audit & Conservation Electrical Measuring Instruments Industrial Safety	V18EEOE1 V18EEOE2 V18EEOE3
Open Elective 2	VII Sem	Non-Conventional Energy Sources Electrical Engineering Materials Servicing of Electrical Appliances	V18EEOE4 V18EEOE5 V18EEOE6
Open Elective 3	VIII Sem	Energy Storage Systems Basics of Electrical Power Generation Industrial Automation	V18EEOE7 V18EEOE8 V18EEOE9

Open Electives Offered MECH Department

Open Elective 1	VI Sem	1. Basic Mechanical Engineering 2. Green Engineering Systems 3. Introduction to Robotics	V18MEOE1 V18MEOE2 V18MEOE3
Open Elective 2	VII Sem	1. Computer Aided Design 2. Condition Monitoring & Machine learning	V18MEOE4 V18MEOE5
Open Elective 3	VIII Sem	1. Power Plant Engineering 2. Mechatronics	V18MEOE6 V18MEOE7

Open Electives Offered ECE Department

Open Elective 1	VI Sem	Internet of Things Principles of Communication Systems Introduction to VLSI Design	V18ECTO E1 V18ECTO E2 V18ECTO E3
Open Elective 2	VII Sem	Principles of Wireless Comm. Medical Electronics Concepts of Embedded Systems	V18ECTO E4 V18ECTO E5 V18ECTO E6
Open Elective 3	VIII Sem	Fundamentals of Digital Image & Video Processing Embedded RTOS Principles of Digital TV Engineering	V18ECTO E7 V18ECTO E8 V18ECTO E9

SYLLABUS

I Sem	English -I	Course Code: V18ENT01	L	T	P	C
			2	0	0	MNC*

(*MNC : Mandatory Non Credit Course)

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO-1 :** Understand human resources and their contribution to the society, listen to and read a text to comprehend, interpret and answer questions, and use prepositions and tenses appropriately.
- CO-2:** Appraise the problems of transport and the solutions, write the gist of a short-story, know the etymological roots of words, use prefixes and exhibit basic skills in writing.
- CO-3:** View Solar Energy as a viable alternative source, and read for comprehension, analysis and interpretation and present narratives in writing.
- CO-4:** Evaluate various alternative sources of energy, spell words appropriately, pronounce them with proper stress, punctuate sentences correctly and narrate instances and stories.
- CO-5 :** Realize the value of our living environment, describe animals, birds, objects, events, processes, etc., write paragraphs coherently and use connectors effectively.
- CO-6 :** Grasp the vital role of training in industrial organizations, use prepositions, take notes, follow the office etiquette and write impressive narrations.

Syllabus

Unit-1

Human Resources: (From 'English for Engineers and Technologists')

Human resources and their contribution to the society
 Word Stress, Simple Present Tense and Simple Past Tense
 Using Present Continuous Tense
 Role-play
 Prepositions and Verb forms : Correct usage
 Phrases and Clauses
 Reading Skills development
 Paragraph writing : Cohesion

An Ideal Family: A short story by **Catherine Mansfield**

(From 'Panorama: A Course on Reading')
 Vocabulary

Unit-2

Transport : Problems and Solutions (From 'English for Engineers and Technologists')

Etymological roots
 Prefixes
 Pronunciation
 Parts of Speech
 Useful expressions
 Writing Skills development
 Writing Minutes of Meeting

War : A short story by **Luigi Pirandello** (From 'Panorama: A Course on Reading')

Vocabulary

Unit-3

Evaluating Technology (From 'English for Engineers and Technologists')

Writing Reading Comprehension

The Verger : A short story by **Somerset Maugham**

(From 'Panorama: A Course on Reading')
 Vocabulary
 Antonyms and abbreviations

Unit-4

Energy: Alternative Sources (From 'English for Engineers and Technologists')

Word Stress
 Antonyms
 Suffixes
 Comprehension
 Spelling and Punctuation
 Sentence structures

The Scarecrow : A short story by **Satyajit Ray**
 (From 'Panorama: A Course on Reading')
 Vocabulary

Unit-5**Our Living Environment** (From 'English for Engineers and Technologists')

Connectors
 Describing an animal/ a bird
 Verb forms : practice
 Reading Skills development
 Writing Skills development
 Making notes

A Village Lost to the Nation : A short story by **Krishna Chandra Pujari**
 (From 'Panorama: A Course on Reading')
 Vocabulary

Unit-6**Industry :Safety and Training** (From 'English for Engineers and Technologists')

Taking notes
 Prepositions
 Reading Skills development
 Word formation : Etymological Roots
 Writing Skills development
 Office Etiquette

Martin Luther King and the African: A short story by **Chinua Achebe**
 (From 'Panorama: A Course on Reading') Vocabulary

Books Prescribed: 1. **English for Engineers and Technologists**
 Orient BlackSwan Pvt Ltd.
 2. **Panorama : A Course on Reading**, Oxford University Press
 (Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation)

Suggested Readings from AICTE

1. Practical English Usage. Michael Swan, OUP. 1995
2. Remedial English Grammar, F.T. Wood. Macmillian, 2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press 2006
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011
6. Exercises in Spoken English. Parts, I-III. CIEFL, Hyderabad Oxford University Press

Books for further reference

1. The Oxford guide to Writing & Speaking – John Seely
2. Technical Communication : Principles and practice – Meenakshi Raman & Sangeetha Sharma, Oxford University Press, New Delhi, 2014.
 (For Gujarat Technological University)
3. Business communication Concepts, Cases and Application – P.D. Chaturvedi and Mukhesh Chaturvedi, Pearson Education, Delhi, 2006.
4. The Students' Companion – Wilfred D. Best (New Edition) – Harper, Collins Publishers, 2012.

I Sem	Mathematics-I	Course Code: VI8MAT01	L	T	P	C
			3	1	0	4

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Apply matrix technique to solve system of linear equation.
CO2: Find Eigen values and Eigen vectors
CO3: Solve the ordinary differential equations of first order & first degree
CO4: Solve the linear differential equations of higher order
CO5: Calculate maxima and minima of functions of two variables
CO6: Solve first order partial differential equations.

UNIT I: Linear system of equations:

Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination – Gauss Jordan- Gauss Jacobi and Gauss Seidal methods.

Applications: Finding the current in electrical Circuits.

UNIT II: Eigen values - Eigen vectors and Cayley-Hamilton theorem:

Eigenvalues - Eigen vectors– Properties – Cayley-Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley-Hamilton theorem.

UNIT-III: Differential equations of first order and first degree:

Linear-Bernoulli-Exact-Reducible to exact differential equations.

Applications: Newton’s Law of cooling-Law of natural growth and decay-Orthogonal Trajectories.

UNIT IV: Linear differential equations of higher order:

Linear non homogeneous differential equations of higher order with constant coefficients involving RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, $xV(x)$ - method of variation of parameters.

UNIT V: Partial differentiation:

Introduction- Homogeneous function-Euler’s theorem-total derivative-chain rule-generalized mean value theorem for single variable (without proof)-Taylor’s and Maclaurin’s series expansion of functions of two variables (without proof)– Functional dependence- Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange’s method (with constraints).

UNIT VI: First order Partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
3. Srimanta Pal, SubodhC.Bhunia, Engineering Mathematics, Oxford University Press.
4. Dass H.K., RajnishVerma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

I Sem	PHYSICS: OPTO-ELECTRONICS AND SEMI CONDUCTORS	Course Code: V18PHT02	L	T	P	C
			3	1	0	4

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Expose the students to the basic concepts of Lasers, optical fibers and their properties.
CO2: Interpret wavelike behavior of matter and how this motivates the need to replace classical mechanics by a wave equation of motion for matter (the Schrödinger equations)
CO3: Distinguish fundamental physical laws for better understanding of materials and their properties for engineering applications.
CO4: Apply fundamental principles and processes to operational semiconductor devices and their uses.

UNIT-I LASERS : Introduction – Coherent Sources – Characteristics of Lasers – Spontaneous and Stimulated Emission of Radiation – Einstein’s Coefficients – Population Inversion – pumping schemes- Ruby laser-He-Ne LASER –Applications of LASERS.

UNIT-II FIBER OPTICS: Introduction – Basic Principle of Optical Fiber-Advantages of fibres – Acceptance Angle and Acceptance Cone – Numerical Aperture – Transmission of Signal Through Step Index and Graded Index Fibers – Basic Optical Fiber Communication Link - Application of Optical Fibers.

UNIT-III INTRODUCTORY QUANTUM MECHANICS: Introduction - Matter Waves – Physical Significance of Wave Function – Schrödinger Time Independent Wave Equation – Application of Schrödinger Wave Equation in One Dimensional Potential Box.

ELECTRON THEORY OF METALS: Assumptions and Failures of Classical Free Electron Theory – Quantum Free Electron Theory - Fermi Level, Fermi Dirac Distribution Function and Sources of Electrical Resistance in Metals.

UNIT-IV BAND THEORY OF SOLIDS: Bloch’s Theorem (Qualitative) – Kronig – Penney Model – Formation of Energy Bands in Crystalline Solids – Classification of Crystalline Solids Based on Band Theory - E-K Relation - Effective Mass of an Electron - Concept of Hole.

UNIT-V SEMICONDUCTOR PHYSICS: Introduction - Types of Semiconductors – Energy Band Diagrams, Carrier Concentration in Intrinsic Semiconductors – Expression for Conductivity-Extrinsic semiconductors-Carrier concentrations- Drift and Diffusion Currents – Relevance of Einstein’s Equation-Hall Effect and its Applications-Direct and Indirect band gap semiconductors.

UNIT-VI SEMICONDUCTOR DEVICES: Introduction- p-n junction Diode, Zener Diode ,Photo detectors- Photo Diode , Pin Diode ,Construction Working Principle of Solar Cell and Light emitting diode .

Text Books:

1. MN Avadhanulu & PG Kshirsagar , A Text Book of Engineering Physics.
2. DK Bhattacharya, Engineering Physics.

Reference Books:

1. P.Bhattacharya, Semiconductor Optoelectronic Devices.
2. A Ghatak, Optics
3. S.O.Pillai , Solid State Physics
4. Dr.P. Sreenivasa Rao, Applied Physics
5. John M Senior, Optical Fiber Communications Principles and Practices
6. A.J.Dekkar , Solid State Physics.

I Sem	Basic Electrical and Electronics Engineering	Course Code: V18EET01	L	T	P	C
			3	1	0	4

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1 :** Apply the fundamentals for solving electrical circuits. **(K3)**
CO2 : Calculate different parameters of R-L, R-C, R-L-C circuits. **(K3)**
CO3 : Understand the basic concepts of DC Machines & Transformers. **(K2)**
CO4 : Describe the operational characteristics of AC Machines. **(K2)**
CO5 : Understand the operation and characteristics of PN junction diode. **(K2)**
CO6 : Explain the characteristics of Transistor configurations and feedback amplifiers. **(K2)**

Module 1: DC Circuits

Electrical circuit elements (R, L and C), Kirchhoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Maximum Power Transfer, Thevenin's and Norton's Theorems.

Module 2: 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 (series and parallel), resonance.

Module 3: DC Machines & Transformers

DC Machines

Introduction-Working principle of DC generator–Magnetization characteristics of D.C. Shunt generator – Types of DC motors – applications – three point starter.

Transformers

Classification, working principle of ideal and practical transformer, losses in transformers, regulation and efficiency, OC& SC test on single phase transformer.

Module 4: AC Machines

Construction and working of a three-phase induction motor, torque-slip characteristics. Loss components and efficiency, starting and speed control of induction motor. Construction and working principle of synchronous generators.

Module 5: Semiconductor Devices & Rectifiers

Introduction– Classification – PN junction diode characteristics a) Forward bias b) Reverse bias - Diode acts as a switch - Half-wave and Full-wave rectifiers – Concepts of ripple factor, voltage regulation and efficiency - Simple problems.

Module 6: Transistors

Types of Transistors - Transistor acts as an amplifier - CB, CE and CC configurations and characteristics- feedback amplifier.

Text Books

1. T. K. Nagsarkar, M. S. Sukhija, "Basic Electrical and Electronics Engineering", Oxford University Press, 2005
2. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
3. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

Reference Books

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
4. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Education India, 2011
5. S. K. Sahdev, "Fundamentals of Electrical Engineering & Electronics", Dhanpat Rai & Company, 2001

I Sem	Environmental Studies	Course Code: V18CHT02	L	T	P	C
			3	0	0	0

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Identify the global environmental challenges and the possible means to combat them.
- CO2:** Examine the natural resources, their availability for the sustenance of the life and conservation.
- CO3:** Assess the concepts of the ecosystem and the need for protecting various ecosystems.
- CO4:** Discuss the biodiversity, threats and conservation practices to protect the biodiversity
- CO5:** Explain various attributes of the pollution and waste management practices.
- CO6:** Outline the environmental management and environmental legislations in India.

UNIT I: FUNDAMENTALS OF ENVIRONMENTAL STUDIES

Definition and components of environment, Global Environmental Challenges: Global warming and climate change- Kyoto protocol, Acid rains, Ozone layer depletion -Population explosion and effects.

UNIT II: NATURAL RESOURCES AND ASSOCIATED PROBLEMS

Forest resources: Use and over exploitation - Deforestation: Timber extraction, Mining, dams and other effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water - Dams: Benefits and problems. Mineral resources: Use and exploitation - Environmental effects of extracting and using mineral resources. Energy resources: Renewable and Non-renewable energy sources. Land resources: Land degradation, Wasteland reclamation.

UNIT III: ECOSYSTEMS

Concept of an ecosystem - Structure and function of an ecosystem: Producers, consumers and decomposers - Energy flow in the ecosystem – Food chains, food webs and Ecological pyramids. Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems -Introduction, types, characteristic features.

UNIT IV: BIODIVERSITY AND ITS CONSERVATION

Definition-Values of biodiversity: Consumptive use, Productive use, Social use. Hot-spots of biodiversity - Threats to biodiversity: Habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity.

UNIT V: ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution and Nuclear Pollution. Solid Waste Management: Sources, classification, effects and control measures of municipal and industrial solid wastes.

UNIT VI: ENVIRONMENTAL LEGISLATION AND THE MANAGEMENT

Human Rights to a clean environment provided by Constitution. Environmental Protection Act, 1986 - Air (Prevention and Control of Pollution) Act, 1981 - Water (Prevention and Control of Pollution) Act, 1974 - Wildlife (Protection) Act, 1972 - Forest (Conservation) Act, 1980 - Issues involved in enforcement of environmental legislation – Eco-tourism.

Text books:

1. Environment Studies, Fourth Edition, Anubha Kaushik, C P Kaushik, New Age International Publishers.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi.
3. Fundamentals of Environment Studies, DD Mishra, S Chand & Co Ltd.
4. Textbook of Environmental Science, M. Anji Reddy, B S Publications, Hyderabad.

I Sem	ECS Lab -I	Course Code: V18ENL01	L	T	P	C
			0	0	2	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO-1** : Listen to and make inquiries on phone, thank and respond to thanks in appropriate spoken idiom.
CO-2 : Make requests, give permissions and directions in fluent English.
CO-3 : Articulate well in the contexts of clarifying, inviting, complaining, congratulating, apologizing, advising, agreeing and disagreeing in conversational mode.
CO-4 : Distinguish and pronounce letters and sounds of English phonetically.
CO-5 : Practice and pronounce consonants, vowels and diphthongs and consonant clusters.
CO-6 : Listen to and understand different accents in English, and pronounce English words and speak sentences with right stress and intonation.

Syllabus

Unit-1

Why Study Spoken English
 Making Inquiries on the Phone, Thanking and
 Responding to Thanks
 Practice Work

Unit-2

Requests, Permissions, and Directions
 Practice Work

Unit-3

Clarifying, Inviting, Complaining, Congratulating and
 Expressing Sympathy
 Apologising, Advising, Suggesting, Agreeing and Disagreeing
 Practice Work

Unit-4

Letters and Sounds
 Practice Work

Unit-5

The Sounds of English
 Practice Work

Unit-6

Pronunciation
 Stress and Intonation
 Practice Work
 Book Prescribed:

Interact : English Lab Manual for Undergraduate Students

Orient BlackSwan

(Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation)

Books for further reference

1. The Official Cambridge Guide to IELTS, For Academic & General Training, (With DVD-ROM), Student Book with Answers, 2015.
2. English Language Communication Skills, Lab Manuel cum Workbook (with CD), Cengage Learning.

** ** *

I Sem	Engineering Workshop & IT Workshop Practice Lab	Course Code: V18MEL01	L	T	P	C
			0	0	3	1.5

Engineering Workshop Lab

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

After successful completion of the course, the student will be able to

- CO1:** prepare different models in the carpentry trade such as Cross lap joint, Dove tail joint. **(K3)**
- CO2:** make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder **(K3)**
- CO3:** model various basic prototypes in the trade of fitting such as Straight fit, V- fit. **(K3)**
- CO4:** prepare different models in the Black smithy such as Round rod to Square, S-Hook.. **(K3)**
- CO5:** perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. **(K3)**
- CO6:** prepare various basic prototypes in the trade of Welding such as Lap joint, Butt joint. **(K3)**

Note: At least two exercises to be done from each trade.

Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel

Fitting shop

1. V- Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House wiring

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Welding shop (Arc welding)

1. Butt Joint
2. Lap Joint

IT WORKSHOP Lab**Syllabus Details****Course Outcomes: After Successful completion of the Course, the student will be able to:**

- After successful completion of the course, the student will be able to
- Demonstrate Disassemble and Assemble a Personal Computer and its peripherals (K3)
 - Practice installation of operating system. (K3)
 - Connect peripherals and install required drivers (K4)
 - Demonstrate internet connectivity and usage of internet as per his/her requirement. (K3)
 - Prepare the Documents for their projects (K3)
 - Prepare Slide shows for their presentations (K3)

PC Hardware:

Task 1: Identification of the peripherals of a computer: To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions. Description of various I/O Devices.

Task 2(Optional) :A practice on disassembling the components of a PC and assembling them to back to working condition.

Task 3: Examples of Operating systems- DOS, Installation of MS windows on a PC

Task 4: Introduction to Memory, types of Storage Devices, I/O Port, Device Drivers, Assemblers, Compilers, Interpreters

Software Troubleshooting (Demonstration): Identification of a problem and fixing the PC for any software issues.

Task 5: Hardware Troubleshooting (Demonstration): Identification of a problem and fixing a defective PC (improper assembly or defective peripherals).

Internet & Networking Infrastructure

Task 6: Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC, Bluetooth Technology, Wireless Technology, Modem, DSL, ISP.

Task 7: Search Engines & Netiquette: Students are enabled to use search engines for simple search, academic search and any other context based search (Bing, Google etc). Students are acquainted to the principles of micro-blogging, wiki, collaboration using social networks, participating in online technology forums.

Word

Task 8: MS Word Orientation: Accessing, overview of toolbars, saving files, Using help and resources, rulers, formatting ,Drop Cap , Applying Text effects, Using Character Spacing, OLE in Word, using templates, Borders and Colors, Inserting Header and Footer, Using Date and Time option, security features in word, converting documents while saving, , mail merge.

Task 9: Creating project : Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Excel

Task 10: Using spread sheet features of EXCEL including the macros, formulae, pivot tables, graphical representations. **Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text, ,Charts,

Task 11: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

Power Point

Task 12: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts,

Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Tables, animation and Charts in PowerPoint.

TEXT BOOK:

Faculty to consolidate the workshop manuals using the following references

1. Computer Fundamentals, Anita Goel, Pearson.
2. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008.
3. Information Technology Workshop, 3e, G Praveen Babu, M V Narayana BS Publications.
4. Comdex Information Technology, Vikas Gupta, dreamtech.

REFERENCE BOOK:

1. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu.
2. PC Hardware trouble shooting made easy, TMH.

I Sem	Basic Electrical and Electronics Engineering Lab	Course Code:	L	T	P	C
		V18EEL01	0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1 :** Compute response of a Network using various Network theorems. **(K3)**
- CO2 :** Determine the critical field resistance and critical speed by conducting magnetization characteristics of D.C. Shunt generator. **(K4)**
- CO3 :** Change the speed of DC shunt motor by conducting Armature voltage & field flux control methods **(K3)**
- CO4 :** Examine the performance of DC shunt motor and 3-phase induction motor. **(K3)**
- CO5 :** Determine the efficiency and regulation of single phase transformer by conducting OC & SC test. **(K4)**
- CO6 :** Examine the performance characteristics of P-N junction diode, Half and full wave rectifiers. **(K3)**

Any 10 of the following experiments are to be conducted

1. Verification of Superposition Theorem.
2. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
3. Verification of maximum power transfer theorem.
4. Series and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
5. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance and speed.
6. Speed control of D.C. Shunt motor by Armature & flux control methods
7. Brake test on DC shunt motor. Determination of performance characteristics.
8. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
9. Brake test on 3-phase Induction motor (performance characteristics).
10. PN junction diode characteristics a) Forward bias b) Reverse bias (Cut in voltage and resistance calculations)
11. Transistor CE characteristics (Input and output)
12. Half wave rectifier with and without filters.
13. Full wave rectifier with and without filters.
14. CE amplifiers.

I Sem	Opto Electronics & Semiconductors Lab	Course Code:	L	T	P	C
		V18PHL02	0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

List of Experiments

(Any eight of the following to be done)

1. Newton's rings – Radius of curvature of Plano – Convex Lens.
2. Determination of wavelength of laser source using diffraction grating.
3. L-C-R Series Resonance Circuit.
4. Study of V/I Characteristics of Semiconductor diode.
5. Study of V/I Characteristics of zener diode.
6. Characteristics of Thermistor – Negative Temperature Coefficient of resistivity.
7. Energy band gap of a Semiconductor p-n junction.
8. Determination of Hall Coefficient and Carrier Concentration - Hall Effect
9. Determination of Planck's constant using photocell.
10. Study the Characteristics of a photo diode.

II Sem	English –II	Course Code:	L	T	P	C
		V18ENT02	2	-	-	2

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO-1 :** Understand the real import of education and work of noble men, use nouns, verbs and adjectives appropriately, identify and correct common errors in usage and write official letters.
- CO-2 :** Derive inspiration from real life samples, interpret and speak on them, use synonyms and antonyms of words properly and do E-correspondence with required netiquette.
- CO-3 :** Assimilate and adjust to new cultural environments, write on life-sketches, make the right use of tense and aspect and concord in sentences and plan and develop speech-writing.
- CO-4 :** Imbibe ideas from the lives and works of successful men, use adverbs, develop view-points and topics and write different types of essays.
- CO-5 :** Emulate personality-development inputs, elaborate on inspiring scientists use one-word substitutes, develop précis writing and write for the media.
- CO-6 :** Learn from the paradigm of great contributors, use collocations and write professional and technical reports in standard formats.

Syllabus

Unit-1

The Greatest Resource – Education (From ‘English Encounters’)

Understanding the author’s perspective

Making use of nouns

Vocabulary – deriving nouns from verbs and adjectives

Misplaced modifiers

Synonyms and Antonyms

Identifying common errors

Letter writing : Standard formats for official letters

A.P.J. Abdul Kalam (From ‘The Great Indian Scientists’)

Synonyms and Anonyms

Unit-2

JadavPayeng : ‘The Forest Man of India’

Vocabulary : deriving adjectives

Synonyms and Antonyms

Identifying common errors in the use of adjectives

E-correspondence with required Netiquette

Cliches

C.V. Raman (From ‘The Great Indian Scientists’)

Use of Synonyms and Antonyms of words in different contexts

Unit-3

Cultural Shock : Adjustment to New Cultural Environments

(From ‘English Encounters’)

Building Vocabulary – Verbs and nouns

Synonyms and Antonyms and appropriate usage

Making use of Tense and aspect and subject-verb agreement in sentences

Planning and developing speech-writing

Reading comprehensions

Homi Jahangir Bhabha (From ‘The Great Indian Scientists’)
Synonyms and Antonyms

Unit-4

SatyaNadella’s First Letter to the Employees as CEO of Microsoft

Building Vocabulary – deriving adverbs

Identifying common errors in the use of adverbs

Essay writing : Developing ideas and topics into different types of essays

Redundancies

Jagadish Chandra Bose (From ‘The Great Indian Scientists’)

Using synonyms and antonyms of words in different contexts

Unit-5

Excerpts from Robin Sharma’s ‘Who Will Cry When You Die?’

One-word substitutes and usage

Prepositions

Required skills to write for the media

Précis writing

Prafulla Chandra Ray (From ‘The Great Indian Scientists’)

Using synonyms and antonyms of words in different contexts

Unit-6

The Chief Software Architect (From ‘English Encounters’)

Building Vocabulary : Collocations and Usage

Identifying common errors

Report writing – Standard formats and required skills

SrinivasaRamanujan(From ‘The Great Indian Scientists’)

Using synonyms and antonyms of words in different contexts

Books Prescribed: **1. English Encounters**

A Text Book to Face Challenges in Communication

Maruthi Publications

(Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation)

Lessons 2,4 and 5 in the above text book have been replaced by the following

1. **JadavPayeng : The Forest Man of India** by Shreya Pareek, 2014

Net Source: <https://www.thebetterindia.com>

2. **SatyaNadella’s First Letter to the Employees as CEO of Microsoft**

Net Source: <https://news.microsoft.com>

3. **Excerpts from Robin Sharma’s ‘Who Will Cry When You Die?’**

JAICO Publishing House, Mumbai, 2009

2. **The Great Indian Scientists**, Cengage

Suggested Readings from AICTE

1. Practical English Usage. Michael Swan, OUP. 1995

2. Remedial English Grammar, F.T. Wood. Macmillian, 2007

3. On Writing Well. William Zinsser. Harper Resource Book. 2001

4. Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press 2006

5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011

6. Exercises in Spoken English. Parts, I-III. CIEFL, Hyderabad Oxford University Press

Books for further reference

1. The Oxford guide to Writing & Speaking – John Seely

2. Technical Communication : Principles and practice – Meenakshi Raman & Sangeetha Sharma, Oxford University Press, New Delhi, 2014.
(For Gujarat Technological University)
3. Business communication Concepts, Cases and Application – P.D. Chaturvedi and Mukhesh Chaturvedi, Pearson Education, Delhi, 2006.
4. The Students' Companion – Wilfred D. Best (New Edition) – Harper, Collins Publishers, 2012.

II Sem	Mathematics-II	Course Code: VI8MAT02	L	T	P	C
			3	1	-	4

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Estimate approximate root of algebraic and transcendental equations
- CO2:** Compute interpolating polynomial for the given data
- CO3:** Solve ordinary differential equations using numerical methods
- CO4:** Evaluate multiple integrals and improper integrals
- CO5:** Calculate gradient of a scalar function, divergence and curl of a vector function.
- CO6:** Apply the knowledge of vector integral concepts to find characteristics of vector fields

UNIT I: Solution of Algebraic and Transcendental Equations:

Introduction- Bisection method – Method of false position – Iteration method – Newton-Raphson method (One variable).

UNIT II: Interpolation: Introduction- finite differences- forward differences backward differences –central differences – symbolic relations and separation of symbols - differences of a polynomial-Newton’s formulae for interpolation - Lagrange’s interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:
Trapezoidal rule- Simpson’s 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor’s series- Euler’s method - Runge-Kutta method (second and fourth order).

UNIT IV: Multiple Integrals:
Definition of Improper integrals - Double and triple integrals – Change of variables – Change of order of integration.
Applications: Finding areas and volumes.

UNIT V: Vector Differentiation:
Vector differential operator - Gradient- Divergence- Curl - Laplacian and second order operators - Vector identities.

UNIT VI: Vector Integration:
Line integral: Work done – Potential function – Surface and volume integrals - Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-
2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
3. V.Ravindranath and P.Vijayalakshmi, Mathematical Methods, Himalaya Publishing House. India

4. Srimanta Pal, SubodhC.Bhunja, Engineering Mathematics, Oxford University Press.
5. Dass H.K., RajnishVerma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

II Sem	Engineering Chemistry	Course Code: V18CHT01	L	T	P	C
			3	1	-	4

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Apply different plastics and rubbers for various engineering applications.
- CO2:** Assess the quality of fuels and apply the knowledge of fuels for the preservation of natural fuels.
- CO3:** Understand relevant concepts of Electro Chemistry to apply them in designing electrochemical energy systems.
- CO4:** Analyse boiler troubles arising due to poor water quality and suggest suitable water treatment methods for different industrial applications.
- CO5:** Analyse the causes for practical corrosion problems and apply corrosion principles for protection of metallic structures from corrosion.
- CO6:** Identify the important applications of advanced engineering materials.

UNIT I: HIGH POLYMERS

Polymerisation: Introduction- Mechanism of Free radical addition polymerization – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication techniques (Compression, Injection, Transfer and Extrusion) - Preparation, properties and applications of Polythene (HDPE and LDPE), PVC, Bakelite, and Teflon.

Elastomers: Natural rubber – Vulcanization of rubber – Synthetic Rubbers: Preparation, properties and applications of Buna S, Buna N, and Thiokol.

UNIT II: FUEL TECHNOLOGY

Fuels – Characteristics of good fuel – Classification – Calorific value - HCV and LCV – Dulong's formula, Numerical problems – Bomb calorimeter – Numerical problems.

Solid fuels - Coal — Proximate and ultimate analysis – Significance of the analyses, Numerical problems.

Liquid fuels –Petroleum- Refining – Cracking – Synthetic petrol (Fischer Tropsch and Bergius process) – Knocking - Octane and Cetane ratings – Anti-knocking agents.

Gaseous fuels – Natural gas, LPG and CNG – Biofuels.

UNIT III: ELECTROCHEMICAL CELLS

Single electrode potential – Electrochemical series and its significance - Standard electrodes (Hydrogen, Calomel and, Glass electrodes)–Conductometric titrations (Acid – Base).

Batteries: Primary battery (Dry Cell) – Secondary batteries (Lead acid cell, Ni-Cd cells).

Fuel cells: H₂-O₂ fuel cell, H₂-methanol fuel cell.

UNIT IV: WATER TECHNOLOGY

Hard water - Types of Hardness – Units of hardness - Determination of hardness and alkalinity - Boiler troubles: Priming and foaming, sludge and scale formation, Boiler corrosion, Caustic embrittlement-Softening of hard water: Zeolite process, Lime – Soda process, and Ion exchange process - Water for drinking purposes - Purification – Sterilization and disinfection: Chlorination, Break point chlorination – Desalination - Reverse Osmosis and Electrodialysis.

UNIT V: CORROSION

Definition – Theories of Corrosion (Chemical & Electrochemical) – Types of electrochemical corrosion (Galvanic corrosion, Concentration cell corrosion, Stress corrosion Pitting corrosion and Intergranular corrosion) - Galvanic series - Factors which influence the rate of corrosion - Protection from corrosion: Metallic coatings (Cathodic and Anodic), Cathodic protection, Protective coatings –Methods of application of coatings on metals (Galvanizing, Tinning, & Electroplating) – Paints.

UNIT VI: CHEMISTRY OF ADVANCED MATERIALS

Nano materials: Introduction – Carbon nanotubes - Types, preparation (Arc discharge, Laser ablation and CVD Method) - Properties and applications of Nano materials.

Liquid crystals: Introduction – Types – Applications.

Biodegradable polymers – Conducting polymers.

Green Chemistry: Principles, Need for green Chemistry.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publications & Co.
2. A Text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd.

Reference Books:

1. Engineering Chemistry of Willey India Pvt. Ltd., Vajiram and others.
2. Engineering Chemistry by PrasanthRath, Cengage Learning.
3. Engineering Chemistry by ShikhaAgarwal; Cambridge University Press.
4. B. Sivasankar, Engineering Chemistry, McGraw-Hill.

II Sem	Programming in 'C' for problem Solving (Common to all branches)	Course Code: V18CST01	L	T	P	C
			3	-	-	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Describe various problem solving strategies such as Algorithms and Flowcharts **(K2)**

CO2: Develop various programming constructs using Control Structures. **(K3)**

CO3: Summarize the process of modular programming approach **(K5)**

CO4: Illustrate the usage of String handling functions and pointers **(K3)**

CO5: Construct Programs using Structures and Unions. **(K3)**

CO6: Distinguish between Sequential files and Random access files. **(K4)**

UNIT-I: **Problem solving concepts:** Problem solving strategies – Top down design, Bottom up design, Algorithms, Flow-charts, Types of Programming Languages, Compiler, Assembler and Linker, Testing and Debugging a program. **Introduction to C Programming:** Overview and importance of C, C Program Structure, Creation and Compilation of C Programs, Identifiers, Variables, Data types, Constants, Declarations.

UNIT-II: **Operators:** Arithmetic, relational and logical operators, increment and decrement operators, conditional operator, assignment operator, bitwise operators, special operators, expressions, Precedence, Associativity, Order of evaluation, Type conversion, Programming Examples. **Input and output statements:** Input and output functions. **Flow of Control:** Conditional statements - If-else, Switch-case constructs, Loops - while, do-while, for.

UNIT-III: **Arrays:** Single-Dimensional Arrays, multi-Dimensional Arrays, initialization and accessing individual elements. **Functions:** Top down approach of problem solving, standard library functions, user defined functions, parameter passing - call by value, call by reference, return statement, passing arrays as parameters to functions, recursion, command line arguments.

UNIT-IV: **Storage Classes:** Scope and extent, Storage Classes in a single source file: auto, extern and static, register. **Strings in C-** Concepts, string handling functions. **Understanding pointers:** Accessing the address of a variable, declaring pointer variables, initialization of pointer variables, accessing a variable through its pointer, pointer arithmetic, pointer and arrays, pointers and character strings, array of pointers.

UNIT-V: **Structures and Unions:** Defining, declaring, initialization, accessing, comparing, operations on individual members, array of structures, structures within structures, self referential structure, structures and functions, pointers and structures, bit fields, Programming Examples.

Dynamic Memory Allocation: Definition, malloc, calloc, realloc, free, dynamic arrays.

UNIT-VI: **File Processing:** Defining and Opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access to files, Programming Examples.

Preprocessor: Definition, Macro substitution, file inclusion, compiler control directives, Programming Examples.

Text Books:

1. Computer Programming: Ashok N Kamthane, Pearson Education
2. C: The Complete Reference: Herbert Schildt, Osborne/Mcgraw Hill, Inc.
3. Let Us C, Yashavant Kanetkar, BPB Publications, 15th Edition

Reference Books:

1. Programming with C, Second edition, Byron S Gottfried, Tata McGrawhill
2. Programming in C, ReemaThareja, Oxford.
3. Problem Solving and Programm design in C, Hanly J R &Koffman E.B, Pearson Education, 2009.
4. Foundations of Computer Science (C Edition) , Alfred V. Aho.
5. Programming and Problem Solving Using C, ISRD Group, Tata McGraw Hill, 2008.
6. Programming in C, PradipDey, ManasGhosh, Oxford University Press, 2007.
7. Problem Solving Using C: Structured Programming Techniques, YukseUckan.
8. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
9. Computer Programming in C – Kerninghan& Ritchie, PHI

II Sem	Engineering Graphics (Common to all branches)	Course Code: V18MET01	L	T	P	C
			1	-	3	2.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate the usage of drawing instruments and sketch conic sections **(K3)**
CO2: Construct different types of scales and special curves **(K5)**
CO3: Draw the projections of the points, lines and planes with reference to the principal planes. **(K2)**
CO4: Develop the projections of solids and its surfaces. **(K3)**
CO5: Draw the Isometric projections of solids. **(K2)**
CO6: Convert the isometric view to orthographic view and vice versa. **(K2)**

UNIT1: INTRODUCTION TO ENGINEERING GRAPHICS:

Introduction to Engineering Graphics and its significance, usage of Drawing instruments- Mini Drafter, Calipers, Set square etc..Lettering, Conic sections – Ellipse, Parabola, Hyperbola,

UNIT 2: SPECIAL CURVES & SCALES:

Special Curves – cycloid, epicycloids, hypocycloid, involutes; Scales – Plain, Diagonal and Vernier Scales.

UNIT 3: ORTHOGRAPHIC PROJECTIONS:

Introduction to Orthographic Projections- Projections of Points, Projection of lines inclined to both the planes; Projections of planes- inclined to both the Planes .

UNIT 4: PROJECTIONS OF REGULAR SOLIDS:

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes. Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.

UNIT 5: ISOMETRIC PROJECTIONS :

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple solids and compound Solids;

UNIT 6:

Conversion of Isometric Views to Orthographic Views and Vice-versa.

Text Books:

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal&Agarwal, Tata McGraw Hill Publishers

Reference Books:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

II Sem	English Communication Skills Lab - II	Course Code: V18ENL02	L	T	P	C
			-	-	2	1

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO-1 : Listen to people critically and argue rationally to present a view-point confidently in formal debates.

CO-2 : Exhibit team spirit and communicative skill and participate effectively in group discussions.

CO-3 : Plan, structure and give presentations in professional manner.

CO-4 : Face and perform well in interviews with required etiquette.

CO-5 : Compose E-mails in standard formats to communicate clearly and write different types of CV in vogue that benefit today's career needs.

CO-6 : Make apt use of idiomatic expressions and recognize and correct typical errors that Indian speakers of English make in pronunciation, spelling, vocabulary and grammar.

Syllabus

Unit-1

Presentation Skills

Practice Work

Unit-2

Group Discussions

Practice Work

Unit-3

Debating

Practice Work

Unit-4

Interview Skills

Practice Work

Unit-5

E-mails

Practice Work

Unit-6

Idiomatic Expressions

Common Errors in English

Book Prescribed:

Interact : English Lab Manual for Undergraduate Students

Orient Black Swan

(Prescribed for I B.Tech students of the JNTUK, Kakinada under R16 Regulation)

Books for further reference

1. The Official Cambridge Guide to IELTS, For Academic & General Training, (With DVD-ROM), Student Book with Answers, 2015.
2. English Language Communication Skills, Lab Manuel cum Workbook (with CD), Cengage Learning.** **
**

II Sem	Programming Lab in 'C' for problem Solving Lab (Common to all branches)	Course Code: V18CSL01	L	T	P	C
			-	-	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO 1:** Demonstrate problem solving techniques using Control Structures. **(K3)**
- CO 2:** Construct Programmes using the concepts of Arrays, Strings and Pointers. **(K3)**
- CO3:** Apply the concepts of Functions, Structures and Unions. **(K3)**
- CO4:** Use various file processing operations to develop realtime applications. **(K4)**

LIST OF EXPERIMENTS:

- Tutorial 1:** Problem solving using computers.
- Lab1:** Familiarization with programming environment.
- Tutorial 2:** Variable types and type conversions.
- Lab 2:** Simple computational problems using arithmetic expressions.
- Tutorial 3:** Branching and logical expressions.
- Lab 3:** Problems involving if-then-else structures, switch – case.
- Tutorial 4:** Loops, while and for loops.
- Lab 4:** Iterative problems e.g. sum of series.
- Tutorial 5:** 1D Arrays: searching, sorting.
- Lab 5:** 1D Array manipulation.
- Tutorial 6:** 2D arrays.
- Lab 6:** Matrix problems.
- Tutorial 7:** Functions, call by value, call by reference, command line arguments.
- Lab 7:** Simple functions.
- Tutorial 8:** String handling.
- Lab 8:** String handling functions.
- Tutorial 9:** Pointers.
- Lab 9:** Programming with pointers.
- Tutorial 10:** Recursion, structure of recursive calls.
- Lab 10:** Recursive functions.
- Tutorial 11:** Structures, unions and dynamic memory allocation.
- Lab 11:** Structures & unions.
- Tutorial 12:** File handling.
- Lab 12:** File operations.

Reference Books:

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C- The Complete Reference, Herbert Schildt, Osborne/Mcgraw Hill, Inc.
5. Programming with C, Byron S Gottfried, Second edition, Tata McGrawhill.
6. Programming in C, ReemaThareja, Oxford.

7. Problem Solving and Program design in C, Hanly J R &Koffman E.B, PearsonEducation, 2009.
8. Programming and Problem Solving Using C, ISRD Group, Tata McGraw Hill,2008.

II Sem	Engineering Chemistry Laboratory	Course Code: V18CHL01	L	T	P	C
			-	-	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Analyse quantitatively a variety of samples using volumetric methods and instrumental methods.
- CO2:** Applying volumetric and instrumental methods for the determination of water quality parameters namely Alkalinity, Hardness and pH.
- CO3:** Prepare polymeric materials and analyse the given coal samples.

List of Experiments:

1. Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.,
2. Trial experiment – Estimation of HCl using standard Na₂CO₃ solution.
3. Estimation of KMnO₄ using standard oxalic acid solution.
4. Determination of alkalinity of a sample of water.
5. Determination of total hardness of water using standard EDTA solution.
6. Determination of rate of corrosion of mild steel in acidic environment in the absence and presence of an inhibitor.
7. Estimation of ferrous iron using standard K₂Cr₂O₇ solution.
8. Estimation of copper using standard EDTA solution.
9. Estimation of vitamin – C using standard Iodine solution.
10. Estimation of pH of the given sample solution using pH meter.
11. Conductometric titration between strong acid and strong base.
12. Potentiometric titration between strong acid and strong base.
13. Proximate analysis of coal.
14. Preparation of phenol – formaldehyde resin.

Reference Books:

1. Practical Engineering Chemistry by K. Mukkanti, B.S. Publications.
2. Vogel's Quantitative Chemical Analysis – V Edition – Longman.
3. A Text Book on experiments and Calculations Engineering by S.S.Dara, S.Chand & Co Ltd.
4. Chemistry Practical Manual, Lorven Publications.

III Sem	PROBABILITY AND STATISTICS	Course Code:	L	T	P	C
		V18MAT04	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Find measures of central tendency and dispersion for real data sets.
CO2: Find parameters of given function
CO3: Apply probability distribution to real time problems
CO4: Plot a best fit curve to an experimental data and find the correlation and regression
CO5: Create good estimators to various parameters
CO6: Apply the principles of Statistical Inference to practical problems

Unit-I: Basic Statistics: Measures of Central Tendency: Mean, Median, Mode Measures of Dispersion: Variance, Standard deviation, Skewness and Kurtosis

Unit-II: Basic Probability : Random Variables: Discrete and continuous - Probability function – density and distribution function, Expectation of a Random Variable, Moments, Chebychev's Inequality (Without proof).

Unit-III: Probability Distributions: Probability distributions: Binomial, Poisson and Normal - Evaluation of statistical parameters: Mean, Variance and their properties, Introduction to Exponential, Gamma and Weibull distributions.

Unit-IV: Bivariate Distributions: Curve fitting by the method of Least squares- Fitting of straight line, parabola and exponential curves, Simple Correlation and Regression – Rank correlation.

Unit-V: Sampling Distribution and Estimation: Introduction –Sampling distribution of means with known and unknown standard deviation Estimation: Criteria of a good estimator, point and interval estimators for means and proportions

Unit-VI: Tests of Hypothesis: Introduction-Type-I, Type-II Errors, Maximum Error, one-tail, two-tail tests, Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means. Test of significance: Small sample test for single mean, difference of means and test of ratio of variances (F-Test) - Chi-square test for goodness of fit and independence of attributes.

Text Books:

1. **B. V. Ramana**, A text Book of Engineering Mathematics, Tata McGraw Hill.
2. **Miller & Freund's**, Probability & Statistics for Engineers – Eighth Edition, Richard. A. Johnson

References Books:

1. **S. Ross**, “A First Course in Probability”, Pearson Education India, 2002.
2. **Dr.T.S.R.Murthy**, Probability and Statistics for Engineers, BS Publications.
3. **T. Veerarajan**, “Engineering Mathematics”, Tata McGraw-Hill, New Delhi, 2010.

III Sem	DIGITAL ELECTRONICS	Course Code: VI8ECT06	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1: Illustrate the conversion of a number from one number system to another .
 CO2: Classify Boolean theorems & simplify the Boolean functions using the Boolean properties.
 CO3: Use K-map as a tool to simplify and design logic circuits
 CO4: Construct different combinational Logic circuits like MUX, Decoders, Encoders etc.
 CO5: Demonstrate the basic flip-flops in terms of truth table & excitation table
 CO6: Apply the concepts of flip-flops in the designing of different sequential circuits like registers, counters, etc.

2. Syllabus Details

Course Outcomes: At the end of the Course student will be able to:

UNIT I: Number systems & Binary codes: Number systems: Number Systems, Radix conversions, complement of numbers. Binary codes: Binary codes, Weighted and non-Weighted codes, BCD code, gray code, excess 3 codes.

UNIT -II: Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms, Logic gates: NOT, OR, AND, NOR, NAND, XOR, XNOR - Universal gates.

UNIT- III: Gate level Minimization:Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation.

UNIT- IV: Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Decoders, Encoders, Multiplexers.

UNIT V: Sequential Logic Circuits: Introduction –Latches and Flip flops: Basic Flip flop circuit, RS, D, JK and T Flip-flops – Triggering of Flip flops: Master Slave Flip flop, edge triggered flip flop – Conversion of one type of Flip flop to another.

UNIT -VI: Registers and Counters: Registers and Counters: Shift Register, Universal Shift Register, Applications of Registers, Asynchronous counter, Synchronous counter, Mod-N Counter, binary up/down counter, Ring counter, Johnson counter. **Memories:** Introduction to ROM, PROM, EPROM.

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.
2. Digital Logic Design, Leach, Malvino, Saha, TMH.
3. Modern Digital Electronics, R.P. Jain, TMH.

III Sem	DATA STRUCTURES AND ALGORITHMS	Course Code: V18CST02	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Explain Sorting and searching techniques.	(K2)
CO2: Demonstrate Singly Linked Lists, Double Linked List.	(K3)
CO3: Interpret the Basic Concepts in Data Structures, Stacks, Queues	(K3)
CO4: Demonstrate Binary Trees and BST	(K3)
CO5: Compare Binary trees with self-balanced tree with appropriate examples	(K4)
CO6: Develop various graph algorithms.	(K3)

1. Syllabus

Unit I: Algorithm Notations - performance analysis: Space complexity, time complexity – Asymptotic notation: Big O, Omega and Theta. **Sorting:** bubble sort, insertion sort, selection sort, quick sort, merge sort, radix sort. **Searching:** linear search, binary search. Introduction to Hashing.

Unit II: Types of Data Structures – Linear data structures and non-linear data structures. Representation of arrays - polynomial representation, addition of two polynomials, sparse representation, transpose of sparse matrix.

Single linked list: Representation of node, operations on single linked list, reverses the linked list, **Double linked list:** operations like insert delete and display. Circular linked List.

Unit III: Stacks Definition, array representation, linked list representation, Towers of hanoi, infix to postfix conversion, expression evolution, Multistack. **Queues** definition, Array representation, linked list representation, operations on queues, Applications of Queues, Circular Queue.

Unit IV: Trees: Introduction, Terminology, Representation of Trees. **Binary Trees:** Properties of Binary Trees, Binary Tree Representation, operations, Tree Traversals – recursive, non-recursive. Binary Search Tree and its operations.

UNIT – V: Self-Balanced Trees - AVL trees: Definition, Representation of an AVL Tree, Height of AVL tree, AVL element searching, insert and delete element from AVL tree. **Priority Queues:** Heaps Definition, types of heaps, properties and its operations.

Unit – VI: Graphs: Graph Definition, properties, Graph Representation, Elementary Graph Operations. Graph Traversal techniques: Depth First Search, Breadth First Search. Spanning Trees: Kruskal's Algorithm, Prim's Algorithm. Single source shortest Paths and all pair shortest path algorithm.

TEXT BOOKS:

1. Data Structures, algorithms and applications in C++, SartajSahni, Universities press, Second Edition.
2. Fundamentals of Data Structures in C++, Ellis Horowitz, SartajSahni and Dinesh Mehta, 2nd Edition, Universities Press (India) Pvt. Ltd.

REFERENCE BOOKS:

1. An Introduction to Data Structures with Application, Jean-Paul Tremblay, Paul Sorenson, Second Edition.
2. Fundamentals of Data Structures and algorithms by C V Sastry, Rakesh Nayak, Ch. Raja Ramesh, IK Publications, new Delhi.
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

III Sem	DISCRETE MATHEMATICS	Course Code: V18CST03	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Demonstrate the concepts associated with propositions and mathematical logic. [K3]

CO2: Demonstrate the basic concepts associated with relations, functions and their applications. [K3]

CO3: Illustrate algebraic structures and their applications in computer science. [K3]

CO4: Apply techniques of graphs for real-time problems [K3]

CO5: Employ the concepts of trees in various real time problems. [K3]

CO6: Solve recurrence relations using various methods and problems based on combinatorics. [K3]

1. Syllabus

UNIT-I Mathematical Logic: Statements and Notation , Connectives, Truth tables, Tautologies, Equivalence of formulas, Tautological Implications, Normal forms, Theory of inference for Statement Calculus, Indirect Method of Proof. Predicate calculus- Predicates, quantifiers, universe of discourse.

UNIT-II Set Theory and Relations: Basic concepts, Operations on Sets, Principle of Inclusion and Exclusion, Relations, Properties of Binary Relations in a set, Relation Matrix and Digraph, Equivalence, Partial Ordering Relations, Hasse Diagrams, Lattice and its Properties , Functions, Bijective Functions, Composition of Functions.

UNIT-III Algebraic Structures:Algebraic Systems and examples, Properties of Binary operations, Semi Groups, Monoids, Homomorphism of Semi groups and Monoids, Groups, Abelian Group, Subgroups.

UNIT-IV Graph Theory-I:Basic Concepts of graph, Representing graphs, Sub graphs, Isomorphic graphs, Paths and Circuits,Eulerian and Hamiltonian Graphs,Planar graphs, Graph Colouring , Chromatic Number.

UNIT-V Number Theory: Properties of integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler 's Theorem) .

UNIT-VI Combinatorics and Recurrence Relations: Combinatorics: Basics of counting, permutations, combinations, inclusion-exclusion, pigeonhole principle. **Recurrence relations:** Solving homogeneous and non-homogeneous recurrence relation by method of substitution, characteristic roots and generating function.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, 1st Edition, Tata McGraw Hill.
2. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H.Rosen, 7th Edition, Tata McGraw Hill..
3. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.

Reference Books:

1. Elements of Discrete Mathematics -A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.
2. Discrete Mathematics with Combinatorics and Graph Theory, Santha, 1st Edition Cengage Learning.

III Sem	OBJECT ORIENTED PROGRAMMING FOR PROBLEM SOLVING	Course Code: V18CST04	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Differentiate Procedural Oriented Programming and Object Oriented Programming. (K2)
CO2: Develop object oriented programs on classes and objects. (K3)
CO3: Demonstrate various object-oriented concepts like Constructors, Destructors and Operator- Overloading. (K3)
CO4: Apply various Object Oriented features like Inheritance and Polymorphism to solve various computing problems. (K3)
CO5: Develop programs to handle Exceptions & Files. (K3)
CO6: Describe Generic Programming. (K3)

1. Syllabus

UNIT I: Introduction to Object-Oriented Programming: Introduction to Object-Oriented Programming – Programming Paradigms, Features of Object Oriented Programming, Data Types, Variables, Constants, Operators, Decision Statements & Control Structures, Arrays, Namespace, Default Arguments, Constant Arguments, Inputting Default Arguments, Reference Arguments.

UNIT II: Classes and Objects: Introduction to Classes and Objects: Defining Classes & Objects, Access specifiers, Scope Resolution Operator, Static Member variables, Static Member Functions, Array of Objects, Inline Functions, Overloading Member Functions, Objects as Function Arguments, Friend Functions, Friend Class, Local Class, Empty Class, Nested Classes, Return by Reference.

UNIT III: Object Initialization, Cleanup and Operator Overloading: Introduction to Constructors, Characteristics, Constructor with Default Arguments, Parameterized Constructors, Overloading Constructors, Copy Constructor, Dynamic Constructors and Destructors, Anonymous Objects. Introduction to operator Overloading, Rules for Overloading Operators, Overloading Unary & Binary Operators, this keyword, Constraint on Increment and Decrement Operators, Overloading with Friend Functions, Type Conversions.

UNIT IV: Inheritance and Polymorphism: Base class and Derived class, Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, and Constructor in Derived Classes. qualifier classes and inheritance, Significance of Virtual Functions, Early Vs Late Binding, Pure Virtual Functions, Virtual Destructor.

UNIT V: Exception Handling and File Handling : Principles of Exception Handling, Keywords, Exception Handling Mechanism, Multiple Catch Statements, Catching Multiple Exceptions, Re-throwing Exception. File Opening Modes, File Stream Classes, I/O manipulators, Classes for File Handling, Sequential Access Files, Random Access Files, Error Handling Functions.

UNIT-VI: Generic Programming with Templates : Need for Templates, Class Templates, Function Templates, overloading Template Functions. Introduction to Standard Template Library, Sequential Containers & Associative Containers.

Text Books

1. Programming in C++, Ashok N Kamthane, 2nd Edition, Pearson.
2. C++ How to Program, Paul J. Deitel, Harvey Deitel, 6th edition, PHI publication.

References Books

1. Object Oriented Programming C++, Joyce Farrell, Cengage.
2. Mastering C++, Venugopal, Raj Kumar, Ravi Kumar, TMH.
3. The Complete Reference C++, Herbert Schildt, 4th Edition, McGraw Hill.
4. Object Oriented Programming With C++, R. Subburaj, Vikas Publishing House.

III Sem	DIGITAL ELECTRONICS LAB	Course Code: V18ECL04	L	T	P	C
			0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Apply the Boolean algebra to design digital logic circuits.
- CO2:** Analyse the behaviour of different combinational logic circuits.
- CO3:** Analyse the behaviour of different sequential logic circuits
- CO4:** Construct and troubleshoot simple combinational and sequential circuits

List of Experiments :*Conduct any TEN experiments*

Study of Integrated Circuits, Bread board & Power supplies.

- 1) Verification of Basic Logic Gates
- 2) Verification of Universal Gates, Special Gates.
- 3) Verify the De-Morgan laws using CMOS IC's
- 4) Design a Gray code encoder & Decoder using IC 7486
- 5) Construct a Half Adder using IC's and verify the truth table.
- 6) Construct a Half Subtractor using IC's and verify the truth table.
- 7) Verify the truth table of IC 74138 (3x8 Decoder)
- 8) Verify the truth table of IC 74153 (4x1 MUX).
- 9) Verify the D Flip-Flop Using IC 7474 with PRESET, CLEAR asynchronous Inputs.
- 10) Verify JK Flip-Flop & T Flip-Flop Using IC 7476 with PRESET, CLEAR asynchronous Inputs.
- 11) Verify Decade counter using IC 7490.
- 12) Design 4-bit right Shift Register using D-Flip-Flop and verify the truth table.

Add-on Experiments

- 13) Verify the read and write operations for the IC 74189.
- 14) Design the Mod-6 counter using IC 74XX

Equipment Required:

1. IC Trainer Kits
2. Electronic chips of all gates
3. Power Supplies
4. Bread boards

III Sem	DATA STRUCTURES AND ALGORITHMS LAB	Course Code: V18CSL02	L	T	P	C
			0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Construct Sorting and searching methods. **(K3)**
CO2: Implement programs using Singly Linked Lists, Double Linked List. **(K3)**
CO3: Construct Basic Data Structures, Stacks, Queues and Applications. **(K3)**
CO4: Implement various graph operations and shortest path algorithm. **(K3)**

LIST OF EXPERIMENTS

1. Programs to implement the following sorting techniques
Selection sort, Quick sort, Merge sort
2. Programs to implement the following searching methods
Linear search and binary search.
3. A Program to Implement hash table and its operations.(Note: Use at least one collision resolution technique)
4. A Program to implement addition of two polynomials. (using arrays).
5. A Program to implement single linked list and its operations. (create, insert, delete, display)
6. A Program to implement double linked list and its operations.
7. A Program to implement stack operations using arrays.
8. A Program to convert infix expression to postfix expression.
9. A Program to implement queue operations using single linked list.
10. A Program to implement circular queue using arrays.
11. A Program to implement Binary search Tree and its operations.
12. A Program to implement AVL trees and its operations.
13. A Program to implement Heap sort.
14. A Program to implement graph traversal algorithms (BFS & DFS).
15. A Program to implement minimum spanning tree algorithms (Prims &Krushkal)
16. A Program to implement single source shortest path algorithm.

TEXT BOOKS:

1. Data Structures, algorithms and applications in C++, SartajSahni, Universities press, Second Edition.
2. Fundamentals of Data Structures in C++, Ellis Horowitz, SartajSahni and Dinesh Mehta, 2nd Edition, Universities Press (India) Pvt. Ltd.

REFERENCE BOOKS:

1. An Introduction to Data Structures with Application, Jean-Paul Tremblay , Paul Sorenson, Second Edition.
2. Fundamentals of Data Structures and algorithms by C V Sastry, Rakesh Nayak, Ch. Raja Ramesh, IK Publications, new Delhi.
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

III Sem	OBJECT ORIENTED PROGRAMMING FOR PROBLEM SOLVING Lab	Course Code: V18CSL03	L	T	P	C
			0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Develop Programs on Classes and Objects. **(K3)**
CO2: Demonstrate Constructors, Destructors and Operator-Overloading, Inheritance and Polymorphism. **(K3)**
CO3: Develop programs to handle Exceptions & Files. **(K3)**
CO4: Demonstrate Generic Programming. **(K3)**

LIST OF EXPERIMENTS

1. Programs illustrating Various Control Structures.
2. Programs illustrating the use of following concepts.
 - a. Default Arguments
 - b. Constant Arguments
 - c. Reference Arguments
3. Programs illustrating the use of following concepts:
 - a) Classes & Objects
 - b) Inline functions
 - c) Static Member functions
 - d) Overloading of Member Functions
4. Programs illustrating the use of following concepts.
 - a) Objects as Function Arguments
 - b) Friend Functions , Friend class
 - c) Local class
 - d) Empty Class& Nested Classes
5. Programs illustrating the use of following concepts.
 - a) Default constructor
 - b) Constructor with arguments
 - c) Copy constructor
6. Programs to illustrate the Overloading of various operators.
 - a) Binary
 - b) Unary
 - c) new
 - d) delete
7. Programs illustrating the various forms of Inheritance.
 - a) Single
 - b) Multilevel
 - c) Hierarchical
 - d) Hybrid
8. Program illustrating the use of Virtual Functions & Virtual Base class.
9. Programs illustrating how Exceptions are handled.
 - a) Division-by-zero
 - b) Overflow in an array
10. Programs illustrating file handling operations:
 - a) Copying text files
 - b) Displaying the contents of the file
11. Programs illustrating Class template and Overloading Function Template.
12. Programs illustrating Sequential Containers & Associative Containers.

III Sem	Professional Communication Skills - I	Course Code: V18ENT03	L	T	P	C
			3	-	-	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Summarize one's introduction in an appropriate manner, exhibit grammatical competence through correction of sentences, analyze noun and pronoun dispositions and develop pre-reading strategies to improve comprehension skills. **[K5]**
- CO2:** Distinguish singular and plural in different contexts and display knowledge through accurate usage of sentences, build conversations which befit the situations, comprehend the passages well and, use different kinds of idioms. **[K4]**
- CO3:** Classify various kinds of adjectives and adverbs, learn natural occurrence of paired words of native speakers, infer the referential and inferential aspects of the passages and make use of idioms while narrating personal experiences. **[K4]**
- CO 4:** Judge and assess the behaviour of people in day to day life using kinesics and proxemics that disclose their disposition and be aware of their personal traits that promote good relations. **(K2)**
- CO5:** Articulate their goals and have a constructive plan of executing them properly and become adept in oral presentations as well as poster presentations that enhance their professional skills. **(K3)**
- CO6:** Evaluate various happenings by thinking out of the box and display their latent talent. They can also reduce the stress levels by applying various stress management techniques. **(K4)**

2. Syllabus

UNIT – I

SELF-INTRODUCTION: Basic information - Academic and personal - interests- strengths and weaknesses – goal.

ERROR ANALYSIS: Nouns & Pronouns – Singular & Plural – Kinds of Nouns & Pronouns- Collective Nouns - Personal and Reflexive Pronouns.

READING COMPREHENSION: Reading as a skill – quick reading - analyzing – answering

IDIOMS& PHRASES: Colloquial expressions– formal and informal expressions.

UNIT – II

ERROR ANALYSIS: Concord – Subject – Verb agreement.

ROLE PLAY: Day to day situations - practical approach – real life experiences.

READING COMPREHENSION: Skimming – scanning - summarizing – problem solving.

IDIOMS & PHRASES: Enriching written and spoken English – use and usage.

UNIT – III

ERROR ANALYSIS: Adjectives – Adverbs – role of modifiers – place of Adjectives– Adverbs of frequency.

COLLOCATIONS: Natural combination of words – closely affiliated with each other.

READING COMPREHENSION: At a glance – close reading – understanding – answering

IDIOMS & PHRASES: Communicative - expressive – competent.

UNIT -IV

INTER AND INTRA PERSONAL SKILLS: Leading, Coaching, Interviewing, Managing, Persuading - Self awareness, Self confidence, Good Attitude.

BODY LANGUAGE: Basics of proxemics and kinesics.

UNIT -V

PRESENTATION SKILLS: Importance of Presentation skills, Structuring our presentations, Ways to improve our presentation skills, Tips for effective presentations.– oral – Power point – poster.

GOAL SETTING: Short-term – long-term – aim – target – vision – How to set SMART goals.

UNIT - VI

LATERAL THINKING: What is creativity, Fundamental approaches to smart thinking, Characteristics of a creative person, Convergent and Divergent thinking.

STRESS MANAGEMENT: Meaning of Stress, Types of Stress, Symptoms of stress, Short term and long term stress, how can people manage stress.

3. Reference:

1. Essential English Grammar - Raymond Murphy
2. Advanced English Grammar – D.S. Paul
3. Word Power Made Easy – Norman Lewis
4. English collocations in use - Michael McCarthy
5. Word Power Made Handy - ShaliniVarma
6. Barron’s GRE - Barron’s
7. Current English Grammar & Usage – R.P Sinha
8. Think & Grow Rich - NapoleonHill
9. Soft Skills for Everyone - Butterfield, Jeff,
10. Soft Skills - Chauhan, G.S. and Sangeeta Sharma
11. Theories of Personality - Hall, Calvin S
12. Corporate Conversations - Holtz, Shel
13. Communication Skills - Kumar, Sanajy and PushpLata
14. Winning at Interviews - Thorpe, Edgar and Showick Thorpe
15. Swami Vivekananda and “Personality Development” published by RK Math.

III Sem	Technical Skills -I	Course Code: V18CST60	L	T	P	C
			4	0	0	MNC

Syllabus Details

Module-1: Problem Solving using C-I

Course Outcomes: After successful completion of the Course, the student will be able to:

- CO1: interpret the problem and find the logic to produce solution (K2)
CO2: Develop programs to solve Real world problems (K3)
CO3: Apply debugging techniques to find defects and errors in problem solution (K3)

Syllabus

- 1. I/O Statements, Operators and Expressions**
- 2. Problem Solving Using Conditional Statements**
- 3. Looping Constructs**
- 4. Functions**
- 5. 2-D Arrays**
- 6. Strings**

Text Books:

1. Let us C: Yesvanth Kanetkar, BPB Publications, 16th Edition
2. Working With C, Yashavant P. Kanetkar, BPB Publications
3. Test Your C Skills, Yashavant P. Kanetkar, BPB Publications

IV Sem	Computer Organization	Course Code:	L	T	P	C
		V18CST05	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Illustrate Basic structure of Computers, Instruction types and their addressing modes.	(K2)
CO2: Describe the different modes of Input / Output transfer.	(K2)
CO3: Illustrate different types of Memory.	(K2)
CO4: Describe the different types of Control Unit techniques.	(K2)
CO5: Illustrate the Fixed point and Floating point arithmetic operations of ALU.	(K2)
CO6: Explain the concept of Pipelining.	(K2)

1. Syllabus

UNIT-I

Introduction: Functional Units, Basic Operational Concepts, Bus Structures.

Instruction Sequencing and Addressing Modes: Instructions and Instruction Sequencing, Addressing modes, Basic Input/Output Operations.

UNIT-II

Input/Output Organization: Accessing Input/Output devices, Interrupts- Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses- Synchronous and Asynchronous.

UNIT-III

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative memory, Cache Memory. **(Morris Mano)**

UNIT-IV

Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, Microprogrammed Control-Microinstructions, Microprogram Sequencing.

UNIT-V

Arithmetic Logic Unit: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations. **(Morris Mano)**

UNIT-VI

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Datapath and Control Considerations.

2. Text Books:

1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, McGraw Hill Education.
2. Computer System Architecture, M. Morris Mano, 3rd Edition, Pearson Education.

Reference Books:

1. Computer Organization and Architecture, William Stallings, 10th Edition, Pearson Education.
2. Computer Architecture and Organization, John P. Hayes, 3rd Edition, McGraw Hill Education.

IV Sem	Software Engineering	Course Code: V18CST06	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Demonstrate Software Process Models	[K3]
CO2: Illustrate Requirement Engineering Process	[K3]
CO3: Discuss Software architecture and Design	[K2]
CO4: Apply Coding principles and Testing techniques	[K3]
CO5: Discuss Software Estimation and Maintenance	[K2]
CO6: Describe Quality Management and Metrics	[K2]

2. Syllabus

UNIT-I : The nature of Software: Defining Software, Software application Domains, Legacy software, Software engineering, Software Myths. **Software Process:** Process and project, Component software process, Software development process models: Waterfall model, Prototyping, Iterative development, Unified process, Time boxing model, Extreme programming and agile process. Merits and Demerits of Software Process Models.

UNIT-II: Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the Software requirements document. **Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

UNIT-III :Software Architecture: Role of software architecture, Architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures. **Design:** Design concepts, Function-oriented design, Object oriented design, Detailed design.

UNIT-IV: Coding and Testing: Programming principles and guidelines, incrementally developing code, managing evolving code. Testing concepts, Testing process, Black-box testing, White-box testing.

Risk management: Reactive vs. Proactive Risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, RMMM Plan.

UNIT-V: Software Project estimation: Decomposition techniques, Empirical Estimation Models. **Software Maintenance:** Maintenance Process, Maintenance Models, Reverse Engineering, Reengineering, Configuration Management

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

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, SEI-CMM Model, Six Sigma and ISO 9000 quality standards.

4. Text Books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 7th Edition, McGrawHill International Edition.
2. Software Engineering- Ian Sommerville, 9th Edition, Pearson education.

5. Reference Books:

1. Software Engineering, A Precise approach, PankajJalote, Wiley
2. Software Engineering principles and practice, W S Jawadekar, 3rdEdition, TMH

IV Sem	Formal Languages And Automata Theory	Course Code: V18CST07	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Construct DFA, NFA and ϵ -NFA.	[K3]
CO2: Produce Regular expressions , Regular Grammars.	[K3]
CO3: Construct Context Free Grammars, Context Free Languages.	[K3]
CO4: Construct Pushdown Automata and its equivalence with CFG.	[K3]
CO5: Construct Turing machine.	[K3]
CO6: Discuss Decidability Theory.	[K2]

1. Syllabus

UNIT-I: Alphabet, Strings, Language, Finite Automaton Definition, Transition Systems, Acceptance of Strings by Finite Automata, DFA, Design of DFA, NFA, Design of NFA, Equivalence between NFA and DFA, Finite Automata with ϵ -Transition, Equivalence between NFA and ϵ -NFA, Minimization of Finite Automata, Equivalence between two Finite Automata, Moore and Mealy machines and their equivalences, Applications of Finite Automata.

UNIT-II: REGULAR EXPRESSIONS: Regular expressions, Identity rules, Equivalence between two Regular Expressions, Equivalence between Regular Expressions and Finite Automata, Pumping lemma, Closure properties of regular sets(proofs not required),Regular Sets and Regular grammars, Equivalence between Regular grammar and FA, Regular Expressions and Regular Grammar.

UNIT-III: CONTEXT FREE GRAMMARS:Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy, Context free Grammars, Derivation of string, Left Most Derivations, Right Most Derivations, parse trees, Ambiguity inContext-Free Grammars, Simplification of Context Free Grammars, Normal Forms-Chomsky Normal Form (CNF), Greibach Normal Form (GNF),PumpingLemma, Closure Properties, Applications of Context Free Languages.

UNIT-IV: PUSHDOWN AUTOMATA: Definitions, Instantaneous descriptions, Languages of a PDA, Equivalence of Pushdown automata and CFG's, Deterministic pushdown automata: Definition DPDA, Regular Languages and DPDA , DPDA and context free languages.

UNIT-V:TURING MACHINE: Definition, Model, Representation of Turing Machines: Instantaneous Description, Transition Tables and Transition Diagrams, Language Acceptance of a Turing Machine, Design of Turing Machine (TM) , Types of TM's (Proofs not required).

UNIT-VI: Recursive languages, Recursive Enumerable Language, Closure Properties of Recursive languages & Recursive Enumerable, Universal Turing Machine. Decidable and Un-decidable Languages, Halting Problem of Turing Machines, Post Correspondence Problem, ModifiedPost'sCorrespondenceProblem.

Text Books:

- 1.Introduction to AutomataTheory,Languagesand Computation,J.E.Hopcroft, R.MotwaniandJ.D.Ullman, 3rdEdition, Pearson, 2008.
- 2.Theoryof ComputerScience-Automata,Languages and Computation, K.L.P.Mishra and N.Chandrasekharan, 3rd Edition,PHI, 2007.
- 3.Peter Linz, "An Introduction to Formal Language and Automata", ThirdEdition, Narosa Publishers, New Delhi, 2002

Reference Books:

- 1.Introduction to AutomataTheory,FormalLanguagesand Computation, ShyamalenduKandar, Pearson, 2013.
2. TheoryofComputation, V.Kulkarni, Oxford UniversityPress, 2013.
3. TheoryofAutomata,LanguagesandComputation, RajendraKumar, McGraw Hill, 2014.
4. FormalLanguageandAutomataTheory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
5. John C Martin, "Introduction to Languages and the Theory ofComputation", Third Edition, Tata McGraw Hill PublishingCompany,New Delhi, 2007
6. Kamala Krithivasan and Rama. R, "Introduction to Formal Languages,Automata Theory and Computation", Pearson Education 2009.

IV Sem	Java Programming	Course Code:	L	T	P	C
		V18CST08	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Describe Java Virtual Machine and Type casting.	(K2)
CO2: Demonstrate Concepts like Constructors, Arrays, Nested Classes and Command Line Arguments.	(K3)
CO3: Implement Concepts of Inheritance and Exception Handling	(K3)
CO4: Develop programs on Multi-Threading and Files	(K3)
CO5: Demonstrate Applet Programming and AWT Components.	(K3)
CO6: Describe Event Handling and Swings.	(K3)

1. Syllabus

UNIT-I: Introduction to Java: Introduction to Object Oriented Paradigm, Concepts of OOP, Applications of OOP, History of Java, Java Features, JVM, Program Structure. Variables, Primitive Data Types, Constants, Operators, Expressions, Precedence rules and Associativity, Primitive type conversion and Casting, Control Structures.

UNIT-II: Classes and Objects: Classes and objects, Class declaration, Creating objects, Methods, Constructors and Constructor Overloading, Importance of Static Keyword and Examples, this Keyword, Arrays, Command Line Arguments, Nested Classes.

UNIT-III: Inheritance and Exception Handling

Inheritance, super Keyword, final Keyword, Method Overriding and Abstract Class. Interfaces, Creating Packages, Using Packages, Importance of Class path. Exception Handling, Importance of try, catch, throw, throws and finally Block.

UNIT-IV: Multithreading and Files: Introduction, Thread Lifecycle, Creation of Threads, Thread Priorities, Thread Synchronization, Communication between Threads. Reading Data from Files and Writing Data to Files, Random Access Files.

UNIT-V: Applet Programming and AWT: Applet Class, Applet Lifecycle, Applet Programs. Introduction to AWT, Components and Containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Layouts, Menu and Scrollbar

UNIT-VI: Event Handling and Swings: Event Handling :Event Delegation Model, Sources of Events, Event Listeners, Adapter Classes, Inner Classes. Introduction to Swings.

TEXT BOOKS:

1. Java Programming, Balagurusamy, 4th Edition , TMH,.
2. The complete Reference Java, 8th Edition, Herbert Schildt, TMH.
3. Introduction to java programming ,Y Daniel Liang, 7th Edition, Pearson.

REFERENCE BOOKS:

1. Core Java: An Integrated Approach , R Nageswara Rao, 7th Edition, Dream Tech
2. Head First Java , Kathy Sierra and Bert Bates, 2nd Edition O'reilly

IV Sem	Python Programming	Course Code:	L	T	P	C
		V18CST09	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Illustrate basic concepts of Python Programming	(K2)
CO2: Describe control structures in python	(K2)
CO3: Demonstrate functions and packages.	(K3)
CO4: Construct python programs using structured data types.	(K3)
CO5: Compare TextFiles and Binary Files	(K4)
CO6: Apply OOPs concepts to Develop Test cases	(K3)

UNIT-I: INTRODUCTION TO PYTHON, DATA TYPES & OPERATORS :Basics of python programming: Features of python – History of Python - The Future of Python installation and execution - Data types – Identifiers - variables – type conversions- Literal Constants – Numbers – Strings. I/O statements. Operators and expressions, operator precedence – expression evaluation.

UNIT-II: Control Structures: Decision Control statements: conditional (if), alternative (if-else), chained conditional (if-elif-else); **Iteration:** while loop, for loop, nested for loop, range function, break, continue and pass statements.

UNIT-III Functions: Functions and modules : Introduction - Function Declaration & Definition - Function Call – Variable Scope and Lifetime -The return statement-More on Defining Functions - Lambda Functions or Anonymous Functions - Documentation Strings- Modules – Packages.

UNIT-IV Structured Data Types:Lists: list operations, list slices, list methods, cloning lists, list parameters. **Tuples:** tuple assignment, tuple as return value. **Set:** Set Creation, Set Operations. **Dictionaries:** Creation, operations; comprehension, operations on strings.

UNIT-V Files & Exception Handling: Introduction - Types of files - Text files - reading and writing files; Errors and exceptions handling.

UNIT-VI OOPS concepts and Testing Basics: Classes, Methods, Constructor, Inheritance, Overriding Methods, Data hiding, GUI programming with TKINTER.

Text Books:

1. “Python Programming using problem solving Approach” ReemaThareja, Oxford University Press – 2017.
2. Python with Machine Learning by “A.Krishna Mohan, Karunakar & T.Murali Mohan” by S. Chand Publisher

Reference Books:

1. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist“, 2nd edition, Updated for Python 3, Shroff /O’Reilly Publishers, 2016 (<http://greenteapress.com/wp/think-python/>)
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, —Introduction to Computation and Programming Using Python“, Revised and expanded Edition, MIT Press , 2013
4. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python:

IV Sem	Managerial Economics And Financial Analysis	Course Code: V18MBT51	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Understanding the basic concepts of managerial economics, demand, and elasticity of demand and methods of demand forecasting.	(K2)
CO2:	Interpret the production function with one, two and infinite variables. Understanding various cost concepts and calculating breakeven point	(K3)
CO3:	Understanding and showing a price output determination in different types of market structures and knowing various pricing methods	(K2).
CO4:	Understanding various forms of business organizations	(K2).
CO5:	Prepare the financial statements and its analysis	(K3).
CO6:	Appraising the projects by using various capital budgeting methods	(K4).

UNIT-I-Introduction to Managerial Economics and demand Analysis: Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects – Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting..

UNIT – IIProduction and Cost Analyses: Concept of Production function- Cobb-Douglas Production function- Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination- Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total cost –Cost-Volume-Profit analysis-Determination of Breakeven point(simple problems)Managerial significance and limitations of Breakeven point.

UNIT – IIIIntroduction to Markets, & Pricing Policies: Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing, Flat Rate Pricing, Usage sensitive pricing and Priority Pricing.

UNIT – IVTypes of Business Organization and Business Cycles: Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms – Business Cycles : Meaning and Features – Phases of Business Cycle.

UNIT – VIntroduction to Accounting & Financing Analysis: Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis

UNIT – VICapital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods and modern methods (simple problems)

TEXT BOOKS

1. Dr. N. AppaRao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House, 2014.
2. V. Maheswari: Managerial Economics, Sultan Chand.2014
3. Suma Damodaran: Managerial Economics, Oxford 2011.
4. VanithaAgarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson
6. Maheswari: Financial Accounting, Vikas Publications.
7. S. A. Siddiqui& A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012
8. Ramesh Singh, Indian Economy, 7th Edn., TMH2015
9. PankajTandonA Text Book of Microeconomic Theory, Sage Publishers, 2015
10. ShailajaGajjala and UshaMunipalle, Univerties press, 2012.

IV Sem	Java Programming Lab	Course Code: V18CSL04	L	T	P	C
			3	0	0	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Develop Programs on Classes and Objects , Constructors, Arrays. **(K3)**
- CO2:** Demonstrate Inheritance and Exception Handling. **(K3)**
- CO3:** Develop programs on Multi Threading and Files. **(K3)**
- CO4:** Demonstrate GUI Programming using Applets and Swings. **(K3)**

LIST OF EXPERIMENTS

1. Programs illustrating Control Structures and Type Conversions in java.
2. Programs illustrating the use of following concepts:
 - a) Classes & Objects b) Usage of static c) Constructors
3. Programs illustrating the use of following concepts.
 - a) Arrays b) Nested Classes c) Command Line Arguments
4. Programs illustrating the use of following concepts.
 - a) Inheritance b) Usage of super c) Method Overriding
5. Programs to illustrate the Overloading of various operators.
 - a) Usage of final b) Abstract class c) Interfaces
6. Programs illustrating the various concepts like.
 - a) Packages b) Exception Handling.
7. Programs illustrating how Multi-Threading implemented.
 - a) Multiple Threads on Single Object b) Thread Deadlock
8. Programs illustrating Thread Communication.
9. Programs illustrating reading from and writing to files.
 - a) Sequential Files b) Random Access Files
10. Programs illustrating GUI using Applets & AWT Components.
11. Programs to illustrate Event Handling using Listener Interfaces.
12. Programs illustrating GUI using Swings.

IV Sem	Python Programming Lab	Course Code:	L	T	P	C
		V18CSL05	0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Demonstrate Basic Python Programs	(K3)
CO2:	Construct control structures in python	(K3)
CO3:	Demonstrate functions and packages.	(K3)
CO4:	Construct python programs using structured data types.	(K3)
CO5:	Demonstrate TextFiles and exception handling	(K3)
CO6:	Test Rock – paper – Scissors game (K4)	

LIST OF EXPERIMENTS

Exercise 1 - Basics

- A sample Python Script using command prompt, Python Command Line and IDLE
- A program to purposefully raise an Indentation Error and correct it

Exercise 2 - Operations

- A program to compute distance between two points taking input from the user(Pythagorean Theorem)
- A program on add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

- A Program to implement for checking whether the given number is a even number or not.
- A program to construct reverse the digits of a given number and add it to the original, If the sum is not a palindrome repeat this procedure.
- 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 program to construct the following pattern, using a nested for loop.

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
*
```

- 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 – Problem Solving using Functions

- Find mean, median, mode for the given set of numbers passed as arguments to a function
- Develop 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.
- Develop a Recursive Function to find the Factorial of a given number .
- Develop function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise - 6 Structured Data types

- a program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings.
- a program to develop unzip a list of tuples into individual lists and convert them into dictionary.

Exercise – 7 Structured Data types Continued

- A program to count the numbers of characters in the string and store them in a dictionary data structure
- a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Exercise - 8– Modules

- a) Install packages requests, flask and explore them using (pip)
- b) A program to implement a script that imports requests and fetch content from the page. Eg. (Wiki)
- c) Develop a simple script that serves a simple HTTPResponse and a simple HTML Page

Exercise - 9 Files

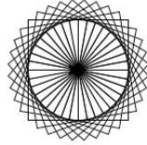
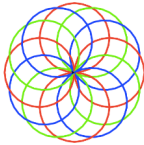
- a) a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?
- b) a program to compute the number of characters, words and lines in a file.

Exercise - 10 OOP

- a) Class variables and instance variable and illustration of self variable
 - i) Robot
 - ii) ATM Machine

Exercise - 11 GUI, Graphics

1. Develop a GUI for an Expression
2. A program to implement the following figures using turtle



Case Study: Implement Rock – paper – Scissors game using tkinter.

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT11	Constitution of India	2	-	-	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Summarize the evolution and historical importance of the Indian Constitution from 1858 to 1947. [K2]
CO2: Explain various stages in the composition of the Indian Constitution. [K2]
CO3: Develop awareness about their primary rights and duties & build up their civic sense. [K3]
CO4: Explain the distribution of powers between the center and states. (K2)
CO5: Summarize and sketch the specific roles of heads of Nation and the functioning of legislative bodies. (K2)
CO6: Explain the role of local self-government in strengthening democracy. (K1)

Syllabus

Unit-I: Historical Perspective of the Indian Constitution – A brief discussion of various Acts i.e from 1858 to 1947 passed by the British Government.

Unit-II: Constitution of India

- a) Preparation of Indian constitution by Constituent Assembly of India.
- b) Preamble or Philosophy of the Indian Constitution.
- c) Salient features of the Indian constitution.

Unit-III:

- a) Fundamental Rights - their importance & Limitations
- b) Fundamental Duties and their importance
- c) Directive principles of the state policy and their implementation

Unit-IV: Indian Federalism

- a) Distribution of powers between Union and State Governments
- b) Legislative, Executive and Financial relations between Union and State Governments

Unit-V: Parliamentary form of Government in India

1. Union Executive

- a) President of India- Powers and functions
- b) Vice-President - Powers and functions
- c) Prime Minister and Council of Minister - Powers and functions

2. Union Legislature

- a) Rajya Sabha – Powers and Functions
- b) Lok Sabha- Powers and Functions
- c) Amending Procedure- Important Constitutional Amendments – 42nd, 44

Constitutional Amendment Acts.

- d) **Judiciary** – Supreme court of India - Powers and Functions

Unit-VI: Local Self-government in India 73rd & 74th Constitutional Amendment Acts

Reference Books:

1. D D Basu-Introduction to the Constitution of India – 18th Edition. Prentice – Hall of India Private Ltd-New Delhi-1998
2. Granville Austin (1972) the Indian Constitution, Cornerstone of a Nation, Oxford university Press, New Delhi
3. Madhavkhosla (2012) the Indian Constitution, Oxford University Press, New Delhi
4. Granville Austin (1999) Working a Democratic Constitution; A History of the Indian Experience, Oxford University Press, New Delhi
5. Zoya Hasan, Sridharan E and Sudharshan R (Eds) 2002 India's living Constitution, Permanent black, New Delhi
Baxi Upendra (1980) the Indian Supreme Court and Politics, Eastern Book Co, Lucknow.

IV Sem	Professional Communication Skills - II	Course Code: V18ENT04	L	T	P	C
			3	0	0	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

Course Outcomes: At the end of the Course student will be able to:

- CO1:** Correlate individual words into one whole sentence using new vocabulary and focus on the error analysis of prepositions and conjunctions. **[K4]**
- CO2:** Distinguish and acquire knowledge of using words of same category in a sentence and learn new words that promote communicative finesse. **[K5]**
- CO3:** Find errors in sentences where the modifiers are misplaced and put them at the appropriate place, use hit pair words and send an email that is concise and lucid **[K5]**
- CO4:** Interpret the importance of Attire and Etiquette in societal context and manage their time. **[K2]**
- CO5:** Discover the team working abilities among themselves and display their leadership qualities. **[K3]**
- CO6:** Identify various elements of emotional balance that have positive impact on work-life-balance. **[K2]**

Syllabus

UNIT – I:

ERROR ANALYSIS: Prepositions - kinds of prepositions –appropriate use - conjunctions –sub-ordinating– co-ordinating.

VOCABULARY: Etymology – roots – suffixes – prefixes and one word substitutes.

SENTENCE IMPROVEMENT: Better choice – error-free sentences – effective – syntax.

UNIT – II

ERROR ANALYSIS: Parallel grammatical forms – same grammatical structures.

VOCABULARY: Words that describe personalities – faiths – professions – medical specialists and Word Clusters.

EXPANSION OF PROVERBS: Meaning – interpretation – explanation.

UNIT – III

ERROR ANALYSIS: Dangling modifiers – misplacement of modifiers – arrangement.

VOCABULARY: Antonyms and Synonyms and Foreign expressions. **EMAIL WRITING:** Format – method of exchanging – technicalities.

UNIT- IV

ATTIRE & ETIQUETTE: Formal – informal- professional – social Attires, Meaning of Etiquette, Need for etiquette, Types of Etiquette.

TIME - MANAGEMENT: Value of time – Setting priorities – effective use of time –

ABCD analysis, Pareto Principle, Eisenhower Method.

UNIT -V

TEAM WORK – Benefits of working with a team – Team Dynamics . **LEADERSHIP QUALITIES:** Leadership Styles, Characteristics of a Good Leader, Big 5 Personality traits, Myths about leadership qualities.

UNIT -VI

EMOTIONAL INTELLIGENCE: What is EI – Daniel Goleman model of EI, Qualities of an Emotionally Intelligent Person - Emotional balance – feelings

– thoughts – motivation.

WORK – LIFE - BALANCE: Personal life – professional life – cause of work-life imbalances, consequences of work-life imbalance, Role of gender and family – improving work life balance.

Reference:

1. Essential English Grammar - Raymond Murphy
2. Advanced English Grammar – D.S. Paul
3. Word Power Made Easy – Norman Lewis
4. English collocations in use - Michael McCarthy
5. Word Power Made Handy - ShaliniVarma
6. Barron’s GRE - Barron’s
7. Current English Grammar & Usage – R.P Sinha
8. Think & Grow Rich - Napoleaon Hill
9. Soft Skills for Everyone - Butterfield, Jeff,
10. Soft Skills - Chauhan, G.S. and Sangeeta Sharma
11. Theories of Personality - Hall, Calvin S
12. Corporate Conversations - Holtz, Shel
13. Communication Skills PushpLata - Kumar, Sanajy and
14. Winning at Interviews Thorpe - Thorpe, Edgar and Showick
15. Swami Vivekananda and “Personality Development” published by RK Math.

IV Sem	Technical Skills-II	Course Code: V18CST61	L	T	P	C
			0	0	4	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

Module-II: Problem Solving using C-II

1. Course Outcomes: After successful completion of the course, the student will be able to:

- | | |
|--|------|
| CO1: Develop programs using Pointers. | [K3] |
| CO2: Develop problems using functions. | [K3] |
| CO3: Solve problems using recursions. | [K3] |
| CO4 :Construct programs using File Handling. | [K3] |
| CO5 :Develop programs using Structures and Unions | [K3] |
| CO6 :Make use of command line arguments and preprocessors to solve the given problems. | [K3] |

Syllabus

1. Pointers
2. Functions and Pointers
3. Recursion
4. File Handling
5. Structures and Union
6. Enum, Preprocessors, Command Line Arguments

Text Books:

1. Let us C: Yesvanth Kanetkar, BPB Publications, 16th Edition
2. Working With C, Yashavant P. Kanetkar, BPB Publications
3. Test Your C Skills, Yashavant P. Kanetkar, BPB Publications
4. Understanding Pointers in C, Yashavant P. Kanetkar, BPB Publications.

V Sem	Database Management Systems	Course Code:	L	T	P	C
		V18CST10	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Demonstrate Database Systems, various Data Models and Database Architecture. **(K2)**

CO2: Apply ER Modeling to Design Relational Databases for Real Time Applications. **(K3)**

CO3: Apply SQL Constructs to Perform Database Operations. **(K3)**

CO4: Apply Normalization Techniques to Refine Schema. **(K3)**

CO5: Explain Transaction Management and Concurrency Control. **(K2)**

CO6: Experiment with various database indexing techniques. **(K3)**

UNIT-I: An Overview of Database Systems: Managing Data, File Systems versus DBMS, Advantages of DBMS, Data Independence. **Database System Architecture:** Three Levels of Architecture, External Level, Conceptual Level, Internal Level, Structure of DBMS, The Database Management Systems and Client/Server Architecture.

UNIT-II: Database Design: The E/R Models, Database Design and Er Diagrams, Entities, Attributes, Entity Sets, Relationships and Relationship Sets, Conceptual Design with ER Models. **Relational Model:** Integrity Constraints Over Relations, Key Constraints ,Foreign Key Constraints, General Constraints, Relational Algebra- Selection and Projection, Set Operation, Renaming, Joins, Division, Relational Calculus- Tuple Relational Calculus, Domain Relational Calculus.

UNIT-III: SQL Queries, Constraints and Triggers: The Form of Basic SQL Query, Union, Intersect, Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.

UNIT-IV: Schema Refinement (Normalization): Purpose of Normalization or Schema Refinement, Concept of Functional Dependency, Normal Forms based on Functional Dependency (1NF, 2NF and 3NF), Concept of Surrogate Key, Boyce-Codd Normal Form (BCNF), Lossless Join and Dependency Preserving Decomposition, Fourth Normal Form(4NF).

UNIT-V: Transaction Management: Transaction, Properties of Transactions, Transaction Log, and Transaction Management with SQL Commit, Rollback and Savepoint. Concurrency Control: Concurrency Control for Lost Updates, Uncommitted Data, Inconsistent Retrievals and the Scheduler. **Concurrency Control with Locking Methods :** Lock Granularity, Lock Types, Two Phase Locking for Ensuring Serializability, Deadlocks, Concurrency Control with Time Stamp Ordering, Transaction Recovery.

UNIT-VI: Storage and Indexing: Overview of Storages and Indexing, Data on External Storage, File Organization and Indexing, Clustered Indexing, Primary and Secondary Indexes, Index Data Structures, Hash based Indexing, Tree based Indexing, Comparison of File Organization

Text Books:

1. Introduction to Database Systems, CJ Date, 8th Edition, Pearson Education.
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, 3rd Edition TATA McGraw Hill.

Reference Books:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition, Course Technology.
2. Fundamentals of Database Systems, Elmasri Navrate , 7th Edition, Pearson Education.
3. Database Systems - The Complete Book, H G Molina, J D Ullman, J Widom, 2nd Edition, Pearson.

V Sem	Computer Networks	Course Code:	L	T	P	C
		V18CST11	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Discuss fundamentals of network concepts and Reference Models. **(K2)**
CO2: Discuss Communication media and switching techniques. **(K2)**
CO3: Demonstrate Error control and protocols. **(K3)**
CO4: Apply Routing algorithms and congestion control algorithms. **(K3)**
CO5: Discuss Transport layer services and protocols. **(K2)**
CO6: Describe Application layer protocols. **(K2)**

UNIT-I: Introduction: Reference models: The OSI Reference Model- the TCP/IP Reference Model, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT– II: Physical Layer: Transmission Media, Multiplexing: FDM, WDM and TDM- LAN Technologies, introduction to switching: Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

UNIT–III: Data link layer: Design issues, Framing, Flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, MAC: ALOHA, CSMA. Elementary Data Link Layer protocols: simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. Sliding window protocol: One bit, Go back N, Selective repeat-Stop and wait protocol, HDLC, point to point protocol (PPP).Piggybacking.

UNIT-IV : Network Layer :Network layer design issues- Algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast Routing algorithms-Congestion control and algorithms, Internet Protocol (IP) Addresses, Subnet masking

UNIT–V :Transport Layer: Services, Primitives and sockets, Elements of transport protocols, Internet Transport protocols(TCP,UDP,RPC,RTTP/RTP,RTCP) Segment headers, Primitives, Control, Congestion control, Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT–VI: Application layer: DNS, SMTP, POP,FTP HTTP Presentation formatting. Network security: Introduction to Cryptography, Authentication, Basics of Public key and private key cryptography, digital signatures and certificates firewalls and wireless security.

Text Books:

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

References:

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

V Sem	Operating Systems	Course Code:	L	T	P	C
		V18CST12	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe Operating System Services and System Calls **(K2).**
CO2: Illustrate Process Management Concepts and CPU Scheduling Algorithms **(K3).**
CO3: Demonstrate Process Synchronization primitives **(K3).**
CO4: Demonstrate Deadlock Prevention, Avoidance and Detection methods **(K3).**
CO5: Illustrate Memory Management Techniques and Page Replacement Algorithms **(K3).**
CO6: Describe File System Concepts and Mass Storage Structures **(K2).**

UNIT-I: Introduction: Operating-System Structure, Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls.

UNIT-II: Process Management: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication. **Threads:** Overview, Multithreading Models. **CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms

UNIT-III : Process Synchronization: The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors

UNIT-IV: Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT-V: Memory Management Main Memory: Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table

Virtual Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing

UNIT-VI:Storage Management:Overview of Mass-Storage Structure, Disk Scheduling, File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Allocation Methods

Text Book:

1. Operating System Concepts, AbrahamSilberschatz, ,Peter Baer Galvin,Greg Gagne, 9th Edition, John Wiley and Sons Inc., 2012

Reference Books:

1. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2012
2. Modern Operating Systems, Andrew S. Tanenbaum, Third Edition, Addison Wesley,2007

V Sem	Design and Analysis of Algorithms	Course Code:	L	T	P	C
		V18CST13	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe asymptotic notation and basic concepts of algorithms (K2).
CO2: Apply divide and conquer paradigm to solve various problems (K3).
CO3: Use greedy technique to solve various problems (K3).
CO4: Apply dynamic programming technique to various problems (K3).
CO5: Employ backtracking technique to various problems (K3).
CO6: Apply branch and bound technique to various problems (K3).

UNIT-I: Introduction: What is an Algorithm, Algorithm Specification-Pseudo code Conventions Recursive Algorithm, Performance Analysis-Space Complexity, Time Complexity, Amortized Complexity, Amortized Complexity, Asymptotic Notation, Practical Complexities, Performance Measurement.

UNIT-II: Divide and Conquer: General Method, Defective Chessboard, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort-Performance Measurement, Randomized Sorting Algorithms.

UNIT-III: The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees-Prim's Algorithm, Kruskal's Algorithms, An Optimal Randomized Algorithm, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT-IV: Dynamic Programming: All Pairs Shortest Paths, Single Source Shortest paths General Weights, Explain Optimal Binary Search Trees, String Edition, 0/1 Knapsack, Reliability Design.

UNIT-V: Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles.

UNIT-VI: Branch and Bound: The Method-Least cost (LC) Search, The 15-Puzzle: an Example, Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound, 0/1 Knapsack Problem-LC Branch-and-Bound Solution, FIFO Branch-and-Bound Solution, Traveling Salesperson.

Text Books:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

Reference Books:

1. Introduction to Algorithms Thomas H. Cormen, PHI Learning.
2. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman.
3. Algorithm Design, Jon Kleinberg, Pearson.

V Sem	Unix Programming	Course Code: V18CST14	L 3	T 0	P 0	C 3
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Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Illustrate the UNIX basics and the working of the built in commands in Unix	(K2).
CO2: Demonstrate the file system and change the permissions associated with files	(K2).
CO3: Develop basic programs using shell script	(K3).
CO4: Demonstrate the grep family and data transforming programs sed, and awk	(K2).
CO5: Construct programs for process system calls	(K3).
CO6: Explain the concept of signals and its system call	(K2).

UNIT I: Introduction to UNIX: The UNIX Operating System, A brief history of UNIX, The UNIX Architecture, Basic features of UNIX. General Purpose Utilities- cal, date, man, echo, bc, clear, passwd, who, whoami,uname. Directory Handling Commands: pwd, cd, mkdir, rmdir. File Handling Utilities - cat, touch, cp, ls, rm, mv, nl, pg,tar,wc Displaying Commands: more,head,tail, simple filters and commands: cmp, comm., ulink, diff, head, tail, find, cut, paste,sort, uniq, tr, finger. Disk Utilities– du, df, mount, umount.Process Utilities– ps, kill. Networking Utilities– ping, telnet, rlogin, ftp.

UNIT II : THE FILE SYSTEM : Types of Files, Directories and Files, UNIX File System, Absolute and relative pathnames, File Attributes and Permissions ,The File Command -knowing the File Type, Chmod Command- Changing File Permissions, Chown Command-Changing the Owner of a File, Chgrp Command-Changing the Group of a File. Vi editor-editing with vi, moving the cursor, editing, copying and moving text, pattern searching.

UNIT III : Introduction to Shell Programming : Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The \$? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-I/O Redirection, The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command. Command Line Structure - Met characters.

UNIT-IV : Regular Expressions: grep, egrep, fgrep, Sed- line addressing, context addressing, text editing,substitution. **Programming with awk:** syntax of awk programming statement, structure of awk script, variables ,records fields, and special variables, patterns, operators ,simple input files, awk programming- simple awk programming, awk control structures, looping, functions in awk.

UNIT-V: Unix process: What is a process, process structure, process identifiers, starting new process, waiting for a process, zombie process, system call interface for process management - fork, vfork, exit, wait, waitpid, exec system call.

UNIT VI: Signals: Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions

Text Books:

1. Introduction to Unix and shell programming, M G Venkateshmurthy, Pearson education
2. Advanced programming in the unix environment, W. Richard Stevens, 3rd Edition, Pearson Education.

References:

1. Unix and shell Programming, B.A. Forouzan& R.F. Giberg, Thomson, First Edition, NewDelhi, 2003.

V	Advanced Computer Architecture (Elective-I)	Course Code:	L	T	P	C
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Sem		V18CST15	3	0	0	3
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Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe the basics of quantitative design and analysis (K2).
CO2: Illustrate memory hierarchy schemes (K2).
CO3: Illustrate concepts of Instruction-Level Parallelism (K2).
CO4: Explain concepts of Data-Level Parallelism (K2).
CO5: Explain concepts of Thread-Level Parallelism (K2).
CO6: Describe architectural aspects of Warehouse-Scale Computers (K2).

UNIT I: Fundamentals of Quantitative Design and Analysis: Classes of Computers, Defining Computer Architecture, Designing the Organization and Hardware to Meet Goals and Functional Requirements, Quantitative Principles of Computer Design

UNIT II: Memory Hierarchy Design: Basics of Memory Hierarchies, Advanced Optimizations of Cache Performance, Memory Technology and Optimizations, Virtual Memory and Virtual Machines.

UNIT III : Instruction-Level Parallelism: Concepts and Challenges, Basic Compiler Techniques, Reducing Branch Costs with Advanced Branch Prediction, Overcoming Data Hazards with Dynamic Scheduling, Tomasulo's Approach, Hardware-Based Speculation, Multiple Issue and Static Scheduling

UNIT IV: Data-Level Parallelism: Vector Architecture, VMIPS, Vector Processors, SIMD Instruction Set Extensions for Multimedia

UNIT V: Thread-Level Parallelism: Introduction, Centralized Shared-Memory Architectures- Multiprocessor Cache Coherence, Basic Schemes for Enforcing Coherence, Snooping Coherence Protocols

UNIT VI: Warehouse-Scale Computers: Introduction, Programming Models and Workloads for Warehouse-Scale Computers, Computer Architecture of Warehouse-Scale Computers

Text Book:

1. Computer Architecture: A Quantitative Approach, John L. Hennessy, David A. Patterson, 5th Edition, Morgan Kaufmann, Elsevier.

Reference Books:

1. Advanced Computer Architectures: A Design Space Approach, D Sima, T Fountain, P Karsuk, 1st Edition, Pearson
2. Advanced Computer Architecture, K Hwang, N Jotwani, 2nd Edition, McGraw-Hill

V Sem	Advanced Data Structures (Elective-I)	Course Code:	L	T	P	C
		V18CST16	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Explain external sorting method (K2).
CO2: Discuss pattern matching Algorithms (K2).
CO3: Illustrate various hash functions with appropriate examples (K3).
CO4: Illustrate various priority queues with appropriate examples (K3).
CO5: Construct self balanced tree with appropriate examples (K3).
CO6: Discuss Multiway search trees (K2).

UNIT I: SORTING: Introduction - External Sorting- K-way Merging - Buffer Handling for parallel Operation-Run Generation- Optimal Merging of Runs.

UNIT II: STRING MATCHING ALGORITHMS: The Navi String matching algorithms – The Robin-Krap algorithm – String Matching algorithm using finite automata – The Knuth Morris Pratt algorithm.

UNIT III: SKIP LIST AND HASHING: Dictionaries – ADT- Linear List representation - Skip List representation: Ideal case – Insertion and Deletion –Assigning levels – The struct skip node – The class skip list – complexity of skipList methods. Hash Table Representation: Ideal hashing – Hash functions and tables -Linear probing- Hashing with Chains

UNIT IV: PRIORITY QUEUES (HEAPS) : Definition and Applications – ADT – Linear lists – Heaps : Definition – Max heap and Min heap operations, Applications – Heap Sort – Huffman Codes.

UNIT V: EFFICIENT BINARY SEARCH TREES :Introduction to AVL Trees- Red-Black Trees- Definition-Representation of a Red- Black Tree- Searching a Red-Black Tree- Inserting into a Red Black Tree- Deletion from a Red-Black Tree- Joining Red-Black Trees, Splitting a Red-Black tree – Splay Trees – Introduction – operation – Amortized complexity.

UNIT VI: MULTIWAY SEARCH TREES : ISAM - M-Way Search Trees, Definition and Properties-Searching an M-Way Search Tree, B-Trees, Definition and Properties- search Elements in a B-tree- Insertion into B-Tree- Deletion from a B-Tree- Node Structure.

Text Books:

1. Data Structures, Algorithms and Applications in C++; SartajSahni; UniverstiyPress ; 2nd Edition.
2. Introduction to Algorithms By Thomas H Cormen, Charless E leiseron, Ronald L Rivest and Clifford Stein PHI publication Third Edition (UNIT – II)

References:

1. Data Structures, a Pseudocode Approach, Richard F Gilberg, BehrouzA Forouzan, Cengage.
2. An Introduction to Data Structures with applications By Jean Paul Trembly and Paul G Sorenson Tata McGraw Hill Second Edition
3. Fundamentals of Data Structures and algorithms by C V Sastry, Rakesh Nayak, Ch. Raja Ramesh, IK Publications, new Delhi.

V Sem	Artificial Intelligence (Elective-I)	Course Code: V18CST17	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Illustrate the concept of intelligent systems and current trends in AI. **(K2)**
CO2: Apply Problem solving, Problem reduction and Game Playing techniques in AI. **(K3)**
CO3: Illustrate the Logic concepts in AI. **(K2)**
CO4: Explain the Knowledge representation techniques in AI. **(K2)**
CO5: Describe Expert systems and their applications. **(K2)**
CO6: Illustrate Uncertainty Measures. **(K2)**

UNIT-I: Introduction to Artificial Intelligence: Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-toe game playing, current trends in AI

UNIT-II: Problem solving: State-space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of problem, Exhaustive searches, Heuristic search techniques, Iterative deepening a*, constraint satisfaction

Problem reduction and game playing: Introduction, problem reduction, game playing, alpha beta pruning, two-player perfect information games

UNIT-III: Logic concepts: Introduction, Propositional Calculus, Proportional Logic, Natural Deduction system, Axiomatic system, Semantic tableau system in proportional logic, Resolution Refutation in Propositional logic, Predicate Logic

UNIT-IV: Knowledge representation: Introduction, approaches to Knowledge representation, Knowledge representation using Semantic Networks, Extended Semantic Networks for KR, Knowledge representation using Frames

UNIT-V: Expert Systems and Applications: Introduction phases in building Expert Systems, Expert System versus Traditional Systems, Rule-based Expert Systems, Blackboard systems, Truth maintenance systems, applications of Expert Systems.

UNIT-VI: Uncertainty measure: Probability theory- Introduction, Probability Theory, Bayesian Belief networks, Certainty Factor Theory, Dempster-Shafer theory

Text Book:

1. Artificial Intelligence, Saroj Kaushik, 1st Edition, Cengage Learning.

Reference Books:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar B Nair, 3rd Edition, Tata McGraw Hill Education Private Limited., 2009
2. Artificial Intelligence- A modern Approach, 3rd Edition, Stuart Russel, Peter Norvig, Pearson Education.

V Sem	Computer Graphics (Elective-I)	Course Code: V18CST18	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Understand the applications of computer graphics and learn basic algorithms. (K2)
CO2: Analyze the concepts of 2D graphics along with transformation techniques. (K3)
CO3: Understand 2D Views of objects and clipping algorithms. (K2)
CO4: Illustrate 3D graphics and will get an idea about projections views of objects. (K2)
CO5: Determine different visible surface detection methods. (K2)
CO6: Understand different animation sequences and Color Models. (K2)

UNIT I: Introduction: Application of Computer Graphics, raster scan systems, random scan systems, raster scan display processors. Output Primitives : Points and lines, line drawing algorithms(Bresenham's and DDA Line derivations and algorithms), mid-point circle and ellipse algorithms.

UNIT II: Filled area primitives: Boundary-fill and flood-fill algorithms. **2-D geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, and homogeneous coordinates, composite transforms.

UNIT III: 2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland, Sutherland –Hodgeman polygon clipping algorithm.

UNIT IV: 3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3D Viewing pipeline, clipping, projections (Parallel and Perspective). **3-D object representation:** Polygon surfaces, quadric surfaces, spline representation, Bezier curve and B-Spline curves.

Unit V: Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, BSPtree methods, area sub-division.

Unit VI: Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages. **Color Models** – RGB, YIQ, CMY, HSV.

Text Books:

1. Computer Graphics C version, Donald Hearn, M.Pauline Baker, Pearson
2. Computer Graphics, Schaum's outlines", Zhigand xiang,Roy Plastock, 2nd Edition,Tata Mc-Graw Hill.
3. Principles of Computer Graphics, S. Govil-Pai, 1st Edition, Springer International Edtion,2005.

Reference Books:

1. Computer Graphics Principles & practice, 2/e, Foley, VanDam, Feiner, Hughes, Pearson
2. Computer Graphics, Peter, Shirley, CENGAGE
3. Principles of Interactive Computer Graphics, Neuman , Sproul, TMH.

V Sem	Organizational Behaviour	Course Code:	L	T	P	C
		V18MBT53	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1 : Identify the basic concepts of organizational behavior. **(K1)**

CO2 : Enumerate the importance of individual personality and learning in the organizational context. **(K2)**

CO3 : Develop decision making abilities and interpersonal communication skills. **(K3)**

CO4 : Identify the basic concepts of Group dynamics. **(K1)**

CO5 : Identify the foundations of organization development. **(K1)**

CO6 : Develop team building skills. **(K2)**

UNIT-I:

Introduction - Nature and scope: linkages with other social sciences – Individual roles and Organizational Goals - Perspectives of Human Behaviour, Approach to organizational behaviour - models of organizational behaviour.

UNIT-II:

Personality Development: Nature - Stages, Determinants of Personality, Johari Window - Transactional Analysis, Learning Processes – theories. Perception: nature -Process –Motivation – Concepts - Theories - Leadership Theories. Attitude and Values.

UNIT-III:

Decision Making Process: Decision making Process- Individual vs. Team decision Making- Interpersonal Communication. Types of decisions.

Unit IV:

Group Dynamics-Behavioural Dimensions, Groups and their formation- Informal Organizations, Group versus Individual Interaction. Group conflict: Listening, Feedback, Collaborative Processes in Work Groups, Conflict Resolution in Groups and Problem Solving Techniques.

UNIT-V:

Organizational Development: Goals, processes, change – resistance to change –Impact of technology on human behaviour- Nature of OD - interventions, OD techniques and OD applications.

UNIT- VI:

Team Building- Meaning and Significance of team building- stages of team building- benefits of team building- High performance teams.

REFERENCE BOOKS:

1. K.Aswhathappa: “Organizational Behavior-Text, Cases and Games”, Himalaya Publishing House, New Delhi, 2008,
2. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma: “Organizational Behavior”, Tata McGraw Hill Education, New Delhi, 2008.
3. Jerald Greenberg and Robert A Baron: “Behavior in Organizations”, PHI Learning Private Limited, New Delhi, 2009.
4. PareekUdai: “Understanding Organizational Behavior”, Oxford University Press, New Delhi, 2007.
5. Jai B.P.Sinha: “Culture and Organizational Behavior”, Sage Publication India Private Limited, New Delhi, 2008.
6. Sharma VS, Veluri: “Organizational Behavior”, JAICO Publishing House, New Delhi, 2009. Slocum,nHelireigel: “Fundamentals of Organizational Behavior”, Cengage Learning India, New Delhi, 2009.
7. JenniferM.George and Gareth R. Jones: “Understanding and Managing Organizational Behavior”, Pearson Education, New Delhi, 2009.
8. Schermerhorn, Hunt and Osborn: “Organizational Behavior”, Wiley India Limited, New Delhi,

9. 2007.

10. Gregory Moorhead, Ricky W. Griffin: "Organizational Behavior", Biztantra, NewDelhi, 2009.

V Sem	Data Base Management System Lab	Course Code: V18CSL06	L	T	P	C
			0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Build SQL Queries and Constraints. (K3)
CO2: Experiment with various Database Indexing Techniques. (K3)
CO3: Construct PL/SQL Cursors and Exceptions. (K3)
CO4: Develop application programs using PL/SQL. (K3)
CO5: Develop PL/SQL Functions, Procedures, and Packages. (K3)
CO6: Apply projections and aggregation on collection of MongoDB database. (K3)

LIST OF EXPERIMENTS

Part-A

1. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
2. Queries using operators in SQL
3. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
4. Queries using Group By, Order By, and Having Clauses
5. Queries on Controlling Data: Commit, Rollback, and Save point
6. Queries to Build Report in SQL *PLUS
7. Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
8. Queries on Joins and Correlated Sub-Queries
9. Queries on Working with Index, Sequence, Synonym, Controlling Access, and Locking Rows for Update, Creating Password and Security features PL/SQL.
10. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation.
11. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL
12. Write a PL/SQL block using SQL and Control Structures in PL/SQL
13. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types
14. Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

Part-B

1. Install and start MongoDB
2. Create and drop database and collection
3. Insert,update ,delete,query document
4. Projection, limiting records, sorting records and aggregation in MongoDB

Text Books:

1. Oracle Database 11g The Complete Reference by Oracle Press, Kevin Loney
2. Database Systems Using Oracle, Nilesh Shah, 2nd Edition ,PHI.
3. Introduction to SQL, Rick F Vander Lans, 4th Edition, Pearson Education.

Reference Books:

1. Introduction to SQL, Rick F. Vander Lans, 4th Edition, Pearson education.
2. Oracle PL/SQL Interactive Workbook, B. Rosenzweig and E. Silvestrova,2nd Edition, Pearson education.
3. SQL & PL/SQL for Oracle 10 g, Black Book, Dr. P. S. Deshpande, Dream Tech.

V Sem	Operating System and Unix Lab	Course Code: V18CSL07	L	T	P	C
			0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Illustrate CPU scheduling algorithms (K3)
CO2: Apply Bankers Algorithm for Deadlock Avoidance and Deadlock Prevention (K3)
CO3: Use Page replacement algorithms for memory management (K3)
CO4: Demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment. (K3)
CO5: Experiment with the concept of shell scripting programs. (K3)
CO 6: Illustrate the process of how the parent and child relationships (K3)

LIST OF EXPERIMENTS**Part-A: OS Lab**

1. Simulate the following CPU scheduling algorithms:
a) FCFS b) SJF c) Round Robin d) Priority
2. Implement : fork (), wait (), exec() and exit () system calls
3. Simulate Producer and Consumer problem using Semaphores
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention
6. Simulate the following page replacement algorithms:
a) FIFO b) LRU c) LFU
7. Simulate the following File allocation strategies:
a) Sequenced b) Indexed c) Linked

Part-A: UNIX Lab

8. **Study of Unix Commands:** General Purpose Utilities, Directory Handling Commands, File Handling Utilities, Displaying Commands, Filters, Disk Utilities
9. Shell Script to list all of the directory files in a directory.
10. Shell Script to find the factorial of a given number
11. Shell Script to generate a Multiplication table.
12. Shell Script to Perform arithmetic operations
13. Implement an AWK script to count the number of lines in a file that do not contain vowels
14. Design an awk script to find the number of characters, words and lines in a file?
15. Design a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen
16. Demonstration of GDB tool to understand process programme.
17. Design a C program to create a Zombie Process.
18. Design a C program that illustrates how an orphan is created.

Reference Books:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 9th Edition, John Wiley and Sons Inc., 2012
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2012
3. Modern Operating Systems, Andrew S. Tanenbaum, Third Edition, Addison Wesley, 2007
4. M G Venkateshmurthy Introduction to Unix and shell programming Pearson education
5. W. Richard Stevens, Advanced programming in the unix environment, 3rd Edition, Pearson education.

V Sem	Professional Communication Skills – III	Course Code: V18ENT05	L	T	P	C
			0	4	0	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1 :** Distinguish the subtle meanings of various words in different contexts, recognize similar words as well as words with contrast meanings and use them appropriately. **(K2)**
- CO2 :** Interpret the passage using different strategies and answer the questions with ease. **(K3)**
- CO3 :** Compare different pairs of words and draw analogy between the words. Choose an appropriate word to make a sentence meaningful. **(K4)**
- CO4 :** Recognize the easiest and best possible way of solving problems in the area of Number and Letter Series, Analogy, Classification, Coding & Decoding Symbols, a Ranking and Analytical Reasoning. **(K1)**
- CO5 :** Investigate the different types of logics involved in Mirror and Water Images, Logical Reasoning & Arithmetical Reasoning. **(K4)**
- CO6 :** Find the common traps in the questions and errors likely to be made from the concepts of Blood Relations, Directions, Average, Clock and Calendar, Data Sufficiency, Permutations Combinations and Probability. **(K3)**

SYLLABUS UNIT – 1

Vocabulary – 500 words – Meaning – contextual Usage - Prefix – Suffix – Root words Synonyms - Antonyms- Para jumbles – Strategies – Directional words – central theme

UNIT – 2

Sentence completion

Strategies – Cause and effect signals – support signals – contrast signals

Writing skills –

Email writing– Types -- Dos and Don'ts- Paragraph writing- Essay writing Fabrication of a story based on the context.

UNIT – 3

Analogies

Strategies - Create a general sentence - Use the correct part of speech - Beware of homonyms - Recognize common relationship types.

Reading Comprehension

Strategies– skimming – scanning – predicting – identifying the central idea – questioning – making inferences

UNIT - 4

Number And Letter Series, Coding & Decoding, Analogy, Classification & Ranking. (K1)

Problems of how to find the next number in the series, Finding the missing number and related sums, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Finding odd one out from groups, Identify the rank in different places.

UNIT-5

Problems On Ages & Numbers, Mirror And Water Images, Logical Reasoning & Arithmetical Reasoning. (K4)

Definition and concept of Venn Diagram – its applications. statements – Affirmations, Denials and Contradictions. Sums related to Ages & numbers. Problems on ages with different logics. Identifying the images of water and Mirror.

UNIT-6**Blood Relations, Directions, Average, Clock And Calendar, Data Sufficiency, Permutations-Combinations And Probability.(K3)**

Deriving the formula to find the angle between hands for the given time, History of calendar-, Finding the day for the given date, Problems related to directions. Difference between words Permutation and Combinations – Various cases -Real Time Scenarios. Concept of Probability –
- Conjunctions – Rules & Cases of Probability.

Reference Books

- Pic Voc – Published by Sri Vasavi Engineering College
- Word Power Made Easy Handy – Dr.ShaliniVerma
- Essential Grammar in Use – RAYMOND MURPHY
- English for Professional Students – S.S.Prabhakar
- General English for Competitive Examination
- A Practical English Grammar – A.J.Thomson
- Soft Skills – Dr.Alex – Tata mcgra Hill
- GRE – Barons- published by Galgotia Publications
- CAT – Mohammed Muneer published by Tata McGraw - Hill Education
- Work book -1 on Aptitude Prepared by Training & Placement cell, Sri Vasavi Engineering College.
- Magical Book on Quicker Maths–Tyra
- Practice Book on Quicker Maths –Kundan & Tyra
- R.S. Agarwal –Sultan Chand Publications
- R.S.Agarwal –Non Verbal Reasoning.

Hyperlinks

1. <https://www.indiabix.com/>
2. <https://www.campusgate.co.in/>
3. <https://www.questionpaper.org/>

V Sem	Technical Skills-III	Course Code: V18CST62	L 0	T 0	P 4	C MNC
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Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Apply fundamental data structures like List, Stack to solve real work problems in linear time i.e. $O(n)$. **(K3)**
- CO2:** Make use of advanced data structures like queue, to solve complex problems in linear time , logarithmic time i.e. $O(n)$ or $O(n \log n)$. **(K3)**
- CO3:** Develop programs to solve problems by with the help of searching and sorting techniques. **(K3)**
- CO4:** Analyze linked list by comparing with Array List and develop programs to solve optimization Problems. **(K4)**
- CO5:** Experiment with types of Linked List to solve complex combinatorial problems. **(K3)**
- CO6:** Develop programs to solve complex problems by using combination of stack, Queue and List. **(K3)**

Data Structures

1. Problem solving using ArrayList
2. Problem solving using LinkedList
3. Problem solving using Stack
4. Problem solving using Queue
5. Problem solving using Searching
6. Problem solving using Sorting

Text Books:

1. Introduction to Algorithms, Second Edition, Thomas H. Cormen Charles E. Leiserson.
2. Data Structures and Algorithms Made Easy: Narasimha Karumanchi .
3. The Algorithm Design Manual, Springer series, Steven Skiena.

VI Sem	Compiler Design	Course Code:	L	T	P	C
		V18CST19	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe the compilation process and lexical analyzer (K2)
CO2: Construct top down parsing Techniques (K3)
CO3: Construct bottom up parsing techniques (K3)
CO4: Construct syntax directed translation (K3)
CO5: Produce intermediate code generation process and run time environments (K3)
CO6: Explain the code generation process. (K2)

UNIT-I: Introduction: Language Processors, the Structure of a Compiler. Lexical Analysis: The Role of the Lexical Analyzer, Specification of Tokens, Recognition of Tokens and the Lexical-Analyzer Generator Lex.

UNIT-II: Syntax Analysis: Definition of CFG, Lexical Versus Syntactic Analysis, Writing a Grammar- Elimination of Left Recursion, Left Factoring. Top Down Parsing: Recursive Descent Parsing, First and Follow, LL(1) Grammars, Non recursive Predictive Parsing, Error Recovery in Predictive Parsing.

UNIT-III: Bottom-Up Parsing: Bottom Up Parser Classification, Reductions, Handle Pruning, Shift-Reducing, Conflicts During Shift Reduce Parsing. Introduction to LR Parsing: Difference between LR and LL Parsers, Why LR Parsers?, Items and the LR(0) automaton, The LR-Parsing Algorithm, Constructing SLR Parsing Tables.

UNIT-IV: More powerful LR parsers: construction of CLR (1), LALR Parsing tables, Comparison of all Bottom Up approaches. Semantic Analysis: Syntax Directed Definitions, Evaluation Orders for SDD's, Applications of SDT.

UNIT-V: Intermediate Code Generation: Variants of Syntax Trees, Three-Address Code, Control Flow, Back-patching. Run-Time Environments: Storage Organization, Stack Allocation of Space, Heap Management.

UNIT-VI: Code Generation: Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Peephole Optimization, Register Allocation and Assignment. Machine-Independent optimizations: The Principal Sources of Optimizations, Introduction to Data-Flow Analysis.

Text Books:

- 1. Compilers, Principles Techniques and Tools- Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D. Ullman, 2nd ed, Pearson, 2007**

Reference Books:

- 1. Principles of compiler design, V. Raghavan, 2nd ed, TMH, 2011.**
- 2. Compiler Design, K. Muneeswaran, Oxford.**

VI Sem	Data Mining	Course Code:	L	T	P	C
		V18CST20	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Explain the concept of Data Mining and its functionalities. **(K2)**
CO2: Discuss various Data Preprocessing Techniques. **(K3)**
CO3: Demonstrate Association Analysis Techniques. **(K3)**
CO4: Illustrate various Classification Techniques. **(K3)**
CO5: Demonstrate Alternative techniques for Classification. **(K3)**
CO6: Use different Clustering techniques to cluster data. **(K3)**

UNIT-I : Introduction: Need for Data Mining, Knowledge Discovery from Data, Kinds of Data mined, Kinds of Patterns mined, Technologies used, Kinds of Applications targeted, Major Issues in Data Mining, Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Measuring Data Similarity and Dissimilarity

UNIT-II: Data Preprocessing: Overview of Data Preprocessing, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization

UNIT-III: Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Frequent Itemset Mining Methods- Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation, Generating Association Rules from Frequent Itemsets, Improving the Efficiency of Apriori, Pattern-Growth Approach for Mining Frequent Itemsets

UNIT-IV: Classification: Basic Concepts, Decision Tree Induction, Attribute Selection Measures, Tree Pruning

UNIT-V: Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification. **Bayesian Belief Networks:** Concepts and Mechanisms, Training Bayesian Belief Networks

UNIT-VI: Cluster Analysis: Basic Concepts and Methods, Partitioning Methods, Hierarchical Methods, Density Based Method-DBSCAN

Text Books:

1. Data Mining Concepts and Techniques, Jiawei Han, Micheline Kamber, Jian Pei, 3rd Edition, Morgan Kaufmann Publishers

Reference Books:

1. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, 1st Edition, Pearson Education.
2. Data Mining and Analysis, Mohammed J Zaki, Wagner Meira JR, 1st Edition, Cambridge University Press.

VI Sem	Object Oriented Analysis and Design Through UML	Course Code: V18CST21	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Discuss importance of modeling. **(K2)**
CO2: Describe classes and relationships. **(K2)**
CO3: Develop class diagrams and object diagrams. **(K3)**
CO4: Develop Interaction, Use case and Activity Diagrams. **(K3)**
CO5: Illustrate advanced behavioral modeling. **(K3)**
CO6: Develop component and deployment diagrams. **(K3)**

UNIT-I: Introduction to UML: Importance of modeling - Principles of modeling - Object oriented modeling - Conceptual model of the UML – Architecture - Software Development Life Cycle.

UNIT-II: Advanced Structural Modeling: Classes – Relationships - Common Mechanisms and diagrams - Advanced classes - Advanced relationships – Interfaces - Types and Roles – Packages.

UNIT-III: Class & Object Diagrams: Terms, concepts - Modeling techniques for Class Diagrams - Modeling techniques for Object Diagrams.

UNIT-IV: Basic Behavioral Modeling-I: Interactions - Interaction diagrams. **Basic Behavioral Modeling-II:** Use cases - Use case Diagrams - Activity Diagrams.

UNIT-V: Advanced Behavioral Modeling: Events and signals - State machines - Processes and Threads - Time and space - State chart diagrams.

UNIT-VI: Architectural Modeling: Component- Deployment - Component diagrams - Deployment diagrams.

Text Book:

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

Reference Books:

1. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.
2. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Pearson Education.
3. Modeling Software Systems Using UML2, Pascal Roques, WILEY-Dreamtech India Pvt. Ltd.

VI Sem	Cryptography and Network Security	Course Code:	L	T	P	C
		V18CST22	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe the fundamentals of networks security, security architecture, threats and vulnerabilities. **(K2)**
CO2: Discuss the mathematical support for both symmetric and asymmetric key cryptography. **(K2)**
CO3: Discuss the concept of developing encryption and decryption algorithms. **(K2)**
CO4: Illustrate various techniques of encryption and message authentication functions. **(K3)**
CO5: Apply various Key management and Distribution techniques and its importance. **(K3)**
CO6: Discuss the Need of Transport level and Email security algorithms. **(K2)**

UNIT-I: Computer Security concepts, security services, and Active vs. Passive attacks, Security mechanisms, OSI Security Architecture, A Model for Network security, Classical Encryption Techniques, Substitution ciphers, Transposition ciphers.

UNIT-II: Introduction to Number Theory, Fermat's and Euler's Theorem, the Chinese Remainder Theorem, Euclidean Algorithm, and Modular Arithmetic.

UNIT-III: Block Ciphers, Data Encryption Standard (DES), Block Cipher Design Principles, Advanced Encryption Standard (AES), Simplified AES, Multiple Encryption and Triple DES, Pseudorandom Number Generators, Pseudorandom Number Generation Using a Block Cipher, Stream Ciphers, RC4.

UNIT-IV: RSA, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography, Message Authentication Code-Message Authentication Functions, Requirements, and Security, HMAC, Hash functions, Secure Hash algorithm,SHA-512.

UNIT-V: Digital Signatures, Digital Signature Standards, Authentication Protocols, Kerberos, Key Management and Distribution, X.509 Digital Certificate, NIST Digital Signature Algorithm.

UNIT-VI: Transport Level Security: Web Security Considerations, Secure Socket Layer, Transport Layer Security. Electronic mail security: Pretty Good Privacy (PGP),S/MIME.

Text Books:

1. "Cryptography and Network Security, Principles and Practices", William Stallings Pearson Education, Sixth Edition.
2. "Network Security Essentials (Applications and Standards)", William Stallings, Pearson Education Fourth Edition.
3. Cryptography and Network Security, Behrouz A Forouzan, Debdeep Mukhopadhyay, (3e) Mc Graw Hill.

Reference Books:

1. "Network Security – PrivateCommunication in a Public World" Charlie Kaufman, Radia Perlman and Mike Speciner , Pearson/PHI.

VI Sem	Software Testing Methodologies (Elective-II)	Course Code: V18CST23	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe Software testing objectives and methodology. **(K2)**
CO2: Apply various Software testing techniques. **(K3)**
CO3: Discuss Static testing techniques for software testing. **(K2)**
CO4: Differentiate software testing and debugging process. **(K2)**
CO5: Construct test cases by understanding test suite management. **(K3)**
CO6: Explain modern software testing tools to support software testing. **(K2)**

UNIT-I: Introduction to Software Testing: Evolution of software Testing, Myths and Facts, Goals of software Testing, Definitions of Testing, Model for Software Testing, Software Testing Terminology, Software Testing Life Cycle.

UNIT-II: Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, Verification of High level and low level designs, How to verify code, Validation. **Dynamic Testing I:** Black Box testing techniques: Boundary Value Analysis, Equivalence Class Testing, Decision Table based Testing,

UNIT-III: Dynamic Testing II: White-Box Testing: Need of White-Box Testing, Logic coverage criteria, Basis path testing, Loop testing. **Static Testing:** Inspections, Structured Walkthroughs, Technical reviews.

UNIT-IV: Regression Testing: Progressive Vs Regressive Testing, Regression testability, Objectives of regression testing, When is Regression Testing done? Regression Testing Types, Regression testing techniques. **Debugging:** Debugging process, Techniques, correcting bugs.

UNIT-V: Efficient Test Suite Management: Why does a Test Suite grow, minimizing the Test suite and its benefits, Test suite prioritization, Types of Test case prioritization, Prioritization techniques, measuring the effectiveness of a prioritized Test Suite.

UNIT-VI: Software Quality Management: Software quality concept, Quality control and Quality Assurance, Software Quality metrics. **Automation and Testing Tools:** Need for automation, categorization of Testing tools, selection of testing tools, Overview of some commercial testing tools.

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, 9th Edition, Oxford Publisher.

Reference Books:

1. Software testing techniques - Boris Beizer, 2nd Edition, Dreamtech publisher.
2. Foundations of Software testing, Aditya P Mathur, 2nd ed, Pearson.
3. Software Testing- Yogesh Singh, CAMBRIDGE.

VI Sem	Principles of Programming Languages (Elective-II)	Course Code: V18CST24	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe Syntax and Semantics of Programming Languages (K2).
CO2: Illustrate Data, Data Types and basic statements of Programming Languages (K3).
CO3: Explain various sub programming Issues (K2).
CO4: Construct programs using Object Oriented, Concurrency and Event Handling (K3).
CO5: Distinguish Programming Languages, schemes and ML (K2).
CO6: Describe Logic Programming Languages (K2).

UNIT I: SYNTAX AND SEMANTICS: Reasons for studying Programming Languages, Programming Domains, Evolution of programming languages, describing syntax, context free grammars, attribute grammars, describing semantics, lexical analysis, parsing, recursive – decent bottom – up parsing.

UNIT II: DATA TYPES AND BASIC STATEMENTS: Introduction, primitive data types, strings, array types, associative arrays, record types, tuple types , union types, pointers and references, Arithmetic expressions, overloaded operators, type conversions, relational and Boolean expressions, assignment statements , mixed mode assignments, control structures – selection, iterations, branching, guarded Statements.

UNIT III: SUBPROGRAMS AND IMPLEMENTATIONS: Subprograms, design issues, local referencing, parameter passing, overloaded methods, generic methods, design issues for functions, semantics of call and return, implementing simple subprograms, stack and dynamic local variables, nested subprograms, blocks, dynamic scoping.

UNIT IV: OBJECT- ORIENTED PROGRAMMING,EVENT HANDLING: Object Model – Classes, Visibility and Information Hiding, Inheritance, Polymorphism, Abstract Classes, Event Handling- Mouse Clicks, Mouse Motion, Buttons, Labels, Text areas, Combo boxes, Examples.

UNIT V: FUNCTIONAL PROGRAMMING LANGUAGES: Introduction to lambda calculus, fundamentals of functional programming languages, Programming with Scheme, – Programming with ML.

UNIT VI: LOGIC PROGRAMMING LANGUAGES: Introduction to logic and Horn Clauses, logic programming – Programming in Prolog, Prolog Examples-Solving Word Puzzles, Eight Queens Problem.

Text Books:

1. Concepts of Programming Languages, Robert W. Sebesta ,Tenth Edition, Addison Wesley, 2012.
2. Programming Languages, Principles & Paradigms, 2ed, Allen B Tucker, Robert E Noonan, TMH

References:

1. The Scheme programming language, R. Kent Dybvig, Fourth Edition, MIT Press, 2009.
2. Elements of ML programming, Jeffrey D. Ullman, Second Edition, Prentice Hall, 1998.
3. The craft of Prolog, Richard A. O’Keefe MIT Press, 2009.

VI Sem	Machine Learning (Elective-II)	Course Code: V18CST25	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate basics of Machine Learning.(K2)
- CO2:** Explain Various Classification Techniques.(K2)
- CO3:** Explain Tree Based Learning and Ensemble Learning (K2)
- CO4:** Demonstrate Neural Networks and Multi Layer Perceptrons.(K2)
- CO5:** Explain Dimensionality Reduction techniques (K2).
- CO6:** Demonstrate clustering algorithms (K2).

UNIT-I: Introduction: Learning: Machine Learning, Types Of Machine Learning, Supervised Learning Regression, Classification, The Machine Learning Process. Some Terminology Weight Space, The Curse Of Dimensionality, Knowing What You Know:, Testing Machine Learning Algorithms, Overfitting Training, Testing, And Validation Sets, Some Basic Statistics. Averages Variance And Covariance, The Bias-Variance Tradeoff.

UNIT II: Classification: The General Problem, Probabilistic Classifiers, Bayes Classifier, Logistic Regression,,K-Nearest Neighbor Classifiers, Support Vector Machines, Assessing Performance Of Classifiers: The Confusion Matrix Accuracy 0/1 Loss, Sensitivity And Specificity, The Receiver Operator Characteristic (Roc) Curve Unbalanced Datasets Measurement: Precision, Recall And F1 Score.

UNIT-III: Tree Learning: Using Decision Trees Constructing Decision Trees Quick Aside: Entropy In Information Theory, ID3, Dealing With Continuous Variables ,Computational Complexity, Classification And Regression Trees (Cart), Gini Impurity Regression In Trees. Classification Example. Ensemble Learning Boosting Adaboost, Stumping Bagging , Subbagging, Random Forests.

UNIT-IV: Neural Networks: The Brain And The Neuron Hebb's Rule Mcculloch And Pitts Neurons Limitations Of The Mcculloch And Pitts Neuronal Model Neural Networks The Perceptron The Learning Rate H The Bias Input The Perceptron Learning Algorithm An Example Of Perceptron Learning: Logic Functions Implementation Linear Separability Linear Regression Linear Regression Examples.

UNIT-V: Dimensionality Reduction: Linear Discriminant Analysis (LDA),Principal Components Analysis (PCA) Relation With The Multi-Layer Perceptron, Kernel PCA, Factor Analysis Independent Components Analysis (ICA) Locally Linear Embedding.

UNIT VI: Unsupervised Learning: The K-Means Algorithm Dealing With Noise The K-Means Neural Network Normalisation Better Weight Update Rule Example: The Iris Dataset Using Competitive Learning For Clustering Vector Quantisation The Self-Organising Feature Maps.

Text Books:

1. Machine Learning: An Algorithmic Approach. Stephen Marsland, 2nd Edition, CRC Press.
2. A First Course in Machine Learning; Volume in Machine Learning and Pattern Recognition Series – CRC-Taylor & Francis-Chapman & Hall Rogers S., Girolami M., (2011).

Reference Books:

1. Machine Learning: The art and Science of Algorithms that Make sense of Data. Peter Flach, Cambridge.
2. Machine Learning: Tom Mitchel, McGraw Hill Learning, 1997

VI Sem	Image Processing (Elective-II)	Course Code:	L	T	P	C
		V18CST26	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Illustrate the different Transforms Techniques & their use in Image Processing applications. **(K3)**
- CO2:** Demonstrate Spatial & frequency domain filtering (like smoothing & sharpening operations) on Images **(K3)**
- CO3:** Describe Restoration operations/techniques on Images. **(K2)**
- CO4:** Demonstrate the Image compression Techniques and multi-resolution processing on Images. **(K3)**
- CO5:** Illustrate Morphological operations on Images & Image segmentation. **(K3)**
- CO6:** Illustrate the different color Image Processing Techniques on Images. **(K3)**

UNIT-I : Introduction: Introduction to Image Processing, Fundamental steps in digital image processing, components of an image processing system, image sensing and acquisition, image sampling and quantization, some basic relationships between pixels, an introduction to the mathematical tools used in digital image processing. **Image Transforms:** Need for image transforms, Discrete Fourier transform (DFT) of one variable, Extension to functions of two variables, some properties of the 2-D Discrete Fourier transform, Importance of Phase, Walsh Transform. Hadamard transform, Haar Transform, Slant transform, Discrete Cosine transform.

UNIT-II: Intensity Transformations and Spatial Filtering: Background, Some basic intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters, sharpening spatial filters. **Filtering in the Frequency Domain:** Preliminary concepts, The Basics of filtering in the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering.

UNIT-III: Image Restoration and Reconstruction: A model of the image degradation / Restoration process, Noise models, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations, Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering, constrained least squares filtering ,geometric mean filter .

UNIT-IV: Image compression: Fundamentals, Basic compression methods: Huffman coding, Arithmetic coding, LZW coding, Run-Length coding, Bit-Plane coding. **Wavelets and Multiresolution Processing:** Image pyramids, subband coding, Multiresolution expansions, wavelet transforms in one dimensions & two dimensions, Wavelet coding.

UNIT-V: Image segmentation: Fundamentals, point, line, edge detection, thresholding, region –based segmentation. **Morphological Image Processing:** Preliminaries, Erosion and dilation, opening and closing, basic morphological algorithms for boundary extraction, thinning, gray-scale morphology.

UNIT-VI: Color image processing: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

Text Books:

1. Digital Image Processing, R. C. Gonzalez and R. E. Woods, 3rd edition, Prentice Hall, 2008.
2. Digital Image Processing, Jayaraman, S. Esakkirajan, and T. Veerakumar, Tata McGraw-Hill Education, 2011.

Reference Books:

1. Fundamentals of Digital Image Processing, Anil K.Jain, Prentice Hall of India, 9th Edition, Indian Reprint, 2002.
2. Digital Image Processing and Analysis, B.Chanda, D.Dutta Majumder, PHI, 2009.

VI Sem	Object Oriented Analysis and Design Through UML Lab	Course Code: V18CSL08	L	T	P	C
			0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Develop OOAD and UML concepts to identify Classes, Use Cases and their relationships. **(K3)**
CO2: Develop Class diagrams. **(K3)**
CO3: Develop Use case diagrams. **(K3)**
CO4: Construct Interaction diagrams. **(K3)**
CO5: Develop State chart, Activity diagrams. **(K3)**
CO6: Develop Component and Deployment diagrams. **(K3)**

List of Experiments

1. Draw basic class diagrams to identify and describe key concepts like classes, and their relationships.
2. Draw one or more Use Case diagrams for capturing and representing requirements of the system. Use case diagrams must include template showing description and steps of the Use Case for various scenarios.
3. Draw sequence diagrams OR communication diagrams with advanced notation for system to show objects and their message exchanges.
4. Draw activity diagrams to display either business flows or like flow charts.
5. Develop State chart diagrams.
6. Draw component diagrams assuming that build the system reusing existing components along with a few new ones.
7. Draw deployment diagrams to model the runtime architecture of system.
8. Design Case study on Library Management System
9. Design Case Study on Hospital Management System
10. Case study-Railway Reservation System
11. Design Case study on Library Management System using C4 Model.

Text Books:

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

. Reference Books:

1. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.
2. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Pearson Education.
3. Modeling Software Systems Using UML2, Pascal Roques, WILEY- Dreamtech India Pvt. Ltd.
4. (<https://c4model.com/>)

VI Sem	Data Mining Lab	Course Code:	L	T	P	C
		V18CSL09	0	0	3	1.5

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate Data Preprocessing techniques. **(K3)**
CO2: Demonstrate Association Rule Mining techniques. **(K3)**
CO3: Demonstrate Classification techniques. **(K3)**
CO4: Demonstrate the Clustering techniques. **(K3)**

List of Experiments (Using Weka Tool):

1. Demonstrate Data Preprocessing on predefined Weka dataset labor.arff
2. Create a student.arff dataset and Demonstrate Data Preprocessing on it
3. Demonstrate Association rule process on predefined Weka dataset contactlenses.arff using apriori algorithm.
4. Create an employee.arff dataset and demonstrate Association rule process on it using apriori algorithm
5. Demonstrate Classification process on student.arff dataset using j48 algorithm
6. Create a customer.arff dataset and demonstrate Classification process on it using j48 algorithm
7. Demonstrate Classification process on employee.arff dataset using id3 algorithm
8. Demonstrate Classification process on employee.arff dataset using Naïve Bayes algorithm
9. Demonstrate Clustering process on predefined Weka dataset iris.arff using simple k-means algorithm.
10. Demonstrate Clustering process on dataset student.arff using simple k- means algorithm.

Reference Books:

1. Data Mining: Practical Machine Learning Tools and Techniques, Ian H. Witten, Eibe Frank, Mark A. Hall, 3rd Edition, Morgan Kaufmann Publishers
2. Data Mining Concepts and Techniques, Jiawei Han, Micheline Kamber, Jian Pei, 3rd Edition, Morgan Kaufmann Publishers
3. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, 1st Edition, Pearson Education Inc.

VI Sem	Professional Communication Skills – IV	Course Code: V18ENT06	L	T	P	C
			0	4	0	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Express writer's tone and relevant ideas using different types of writing skills and prepare resume to show case skills and accomplishments. (K2)
- CO2:** Organize thoughts in the discussions and express views without reticence and face interviews with aplomb. (K3)
- CO3:** Infer the meaning of the picture by thinking out of the box and speak without inhibitions. (K4)
- CO4:** Demonstrate problem solving skills through the concepts of Percentages, Profit and loss, Simple Interest & Compound Interest and Allegation. (K3)
- CO5:** Analyze appropriate methods of logical thinking on Ratio and Proportion, Partnership, LCM and HCF, Number System, Areas & Volumes. (K4)
- CO6:** Calculate the end results of Cubes, Dice and Data Analysis, Time & Work, Time & Distance, Race & Games. (K4)

SYLLABUS

UNIT – 1

Writing skills – Importance of writing skills – Types – Expository – Descriptive – Persuasive – Creative – Narrative Skills.

Resume – Basic rules for a good resume - Steps to make an effective resume format.

UNIT – 2

Group Discussion – Definition – methodology & guidelines – characteristics of a successful GD– vital role of GD in selection process- Etiquette- Types of GDs- Sentence starters for GD -Mock GDs.

Campus to corporate – Steps to a successful interview – Kinds of interviews –

Screening – Face– to–Face – Panel & Skype interviews - Mock interviews

UNIT -3

Speaking skillsLevel -1 – JAM sessions – Brain storming – Picture interpretation

Speaking skillsLevel -2– Debate – Press conference – Business Skills

UNIT - 4

Percentages, Profit and Loss, Simple and Compound Interest, Allegation & Mixtures

Definition of Simple and Compound Interest. Formulas of Applications – Difference between Simple and Compound interest – Rate of Increase or Decrease Population – Expected values of Maturity. Calculate percentages on different situations, using in profit and loss. Identifying difference between Cost price, Selling Price and Marked Price, Finding Discounts, using the method of allegation.

UNIT – 5

Ratio - Proportion, Partnership, LCM - HCF, Areas & Volumes

Introducing the concept of ratio in three different methods, a method to compute and compare two ratios – The effect of increase or decrease of a quantity on the ratio – The meaning of proportion and Problems related to Ratio and Proportion. Improve problem solving skills through Lcm& Hcf.

Unit- 6

Time, Work and Distance, Cubes, Dice and Data Analysis

Men- Days -work –completion- Capability Ratio among Men, Women and Children – Application of time in Pipes and Cistern. Work Progress in positive and negative effects. Relation among Time, Speed and Distance – Concepts of Relative speed and Average Speed – Ideas about Boats and Streams and Races of Games. Calculate the end results of Cubes and Dice.

References

- Communication Skills for Engineer's – Suneetha Mishra & C.Murali Krishnan- Pearson publications.
- Interviews and Group Discussions – T.S. Jain & Gupta- Upkar's Publications.
- Effective Interpersonal and Team Communication skills – Clifford.A.Whitecomb& Leslie E. Whitecomb- Wiley Publications
- The Fine Art of small Talk- Debra Fine- Piatkus publications
- Soft Skills – Dr.Alex – Tata mc graw Hill
- GRE – Barons & CAT – Muneer
- Work book -II on Aptitude prepared by Training Dept., Sri Vasavi Engineering College.
- Magical Book on Quicker Maths-Tyra
- Practice Book on Quicker Maths -Kundan & Tyra
- R.S. Agarwal - Sultan Chand Publications
- R.s.Agarwal - Non Verbal Reasoning.

Hyperlinks

- <https://www.indiabix.com/>
- <https://www.campusgate.co.in/>
- <https://www.questionpaper.org/>

VI Sem	Technical Skills-IV	Course Code: V18CST63	L	T	P	C
			0	0	4	MNC

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate java fundamentals to solve real world computational problems. (K2)
CO2: Illustrate object orientated concepts in solving problems with reusability feature. (K2)
CO3: Apply collections on java to solve complex problems in linear time. (K3)
CO4: Make use of StringBuffer and StringBuilder to solve problems in linear and logarithmic time. (K3)
CO5: Experiment with Object Oriented concepts to reduce complexity of problems. (K3)
CO6: Develop programs to solve robust programs by using Exception Handling. (K3)

Java Programming

1. Problem solving using Control Statements
2. Problem solving using Arrays
3. Problem solving using Strings ,StringBuffer, StringBuilder
4. Problem solving using OOP Concepts
5. Problem solving using Inheritance
6. Problem solving using Polymorphism
7. Problem solving Collections (includes all)
8. Problem solving using Exception Handling

Text Books:

1. Thinking on Java - O'Reilly.
2. Java Complete Reference.
3. Effective Java. Third Edition. Joshua Bloch .

VII Sem	Advanced Java and Web Technologies	Course Code: V18CST27	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Illustrate the basic concepts of HTML and CSS.	(K2)
CO2: Develop dynamic webpages and validate with java Script.	(K3)
CO3: Illustrate the basic concepts of NODE JS and Angular.	(K2)
CO4: Illustrate Extensible markup language & AJAX.	(K2)
CO5: Build database driven web applications using JSP.	(K3)
CO6: Develop web applications using PHP and MySQL.	(K3)

UNIT-I :HTML: Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Frames Forms.**CSS:** Cascading style sheets, Levels of Style Sheets, Style Specification Formats, Selector Forms, Property value forms, Font Properties, List Properties, color, Alignment of Text.

UNIT-II: JavaScript: Overview of JavaScript, General Syntactic Characteristics, Primitives Operations and Expressions, Screen output and Keyboard Input, Control Statements, Object creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions, Events and Event Handling. **DHTML:** Positioning Moving and Changing Elements.

UNIT-III: Fundamentals of NODE JS and Angular : Understanding Node.js, Installing Node.js, Working with Node Packages, Creating a Node.js Application, Understanding Angular, Modules, Directives, Data Binding, Dependency Injection, Services, Separation of Responsibilities, Creating a Basic Angular Application.

UNIT-IV: Working with XML: Introduction, The syntax of XML,XML Document Structure, Document type Definition (DTD), Namespaces, XML schemas, XSLT, XML Processors - DOM and SAX. **AJAX A New Approach:** Overview of AJAX, Basics of AJAX.

UNIT-V: Introduction to Servlets & JSP: Introduction to servlets, Life cycle of Servlet, Limitations of servlets, Java Server Pages: JSP Overview, Components of a JSP Page: Directives, comments, Expressions, Scriptlets , Declarations, implicit objects, Database Access, session tracking.

UNIT-VI: PHP Programming: Overview of PHP, General syntactic characteristics, Primitives, operations, Expressions, Output, Control statements, Arrays, Functions, Pattern Matching, Form Handling, Cookies, Session Tracking. PHP with MySQL connectivity. Integrating PHP and AJAX.

Text Books:

1. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.
2. Node.js, MongoDB and Angular Web Development, 2nd Edition,Brad Dayley Brendan Dayley Caleb Dayley,Pearson Education,2018
3. JSP:The Complete reference,Phil Hanna,The McGraw-Hill Copanies,2001

Reference Books:

1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
2. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
3. Web Technologies, 1st Edition 7th impression, Uttam K Roy, Oxford, 2012.

VII Sem	Management Science	Course Code: V18MBT52	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO 1** : Understand various approaches to Management. (K2)
CO 2 : Explain the principles and practices of operations Mmanagement. (K2)
CO 3 : Understand the Functions of Human Resource Management and Marketing Management. (K2)
CO 4 : Sketch the networks for better project Mmanagement. (K3)
CO 5 : Understand the Concept of Strategic Management . (K2)
CO 6 : Describe the knowledge of contemporary management practices. (K1)

UNIT I: Introduction to Management: Concept –nature and importance of Management – Functions of Management – Scientific Management: F W Taylor contributions, Henry Fayal 14 Principles. Theories of Motivation: Abraham Maslow’s Need Hierarchy, Theory-X and Theory Y. Herzberg Two Factor Theory.

UNIT II: Operations Management: Plant Location, Plant layout types. – Work study- Statistical Quality Control- Control charts (X-chart, R-chart,) Simple problems, Material Management: Need for Inventory control- EOQ, ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT III: Functional Management: Concept of HRM, HRD - Functions of HR Manager- Job analysis, Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Four P’s , Product, Price, Place and Promotion- New product development- product life cycle, services marketing.

UNIT IV: Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM-Identifying Critical Path- Project Crashing (Simple Problems).

UNIT V: Strategic Management: Vision, Mission, Goals, Strategy- Strategic management process – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis..

UNIT VI: Contemporary Management Practices: ERP, Total Quality Management (TQM), Six sigma, Supply Chain Management, Business Process outsourcing (BPO), Lean start ups and entrepreneurship.

References:

1. Dr. A. R. Aryasri, Management Science’ TMH 2011.
2. Koontz & Weirich: ‘Essentials of management’ TMH 2011
3. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
4. Robbins: Organizational Behaviour, Pearson publications, 2011
5. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011
6. Philip Kotler & Armstrong: Principles of Marketing, Pearson publications
7. Biswajit Patnaik: Human Resource Management, PHI, 2011
8. Hitt and Vijaya Kumar: Starategic Management, Cengage learning
9. Prem Chadha: Performance Management, Trinity Press (An imprint of Laxmi Publications Pvt. Ltd.) Delhi 2015.
10. Anil Bhat & Arya Kumar : Principles of Management, Oxford University Press, New Delhi, 2015.

VII Sem	Advanced Operating Systems (Elective – III)	Course Code: VI8CST28	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe Architectures of Distributed Systems and Distributed Mutual Exclusion. (K2)
CO2: Illustrate the concepts of Deadlock Handling Strategies in Distributed Systems. (K3)
CO3: Explain the various Resource Management Techniques for Distributed Systems. (K2)
CO4: Discuss Fault Tolerance and Fault Recovery concepts in Distributed Systems. (K2)
CO5: Interpret the concepts of Cryptography and Data Security in Distributed Systems. (K3)
CO6: Describe Multiprocessor Operating System, Process Synchronization, Scheduling. (K2)

UNIT I: Architectures of Distributed Systems –System Architecture types - issues in distributed operating systems - communication networks - communication primitives. Distributed Mutual Exclusion - introduction - the classification of mutual exclusion and associated algorithms

UNIT II: Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems - issues in deadlock detection and resolution - control organizations for distributed deadlock detection - centralized and distributed deadlock detection algorithms -hierarchical deadlock detection algorithms.

UNIT III: Distributed Resource Management- Algorithms for implementing DSM - memory coherence and protocols - design issues. Distributed Scheduling - introduction - issues in load distributing - components of a load distributing algorithm - stability - load distributing algorithm – performance comparison - selecting a suitable load sharing algorithm - requirements for load distributing.

UNIT IV: Failure Recovery and Fault tolerance: Introduction- basic concepts - classification of failures - backward and forward error recovery, backward error recovery- recovery in concurrent systems - consistent set of check points - synchronous and asynchronous check pointing and recovery - check pointing for distributed database systems- recovery in replicated distributed databases.

UNIT V: Protection and Security - Preliminaries, the access matrix model and its implementations.-safety in matrix model, advanced models of protection. Data security - cryptography: Model of cryptography, conventional cryptography- modern cryptography, multiple encryptions - authentication in distributed systems.

UNIT VI: Multiprocessor Operating Systems - Basic multiprocessor system architectures - inter connection networks for multiprocessor systems .Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling.

TEXT BOOKS:

- Advanced Concepts in Operating Systems: Distributed, Database and Multiprocessor Operating Systems, MukeshSinghal, NiranjanaG.Shivaratri, TMH, 2001.
- Distributed Operating System-Concepts and Design, PradeepK.Sinha ,PHI, 2003.

REFERENCE BOOKS:

- Modern operating system, Andrew S.Tanenbaum, PHI, 2003
- Distributed operating system, Andrew S.Tanenbaum, Pearson education, 2003.
- Operating System Concepts, Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, Seventh Edition, John Wiley & Sons, 2004.

VII Sem	Statistics with R Programming (Elective – III)	Course Code: VI8CST29	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Illustrate different data structures in R. **(K2)**
CO2: Demonstrate about control statements and functions in R. **(K3)**
CO3: Compute different mathematical operations using R pre defined functions. **(K3)**
CO4: Construct and edit visualizations with R. **(K3)**
CO5: Identify appropriate statistical tests using R. **(K2)**
CO6: Examine linear and non linear models to create testable hypotheses. **(K3)**

UNIT I: Introduction and Data Structures: Introduction, How to install and run R, R Sessions, Functions, Basic Math, constants, Variables, Expressions, Reserved words in R, Arithmetic, and Boolean Operators and values, Data Types, Vectors, Advanced Data Structures: Data Frames, Lists, Matrices, Arrays, Classes.

UNIT II: Control Statements and Functions in R: R Programming Structures, Control Statements, Loops, – Looping Over Nonvector Sets,- If-Else, Default Values for Argument, return values, Deciding Whether to explicitly call return- returning Complex Objects, Functions are Objects, No Pointers in R, Recursion, A Quick sort Implementation- Extended Example: A Binary Search Tree.

UNIT III: Math and Simulation and Input/output in R: Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability Cumulative Sums and Products-Minima and Maxima- Calculus, Functions for Statistical Distribution, Sorting, Linear Algebra, Operations on Vectors and Matrices, Extended Example: Vector cross Product, Set Operations. **Input /output:** Accessing the Keyboard and Monitor, Reading and writing Files

UNIT IV: Graphics: Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function ,Customizing Graphs, Saving Graphs to Files.

UNIT V: Probability Distributions and Basic Statistics: Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T- Tests,-ANOVA.

UNIT VI: Linear Models in R: Linear Models, Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression, Nonlinear Models, Splines- Decision- Random Forests.

TEXT BOOKS:

1. R for Everyone, Lander, Pearson, 2nd edition 2018.
2. The Art of R Programming, Norman Matloff, Cengage Learning, 2nd edition, 2017.

REFERENCE BOOKS:

1. R Cookbook, Paul Teetor, Oreilly, 2nd edition, 2017.
2. R in Action, Rob Kabacoff, Manning, 3rd edition, 2019.

VII Sem	Information Retrieval Systems (Elective – III)	Course Code: VI8CST30	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Identify the basic concepts of information retrieval.	(K2)
CO2: Describe the Capabilities of IRS, cataloging and indexing.	(K2)
CO3: Explain the data structures and retrieving documents.	(K2)
CO4: Describe the difficulty of representing and retrieving documents.	(K2)
CO5: Explain the latest technologies for describing and searching the web.	(K2)
CO6: Illustrate searching procedure for user-text and Information System Evaluation.	(K2)

UNIT I: Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

UNIT II: Information Retrieval System Capabilities: Search, Browse, Miscellaneous Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

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

UNIT IV: Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages. **Document and Term Clustering:** Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT V: User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext. **Information Visualization:** Introduction, Cognition and perception, Information visualization technologies.

UNIT VI: Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. **Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

Text Books:

1. Information Storage and Retrieval System: Theory and Implementation, Gerald J. Kowalski, Mark T. Maybury, 2nd edition, 2002, Kluwer Academic Press.

Reference Books:

1. Information Retrieval Data Structures and Algorithms, Frakes, W.B., Ricardo Baeza-Yates Prentice Hall.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons, Wiley computer publisher, 1997.

VII Sem	Human Computer Interaction (Elective – III)	Course Code: VI8CST31	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Describe the principles and characteristics of GUI.	(K2)
CO2: Recognize how a computer system may be modified to include human diversity.	(K2)
CO3: Select an effective style for a specific application.	(K2)
CO4: Discuss Screen Designing mock-ups and carry out user and expert evaluation of interfaces.	(K2)
CO5: Explain System Menus & Navigation Schemes.	(K2)
CO6: Discuss Device and Screen based controls.	(K2)

UNIT I: The User Interface: Introduction, Importance of the User Interface, Importance and benefits of Good Design History of Human Computer Interface. Characteristics of Graphical and Web User Interface: Graphical User Interface, popularity of graphics, concepts of Direct Manipulation, Graphical System advantage and disadvantage, Characteristics of GUI. Web User Interface, popularity of web, Characteristics of Web Interface, Merging of Graphical Business systems& the Web, Principles of User Interface Design.

UNIT II: The User Interface Design Process: Obstacles and Pitfall in the development Process, Usability, The Design Team, Human Interaction with Computers, Important Human Characteristics in Design, Human Consideration in Design, Human Interaction Speeds, Performance versus Preference, Methods for Gaining and Understanding of Users.

UNIT III: Understanding Business Functions: Business Definitions & Requirement analysis, Determining Business Functions, Design standards or Style Guides, System Training and Documentation.

UNIT IV: Principles of Good Screen Design: Human considerations in screen Design, interface design goals, test for a good design, screen meaning and purpose, Technological considerations in Interface Design.

UNIT V: System Menus and Navigation Schemes: Structure, Functions, Context, Formatting, Phrasing and Selecting, Navigating of Menus, Kinds of Graphical Menus Windows Interface: Windows characteristic, Components of Window, Windows Presentation Styles, Types of Windows, Window Management, Websystems

UNIT VI: Device and Screen-Based Control: Device based controls, Operable Controls, Text entry/read-Only Controls, Section Controls, Combining Entry/Selection Controls, Other Operable Controls and Presentation Controls, Selecting proper controls

Text Books:

1. "The Essential Guide to User Interface Design", Wilbert O. Galitz, 2nd edition, 2002, Wiley India Edition.
2. Prece, Rogers, "Sharps Interaction Design", Wiley India.
3. "Designing the user interfaces". Ben Shneidermann 3rd Edition, Pearson Education Asia.

.Reference Books:

1. "User Interface Design" , SorenLauesen, Pearson Education
2. "Essentials of Interaction Design", Alan Cooper, Robert Riemann, David Cronin, Wiley
3. "HumanComputer Interaction", Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell, Bealg, Pearson Education.

VII Sem	Distributed Systems (Elective – IV)	Course Code:	L	T	P	C
		VI8CST32	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe distributed system and desired properties of such systems. (K2)
CO2: Discuss the theoretical concepts, namely, virtual time and agreement. (K2)
CO3: Discuss the basic concepts of distributed systems and Characteristics of IPC protocols. (K2)
CO4: Explain the mechanisms such as Remote procedure call (RPC/RMI) and OSS (K2)
CO5: Explain the mechanisms such as file systems and P2P algorithms. (K2)
CO6: Discuss the Transactions and Replications in distributed systems. (K2)

UNIT I: Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges. **System Models:** Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT II: 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, Consensus and Related Problems.

UNIT III: Inter process Communication: Introduction, The API for the Internet Protocols- The Characteristics of Inter process communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication, Case Study: MPI.

UNIT IV:: Remote Invocation: Introduction, Request-reply protocols, Remote Procedure Call, Events and Notifications, **Case Study:** JAVA RMI.. **Operating System Support:** Introduction, The Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads.

UNIT V: Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays. **Case Study1:** Sun Network File system. **Case Study 2:** The Andrew File System.

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

Text Books:

1. “Distributed Systems- Concepts and Design”, George Coulouris, Jean Dollimore, Tim Kindberg, Fourth Edition, Pearson Publication
2. “Distributed Computing, Principles, Algorithms and Systems”, Ajay D Kshemkalyani, MukeshSinghal, Cambridge.

Reference Books:

1. “Distributed Systems, Principles and Paradigms”, Andrew S. Tanenbaum, Maarten Van Steen, 2d Edition, PHI.
2. “Distributed Systems, An Algorithm Approach,” Sukumar Ghosh, Chapman & HalyCRC, Taylor & Fransis Group, 2007.

VII Sem	Scripting Languages (Elective – IV)	Course Code:	L	T	P	C
		VI8CST33	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- | | |
|---|-------------|
| CO1: Illustrate the concepts of scripting languages. | (K2) |
| CO2: Develop Scripting for application using Ruby. | (K3) |
| CO3: Explain the concepts of Programming in Perl. | (K2) |
| CO4: Construct programs using Perl. | (K3) |
| CO5: Describe TCL Scripting and their applications. | (K2) |
| CO6: Discuss features of Groovy when compare with other Scripting Languages. | (K2) |

UNIT I: Introduction: Ruby, Rails, the structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Web servers, SOAP and web services. RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling.

UNIT II: Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby TypeSystem, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter.

UNIT III: 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 IV: 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.

UNIT V: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.

UNIT VI: Groovy: Features of Groovy, Environment, Basic Syntax, data types, variables, operators, loops, decision making, methods, File i/o, Optionals , numbers, strings, ranges, lists, maps, date and time, Regular expressions, Exception Handling, OO concepts.

Text Books:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly.
3. "Programming Ruby" The Prammatic programmers guide by Dabve Thomas Second edition.

Reference Books:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E.Quigley, Pearson Education.
3. Programming Perl, Larry Wall T.Christiansen and J.Orwant, O'Reilly, SPD.
4. Tcl and the Tk Toolkit, Ousterhout, Pearson Education.
5. Pearl Power, J.P. Flynt, Cengage Learning.

VII Sem	Deep Learning (Elective – IV)	Course Code: VI8CST34	L 3	T 0	P 0	C 3
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Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Explain the basics of machine learning. (K2)
CO2: Demonstrate the working of an artificial neural network. (K2)
CO3: Identify various parameters and issues while training a deep neural network. (K2)
CO4: Explain the working of convolution neural networks. (K2)
CO5: Explain the working of recurrent neural networks. (K2)
CO6: Recognize the ways of applying deep learning techniques for complex problem-solving. (K2)

UNIT I: Machine Learning Basics: Learning Algorithms, Capacity, Overfitting and Underfitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood Estimation, Bayesian Statistics, Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Descent.

UNIT II: Introduction to Neural Networks: The Basic Architecture of Neural Networks- Single Computational Layer: The Perceptron, Multilayer Neural Networks; Training a Neural Network with Backpropagation, Practical Issues in Neural Network Training-The Problem of Overfitting, The Vanishing and Exploding Gradient Problems, Difficulties in Convergence, Local and Spurious Optima;

UNIT III: Training Deep Neural Networks: Introduction, Backpropagation: Backpropagation with the Computational Graph Abstraction, Dynamic Programming to the Rescue, Backpropagation with Post-Activation Variables and Pre-activation Variables, Setup and Initialization Issues, The Vanishing and Exploding Gradient Problems, Parameter-Specific Learning Rates- AdaGrad, RMSProp, AdaDelta, Adam.

UNIT IV: Convolutional Neural Networks: Introduction, The Basic Structure of a Convolutional Network- Padding, Strides, Typical Settings, The ReLU Layer, Pooling, Fully Connected Layers, The Interleaving Between Layers, Local Response Normalization, Hierarchical Feature Engineering; Training a Convolutional Network- Backpropagating Through Convolutions.

UNIT V: Recurrent Neural Networks: Introduction, The Architecture of Recurrent Neural Networks- Language Modeling Example of RNN, Backpropagation Through Time, Bidirectional Recurrent Networks, Multilayer Recurrent Networks; Long Short-Term Memory (LSTM), Gated Recurrent Units (GRUs).

UNIT VI: Applications Deep Learning: Applications of Convolutional Networks: Content-Based Image Retrieval, Object Localization, Object Detection, Natural Language and Sequence Learning; Application of Recurrent Neural Networks: Application to Automatic Image Captioning, Time-Series Forecasting and Prediction, End-to-End Speech Recognition, Handwriting Recognition.

Text Books:

1. Deep Learning, Ian Goodfellow, Ian Goodfellow, and Aaron Courville, MIT Press.
2. Neural Networks and Deep Learning, Charu C. Aggarwal, Springer.

Reference Books:

1. Neural Networks: A Systematic Introduction, Raúl Rojas, Springer.
2. Introduction to Deep Learning, Eugene Charniak, MIT Press.

VII Sem	Social Networks and Semantic Web (Elective – IV)	Course Code: VI8CST35	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate knowledge by explaining the three different “named” generations of the web. **(K3)**
- CO2:** Construct a social network. **(K3)**
- CO3:** Relate knowledge representation methods for semantic web. **(K3)**
- CO4:** Explain the key aspects of Web Architecture. **(K2)**
- CO5:** Describe web services and its Applications. **(K2)**
- CO6:** Develop “Linked Data” Applications using Semantic Web Technologies. **(K3)**

UNIT-I: The Semantic web: Limitations of the current Web, The semantic solution, Development of the Semantic Web, The emergence of the social web.

UNIT-II: Social Network Analysis: What is network analysis? Development of Social Network Analysis, Key concepts and measures in network analysis. Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities, Web-based networks.

UNIT-III: Knowledge Representation on the Semantic Web: Ontologies and their role in the Semantic Web, Ontology languages for the semantic Web.

UNIT-IV: Modeling and Aggregating Social Network Data: State of the art in network data representation, Ontological representation of Social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.

UNIT-V: Developing social semantic applications: Building Semantic Web applications with social network features, Flink- the social networks of the Semantic Web community, Open academia: distributed, semantic-based publication management.

UNIT-VI: Evaluation of Web-Based Social Network Extraction: Differences between survey methods and electronic data extraction, context of the empirical study, Data collection, Preparing the data, optimizing goodness of fit, Comparison across methods and networks, Predicting the goodness of fit, Evaluation through analysis.

Text Books:

1. Social Networks and the Semantic Web, PeterMika, Springer,2007.
2. Semantic Web Technologies, Trends and Research in Ontology basedsystems, J.Davies,RudiStuder,PaulWarren,JohnWiley&Sons.

Reference Books:

1. Semantic Web and Semantic Web Services –Liyang Lu Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
2. Information Sharing on the semantic Web – Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications

VII Sem	Advanced Java and Web Technologies Lab	Course Code: VI8CSL10	L	T	P	C
			0	0	2	1

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Develop static web pages using HTML, CSS. **(K3)**

CO2: Demonstrate the concepts of JavaScript, DHTML and XML. **(K3)**

CO3: Develop Web Applications using JSP. **(K3)**

CO4: Develop dynamic Web Applications using PHP & MySQL. **(K3)**

LIST OF EXPERIMENTS

1) Design the following static web pages required for an online book store web site:

(a) HOME PAGE:

The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below). Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link “MCA” the catalogue for MCA Books should be displayed in the Right frame. Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
mca mba BCA	Description of the Web Site			









(b) LOGIN PAGE:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA BCA	Login : <input type="text" value="11a51f0003"/> Password: <input type="password" value="*****"/> <input type="button" value="Submit"/> <input type="button" value="Reset"/>			

(c) CATALOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table: The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
	Home	Login	Registration	Catalogue
MCA	   	Book : XML Bible Author : Winston Publication : Wiely	\$ 40.5	
MBA		Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	
BCA		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam	\$ 50	

(d). REGISTRATION PAGE:

Create a “registration form” with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes) 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)

2) Design a web page using CSS (Cascading Style Sheets) which includes the following: Use different font, styles:

In the style definition you define how each selector should work (font, color etc.).

3) Design a login page and Make use of Events to perform validation using JavaScript.

4) Demonstrate a JavaScript program to perform On Mouse over event.

5) Demonstrate the concept of Mouse events (Ex:ng-click) with the help of Angular JS.

6) Design a simple Angular JS form.

7) Write an XML file which will display the Book information which includes the following:

- 1) Title of the book
- 2) Author Name
- 3) ISBN number
- 4) Publisher name
- 5) Edition
- 6) Price
- a) Write a Document Type Definition (DTD) to validate the above XML file.
- b) Write a XML Schema Definition (XSD)

8) Create a simple JSP to print the current Date and Time.

9) Create JSP to insert the details of 3 or 4 users using a registration form store these values in the data base and then check the authentication of the user by entering the name and password using a login form.

10) Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.

A)

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user".

B) Use init-parameters to do the same.

11) Create a table which should contain at least the following fields: name, password, email id, phone number (these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page.

12) Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.

Reference Books:

1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
2. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
3. Web Technologies, 1st Edition 7th impression, Uttam K Roy, Oxford, 2012.

VIII Sem	Software Project Management (Elective – V)	Course Code: VI8CST36	L 3	T 0	P 0	C 3
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Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe Software Project Management Terminology. (K2)
CO2: Explain various Software development process Models and software Life cycle phases. (K2)
CO3: Illustrate various Effort Estimation Techniques and activity network models for Software Project Planning. (K3)
CO4: Demonstrate Risk Management Concepts and resource allocation. (K3)
CO5: Explain the importance of Project monitoring and control for accomplishing project goals. (K2)
CO6: Describe Software Quality models. (K2)

UNIT I: Introduction to Software Project Management: Software Project versus other types of projects, Activities covered by Software Project Management, Categorizing projects, Stakeholders, Objectives & goals, what is management. **Project Planning:** Step-wise planning, Identify Project Scope and objectives, Infrastructure, Project Products & deliverables, Project activities, Effort estimation.

UNIT II: Project Approach: Build or buy, **process models:** waterfall model, Prototyping, Incremental delivery model, **Agile methods:** Extreme Programming, Atern method, selecting an appropriate process model. **Lifecycle phases:** Engineering and Production stages, Inception, Elaboration, Construction, Transition phases.

UNIT III: Software effort estimation and Activity planning: Overview of Effort Estimation techniques, Function Point analysis, COCOMO. **Activity planning:** Objectives, Network planning models, forward pass and backward pass, Identify Critical path and activities.

UNIT IV: Risk Management and Resource Allocation: Introduction, Risk and its categories, Identification, Assessment, Risk Planning and management, applying PERT technique. Resource Allocation: Types of Resources, Identifying resource requirements, Resource scheduling.

UNIT V: Project Monitoring and Control: Creating framework for monitoring & control, Collecting Data, Visualizing Progress, Cost monitoring, Earned value Analysis.

UNIT VI: Software Quality: Defining Quality, Importance of quality, ISO 9126, Product Quality Vs Process Quality management. **Process Capability Models:** Capability Maturity Model, Enhancing software Quality.

Text Books:

1. Software Project Management, Bob Hughes & Mike Cotterell, 6th edition, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce 2nd edition, Pearson Education.

Reference Books:

1. Software Project Management in practice, Pankaj Jalote, 9th edition, Pearson Education.
2. Software Project Management, Joel Henry, 3rd edition, Pearson Education.

VIII Sem	Big Data Analytics (Elective – V)	Course Code:	L	T	P	C
		VI8CST37	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Discuss the challenges of Big Data using Hadoop.	(K2)
CO2: Interpret Hadoop's architecture and core components of Hadoop Distributed File System.	(K2)
CO3: Apply data modelling techniques to large data sets using map reduce programs.	(K3)
CO4: Describe the Hadoop I/O classes.	(K2)
CO5: Examine the use of Pig Framework to work with big data.	(K3)
CO6: Develop a data analytical system using HIVE.	(K3)

UNIT I: Introduction to Big Data: What is Big Data, Why Big Data is Important, Data Storage and Analysis, Comparison with other systems, Grid Computing. **Introduction to Hadoop:** A brief history of Hadoop, Meet Hadoop Data, Apache Hadoop and the Hadoop Ecosystem.

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

UNIT III: Writing Map Reduce Programs: A Weather Dataset –Data Format, Analyzing Data with UNIX Tools, Analyzing the Data with Hadoop-Map Reduce. **Basic programs of Hadoop Map Reduce:** Driver code, Mapper code, Reducer code, RecordReader, Combiner functions. Map Reduce Types, Input Formatclass Hierarchy, other map reduce examples (word count).

UNIT IV: Hadoop I/O: The Writable Interface, Writable Comparable and Comparators. **Writable Classes:** Writable wrappers for Java primitives, Text & Bytes Writable, NullWritable, ObjectWritable and Generic Writable, Writable collections. **Implementing a Custom Writable:** Implementing a Raw Comparator for speed, Custom comparators

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

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

Text Books:

1. Hadoop: The Definitive Guide, Tom White, O'Reilly, 3rd Edition, 2012.
2. Hadoop in Action, Chuck Lam, MANNING Publ., 2016.
3. Hadoop for Dummies, Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk, Bruce Brown, Rafael Coss, 2014.

Reference Books:

1. Hadoop in Practice, Alex Holmes, MANNING Publ., 2014.
2. Hadoop Map Reduce Cookbook, Srinath Perera, Thilina Gunarathne, PACKT, 2013.

VIII Sem	Soft Computing (Elective – V)	Course Code: VI8CST38	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Discuss about Soft Computing, Requirements and Applications of Soft Computing.	(K2)
CO2: Discuss about various Supervised and Unsupervised Learning Networks.	(K2)
CO3: Illustrate various Fuzzy Logic, Fuzzy Sets, Crisp sets, Fuzzification and De-fuzzification Principles.	(K2)
CO4: Discuss about Fuzzy Arithmetic and Fuzzy measures.	(K2)
CO5: Discuss about Genetic Algorithms and its Operators.	(K2)
CO6: Discuss about Various Hybrid Soft Computing Techniques.	(K2)

UNIT I: Introduction: What is Soft Computing? Difference between Hard and Soft computing, Requirements of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.

UNIT II: Associative Memory Networks: (Supervised Learning): Introduction, Training Algorithms for Pattern Association, Auto-associative Memory Network, Hetero-associative Memory Network, Bidirectional Associative Memory (BAM), Hopfield Networks, Iterative Auto-associative Memory Networks, Temporal Associative Memory Network. **Unsupervised Learning Networks:** Introduction, Fixed Weight Competitive Nets, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter propagation Networks, Adaptive Resonance Theory Network.

UNIT III: Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets: Introduction to Fuzzy Logic, Classical Sets (Crisp Sets), Fuzzy Sets and Operations on Fuzzy sets- Compliment, Intersections, Unions.

Membership Function: Introduction, Features of the Membership Functions, Fuzzification, Methods of Membership Value Assignments. **Defuzzification:** Introduction, Lambda-Cuts for Fuzzy Sets (Alpha-Cuts), Lambda-Cuts for Fuzzy Relations, Defuzzification Methods

UNIT IV: Fuzzy Arithmetic and Fuzzy Measures: Introduction, Fuzzy Arithmetic, Extension Principle, Fuzzy Measures, Measures of Fuzziness, Fuzzy Integrals.

UNIT V: Genetic Algorithm: Introduction to genetic algorithm, operators in genetic algorithm, stopping condition for genetic algorithm flow.

UNIT VI: Hybrid Soft Computing Techniques: Introduction, Neuro-Fuzzy Hybrid Systems, Genetic Neuro-Hybrid Systems.

Text Books:

1. Principles of Soft Computing, S.N. Sivanandam and S.N. Deepa, 3-edition, Wiley India, 2007.
2. “Fuzzy Sets & Fuzzy Logic”, G.J. Klir & B. Yuan, PHI, 1995.
3. “An Introduction to Genetic Algorithm”, Melanie Mitchell, PHI, 1998.

Reference Books:

1. Neural Networks, Fuzzy Logic and Genetic Algorithms, S. Rajasekaran and G.A.V.Pai, PHI, 2003.
2. Fuzzy Logic with Engineering Applications, Timothy J.Ross, McGraw-Hill, 1997.
3. Neuro-Fuzzy and Soft Computing, J.S.R.Jang, C.T.Sun and E.Mizutani, PHI, 2004, Pearson Education.

VIII Sem	Cloud Computing (Elective – V)	Course Code: VI8CST39	L 3	T 0	P 0	C 3
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Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Outline the concepts of cloud computing architecture. **(K2)**
CO2: Describe the Virtualization concepts in different scenarios. **(K2)**
CO3: Explain the best policies for cloud deployment. **(K2)**
CO4: Illustrate the design issues of Cloud computing. **(K2)**
CO5: Illustrate the security and privacy of the data in cloud computing. **(K2)**
CO6: Demonstrate cloud instances in Amazon Web Services. **(K3)**

UNIT I: Introduction to Cloud Computing: Trends in Computing - Distributed Computing, Grid Computing, Cluster Computing, Utility Computing, Cloud Computing, Definition of Cloud Computing, Characteristics, Service Models, Deployment Models, Cloud Service Models Providers, Advantages and Disadvantages of Cloud Computing, Cloud-based Services & Applications.

UNIT II: Cloud Concepts & Technologies: Virtualization and its types, Software Defined Networking, Network Function Virtualization (NFV). **Cloud Services:** Compute Services, Storage Services, Database Services, Application Services

UNIT III: Cloud Application Design: Design Considerations for Cloud Applications, Reference Architectures for Cloud Applications, Cloud Application Design Methodologies: SOA, Cloud Component Model and MVC, Data Storage Approaches.

UNIT IV: Cloud Security: Cloud Security Architecture (CSA), Authentication, Authorization, Identity & Access Management, Data Security, Key Management.

UNIT V: Migrating into a Cloud: Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Migration Risks and mitigation, Phases of Migrating to Cloud, benefits and risks of Migrating to Cloud.

UNIT VI: SLA Management in Cloud Computing: Service Level Agreements (SLA), Considerations for SLA, SLA Requirements, Types of SLA, Life Cycle of SLA, SLA Management in Cloud. **Case Study:** Amazon AWS: EC2, Amazon Simple DB, Amazon S3, Amazon Cloud Front and Amazon SQS.

Text Books:

1. Cloud Computing: A Hands-on Approach, Arshdeep Bahga, Vijay Madiseti, Universities Press.
2. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley Publication.

Reference Books:

1. Cloud Computing – Web-Based Applications That Change the way you Work and Collaborate Online, Michael Miller, Pearson Education.
2. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, McGraw-Hill, (2010).

VIII Sem	Software Architecture & Design Patterns (Elective – VI)	Course Code:	L	T	P	C
		VI8CST40	3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe Architectural Structures and Quality Attributes. (K2)
CO2: Explain the mechanism of Evaluating Architecture. (K2)
CO3: Demonstrate Creational Patterns. (K3)
CO4: Construct Structural Patterns for a given Scenario. (K3)
CO5: Construct Behavioural Patterns for a given Scenario. (K3)
CO6: Examine various Case Studies in utilizing Software Architectures. (K3)

UNIT-I: Envisioning Architecture The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views. Creating and Architecture Quality Attributes, Achieving qualities, Designing the Architecture.

UNIT-II: Analyzing Architectures Architecture Evaluation, Architecture design decision making, ATAM, CBAM. Software Product Lines, Software architecture in future.

UNIT-III: Pattern Description, role in solving design problems, Selection and usage. **Creational Patterns:** Abstract factory, Builder, Factory method, Prototype, Singleton.

UNIT-IV: Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, PROXY.

UNIT-V: Behavioural Patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

UNIT-VI: Case Studies A-7E – A case study in utilizing architectural structures, The **World Wide Web** - a case study in Interoperability, **Air Traffic Control** – a case study in designing for high availability, **Celsius Tech** – a case study in product line development.

Text Books:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

Reference Books:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006.

VIII Sem	Middleware Technologies (Elective – VI)	Course Code: V18CST41	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Illustrate Middleware, E- Business, IT architecture, RPC, RDC.	(K2)
CO2: Demonstrate Internet Applications and Web services.	(K2)
CO3: Summarize Technical issues in Middleware.	(K2)
CO4: Demonstrate the Use of Middleware in Building Distributed Technologies.	(K2)
CO5: Identify Security Issues with Distributed Applications.	(K3)
CO6: Apply Appropriate Middleware Technology to Develop Real Time Applications.	(K3)

UNIT I: Introduction: Moving to e-business, what is IT architecture? Why is this different from what we did before? Rewrite or evolve?, Who develops the architecture?, Early days, Preliminaries, Remote procedure calls, Remote database access, Distributed transaction processing, Message queuing, Message queuing versus distributed transaction processing, what happened to all this technology.

UNIT II: Objects, Components and the Web: Using object middleware, Transactional component middleware- COM+, EJB, Final comments on TCM, Internet Applications. WEB SERVICES: Service concepts, Web services, and Using Web services: A pragmatic approach.

UNIT III: A Technical Summary Of Middleware: Middleware elements- The communications link, The middleware protocol, The programmatic interface, Data presentation, Server control, Naming and directory services, Security, System management, Comments on Web services, Vendor architectures- Vendor platform architectures, Vendor-distributed architectures, Using vendor architectures, Positioning, Strawman for user target architecture, Marketing, Implicit architectures, Middleware interoperability.

UNIT IV: Using Middleware to Build Distributed Applications: What is middleware for? -Support for business processes, Information retrieval, Collaboration, Tiers- The presentation tier, The processing tier, The data tier, Services versus tiers, Architectural choices - Middleware bus architectures, Hub architectures, Web services architectures, Loosely coupled versus tightly coupled.

UNIT V: Security: What security is needed, Traditional distributed system security, Web services security, Architecture and security. **Application Design and It's Architecture :** Problems with today's design approaches, Design up front or as needed?- The role of business rules, Existing systems, Reuse, Silo and monolithic development, The role of architecture, Levels of design, Reconciling design approaches.

UNIT VI: Building an IT Architecture: Case Studies – Providing an integration infrastructure, creating a service-oriented architecture, Developing a new application. What does the future hold? , The key points to remember-Middleware technology alternatives, IT architecture guideline guidelines, Distribute systems technology principals and Distribute systems implementation design.

Text Books:

1. IT Architectures and Middleware: Strategies for Building Large, Integrated Systems, Chris Britton and Peter Eye, 2nd Edition, Pearson Education.

Reference Books:

1. Middleware for Communications, Qusay H. Mahmoud, 1st Edition, John Wiley and Sons.
2. Middleware Networks: Concept, Design and Deployment of Internet Infrastructure, Michah Lerner, 1st Edition, Kluwer Academic Publishers.
3. Middleware and Enterprise Integration Technologies, G. Sudha Sadasivam and Radha Shankarmani, 1st edition, Wiley, 2009.

VIII Sem	Natural Language Processing (Elective – VI)	Course Code: VI8CST42	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Illustrate the Syntax and semantics and Language models of Natural Language Processors. **(K2)**
CO2: Classify Morphology and Finite State Transducers, Markov Models and Entropy Models. **(K2)**
CO3: Explain about Statistical parsing and probabilistic CFGs. **(K2)**
CO4: Demonstrate semantic analysis. **(K2)**
CO5: Explain Discourse Analysis and Lexical Resources. **(K2)**
CO6: Develop a Statistical Methods for Real World Applications and explore deep learning-based NLP. **(K3)**

UNIT I: Introduction: Natural Language Processing tasks in syntax, semantics, and pragmatics – Issues – Applications – The role of machine learning – Probability Basics – Information theory – Collocations – N-gram Language Models - Estimating parameters and smoothing - Evaluating language models.

UNIT II: Morphology And Part Of Speech Tagging: Linguistic essentials - Lexical syntax- Morphology and Finite State Transducers - Part of speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models. Conditional Random Fields.

UNIT III: Syntax Parsing: Syntax Parsing - Grammar formalisms and tree banks - Parsing with Context Free Grammars- Features and Unification-Statistical parsing and probabilistic CFGs(PCFGs)- Lexicalized PCFGs.

UNIT IV: Semantic Analysis: Representing Meaning – Semantic Analysis - Lexical semantics – Word-sense disambiguation- Supervised – Dictionary based and Unsupervised Approaches - Compositional semantics- Semantic Role Labeling and Semantic Parsing – Discourse Analysis.

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, Brills Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

UNIT VI: NLP Applications: Named entity recognition and relation extraction- IE using sequence labeling- Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment- phrase-based translation – Question Answering.

Text Books:

1. Daniel Jurafsky and James H. Martin Speech and Language Processing (2nd Edition), Prentice Hall; 2nd edition, 2008
2. Foundations of Statistical Natural Language Processing by Christopher D. Manning and Hinrich Schuetze, MIT Press, 1999

3. Steven Bird, Ewan Klein and Edward Loper Natural Language Processing with Python, O'Reilly Media; 1 edition,2009
4. Roland R. Hausser, Foundations of Computational Linguistics: Human-Computer Communication in Natural Language, Paperback, MIT Press,2011

References:

1. Pierre M. Nugues, An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special Consideration of English, French, and German (Cognitive Technologies) Softcover reprint,2010
2. James Allen, Natural Language Understanding, Addison Wesley; 2 edition 1994
 - a. NLTK – Natural Language Tool Kit -<http://www.nltk.org/>

VIII Sem	Cyber Security (Elective – VI)	Course Code: VI8CST43	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Describe about Cybercrimes.	(K2)
CO2: Explain Cyber criminals and their attacks.	(K2)
CO3: Illustrate Cybercrimes and security in mobile devices	(K2)
CO4: Discuss about the Tools and methods used to overcome Cybercrimes.	(K2)
CO5: Discuss about Cyber Laws and IT Acts.	(K2)
CO6: Explain about Computer Forensics.	(K2)

UNIT I: Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

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 VectorCloud 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/CellPhones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT IV: Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoSAttacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.
Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

UNIT V: Cybercrimes and Cyber security: The Legal Perspectives, Introduction, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment.

UNIT VI: Understanding Computer Forensics: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Anti-forensics.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, NinaGodbole, SunitBelapure, 1stedition, Wiley.

Reference Books:

1. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, 4th edition, Cengage Learning.
2. Information Security the complete reference, Mark Rhodes, Ousley, 2nd edition, MGH.

VI Sem	Repair And Rehabilitation Of Structures (Civil Engineering)	Course Code: V18CETOE1	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Describe the deterioration of concrete in structures	(K1)
CO2:	Estimate the degree of deterioration using Non Destructive Test methods	(K2)
CO3:	Assess the failures and causes of failures in structures	(K3)
CO4:	Relate different materials used for repair and rehabilitation of structures	(K3)
CO5:	Employ and suggest suitable retrofitting techniques	(K3)
CO6:	Organize the case studies and report the condition of structures	(K3)

UNIT I

Deterioration of concrete in structures: Physical processes of deterioration like Freezing and Thawing, Wetting and Drying, Abrasion, Erosion, Pitting. Chemical processes of deterioration like Carbonation, Chloride ingress, Corrosion, Alkali aggregate reaction, Sulphate attack, Acid attack, temperature and their causes, Mechanism, Effect, preventive measures.

Cracks: Cracks in concrete, types, pattern, quantification, measurement and preventive measures.

UNIT II

Non Destructive Testing: Non destructive test methods for concrete like Rebound hammer, Ultrasonic pulse velocity, Rebar locator, Corrosion meter, Penetration resistance and Pull out tests. Methods for corrosion measurement and assessment, including half-cell potential and resistivity, mapping of data.

UNIT III

Failure of buildings: Definition of building failure, types of failures, Causes of Failures, Faulty Design, Accidental over Loading, Poor quality of material, Poor Construction practices and Fire damage. Investigation of failures, diagnostic testing methods and equipments required. Repair of cracks in concrete.

UNIT IV

Materials for repair and rehabilitation: Admixtures, types of admixtures, purposes of using admixtures, chemical composition, Natural admixtures, Fibres, wraps, Glass and Carbon fibre wraps, Steel Plates. Concrete behavior under corrosion, disintegrated mechanisms, moisture effects and thermal effects. Visual investigation, Acoustical emission methods, Corrosion activity measurement, chloride content, Depth of carbonation, Impact echo methods, Ultrasound pulse velocity methods, Pull out tests.

UNIT V

Repair Techniques: Grouting, Jacketing, Shotcreting, Externally bonded plates, Nailing, Underpinning and under water repair. Materials, Equipments, Precautions and Processes.

UNIT VI

Investigation of structures: Distress, observation and preliminary test methods. Case studies related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion damaged structures.

TEXT BOOKS:

1. "Maintenance & Repair of Civil Structures", Gupta, B.I., and Amit Gupta, Standard Publishers and Distributors, 2015.
2. "Rehabilitation of Concrete Structures", Vidivelli, B., Standard Publishers and Distributors, 2007.
3. "Concrete Bridge Practice, Construction, Maintenance & Rehabilitation", Raina. V.K., Shroff Publishers and Distributors, 2010.

REFERENCES:

1. "Concrete Structures- protection Repair and Rehabilitation", Doodge, R. Woodson., BH Publishers.

2. "Concrete technology", Neville, A.M and Brooks, J.J. Prentice Hall, 2010.
3. "Special Structural concrete", Rafat Siddique, Galgotia Publications, 2000.
4. "Concrete repair and maintenance illustrated", Peter H Emmons, R S Means Publishers, 1993.
5. "Concrete technology", Shetty, M.S., S Chand publishers, 1982.
6. "Repair and protection of concrete structures", Noel P.Mailvaganam, CRC press, London, 1992.

V Sem	Remote Sensing And Geographical Information System (Civil Engineering)	Course Code: V18CEOE2	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Define the basic principles of Remote Sensing and GIS, including ground, air and satellitebased sensor platforms **(K1)**
- CO2:** Interpret the aerial photographs and satellite imageries **(K2)**
- CO3:** Relate the process of input spatial data entry and its types **(K3)**
- CO4:** Examine the Spatial Data for a variety of applications **(K3)**
- CO5:** Employ RS and GIS for diverse applications **(K3)**
- CO6:** Apply RS and GIS concepts in water resources engineering **(K3)**

SYLLAB

USUNIT

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, Characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, space borne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT, MODIS, ASTER,RISAT and CARTOSAT.

UNIT II

Image analysis: Introduction, elements of visual interpretations, digital image processing-image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing and buffer analysis.

UNIT V

RS and GIS Applications: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT VI

Applications of Hydrology, Water Resources and Disaster Management: Food zoning and mapping, groundwater prospects and potential recharge zones, watershed management and disaster management with case studies.

TEXTBOOKS:

1. "Remote sensing and GIS", Bhatta, B., Oxford University Press, 2008.
2. "Remote Sensing and Geographical Information Systems", Anji Reddy, M., B S Publications, 2008.
3. "Basics of Remote Sensing and GIS" Kumar. S., Laxmi Publications,

REFERENCE BOOKS:

1. "Fundamentals of Remote Sensing", George Joseph, Universities Press, 2013.
2. "Concepts and Techniques of Geographical Information System", Chor Pang Lo and Yeung, A.K.W., Prentice Hall, India, 2006.
3. "Remote Sensing and its Applications", Narayan L.R.A, Universities Press, 2012.
4. "Introduction to Geographic Information Systems", Kand Tsung Chang, McGraw Hill Higher Education, 2009.
5. "Basics of Remote sensing & GIS", Kumar, S., Laxmi Publications, New Delhi, 2005.
6. "Principals of Geographical Information Systems", Burrough, P.A and McDonnell, R.A. Oxford University Press, 1998.
7. " Remote Sensing", Schowenger, R. A., Elsevier publishers, 2006.
8. "Remote Sensing and Image Interpretation", Lillesand, T.M, Kiefer, R.W. and Chipman, J.W., Wiley India Pvt. Ltd., New Delhi, 2013.
9. "Fundamentals of Geographic Information Systems", Demers, M.N, Wiley India Pvt. Ltd, 2013.

VII Sem	Environmental Pollution And Control (Civil Engineering)	Course Code: V18CEOE03	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe about air pollution and its control methods to students **(K2)**
CO2: Develop the student to understand about industrial wastewater and ways to control it **(K3)**
CO3: Describe student to understand about solid waste and methods to control it **(K2)**
CO4: Express to student about importance of Environmental sanitation **(K2)**
CO5: Prepare student to understand about Hazardous waste and ways to control it **(K3)**
CO6: Illustrate the importance of Sustainable development to student **(K3)**

SYLLABUS

UNIT I

Air Pollution: Air pollution Control Methods–Particulate control devices – Methods of Controlling Gaseous Emissions – Air quality standards.Noise Pollution: Noise standards, Measurement and control methods –Reducing residential and industrial noise – ISO14000.

UNIT II

Industrial wastewater Management: – Strategies for pollution control -Volume and Strength reduction – Neutralization – Equalization –Proportioning – Common Effluent Treatment Plants - Recirculation of industrial wastes – Effluent standards.

UNIT III

Solid Waste Management: solid waste characteristics – basics of on-site handling and collection – separation and processing – Incineration Composting-Solid waste disposal methods – fundamentals of Land filling.

UNIT IV

Environmental Sanitation: Environmental Sanitation Methods for Hostels and Hotels, Hospitals, Swimming pools and public bathing places, social gatherings (melas and fares), Schools and Institutions, Rural Sanitation-low cost waste disposal methods.

UNIT V

Hazardous Waste: Characterization - Nuclear waste – Biomedical wastes – Electronic wastes - Chemical wastes – Treatment and management of hazardous waste-Disposal and Control methods.

UNIT VI

Sustainable Development: Definition- elements of sustainable developments-Indicators of sustainable development- Sustainability Strategies- Barriers to Sustainability–Industrialization and sustainable development – Cleaner production in achieving sustainability- sustainable development.

Text Books:

1. Environmental Engineering, by Ruth F. Weiner and Robin Matthews – 4th Edition Elsevier, 2003.
2. Environmental Science and Engineering by J.G. Henry and G.W. Heinke – Pearson Education.

3. Environmental Engineering by Mackenzie L Davis & David A Cornwell. McGraw Hill Publishing.

References:

1. Air Pollution and Control by M.N. Rao & H.N. Rao
2. Solid Waste Management by K. Sasi Kumar, S.A. Gopi Krishna. PHI New Delhi.
3. Environmental Engineering by Gerard Kiley, Tata McGraw Hill.
4. Environmental Sanitation by KVSG Murali Krishna, Reem Publications, New Delhi.
5. Industrial Water Pollution Control by Nemerow Jr., McGraw Hill Publishing.
6. Unit Operations and Processes in Environmental Engineering by Reynolds. Richard – Cengage Learning.
7. Environmental Engineering by D. Srinivasan, PHI Learning Private Limited, New Delhi, 2011.
8. Environmental Engineering – Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglous – Mc-Graw-Hill Book Company, New Delhi, 1985.

VII Sem	Disaster Management (Civil Engineering)	Course Code: V18CEO04	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe to student to have a idea on different natural hazards and disaster management (K2)
CO2: Develop the student to understand manmade disaster and their management (K3)
CO3: Prepare the student in such a way in order to understand building codes and vulnerability of disaster (K3)
CO4: Illustrate to student about role of technology in disaster management (K2)
CO5: Assess the importance of education and community preparedness in disaster management to student (K3)
CO6: Classify the multi-sectional issues caused by disaster to student (K2)

SYLLABUS

UNIT I

Natural Hazards and Disaster Management: Introduction of DM Disaster Management cycle – Five priorities for action- Case study methods of the following: floods, droughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides.

UNIT II

Man Made Disaster And Their Management Along With Case Study Methods Of The Following: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrorism - rail and air craft's accidents-Management of these disasters

UNIT III

Risk And Vulnerability: – Building codes and land use planning – social vulnerability – environmental vulnerability -Financial management of disaster.

UNIT IV

Role Of Technology In Disaster Managements: Disaster management for infra structures, taxonomy of infra structure - mitigation programme for earth quakes –geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training- transformable indigenous knowledge in disaster reduction.

UNIT V

Education And Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery - Community based disaster management and social capital-Designing resilience- building.

UNIT VI

Multi-sectional Issues: Impact of disaster on poverty and deprivation- Climate change adaptation and human health -Exposure , health hazards and environmental risk-Forest management and disaster risk reduction - The Red cross and red crescent movement.

Text Books:

1. Disaster Management – Global Challenges and Local Solutions’ by Rajib shah & R R Krishnamurthy(2009),Universities press.
2. Disaster Science & Management’ by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. Disaster Management – Future Challenges and Opportunities’ by Jagbir Singh (2007), I K International Publishing House Pvt. Ltd.

Reference Books:

1. ‘Disaster Management’ edited by H K Gupta (2003), Universities press.
2. Natural Hazards and Disaster Management, Vulnerability and Mitigation by RB Singh
3. Disaster Management by Harish K.Gupta

VIII Sem	Solid Waste Management (Civil Engineering)	Course Code: V18CEOE05	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Generalize Solid Waste and its management. **(K2)**
CO2: Assess different elements for managing Solid Waste. **(K3)**
CO3: Employ different methods for transfer and transport of solid waste . **(K3)**
CO4: Employ different methods for Separation and Transformation of Solid waste. **(K3)**
CO5: Organize different methods for processing and treatment of municipal solid waste . **(K3)**
CO6: Identify suitable disposal methods with respect to solid waste. **(K2)**

SYLLABUS

UNIT I

Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste – Factors Influencing generation of solid waste – sampling and characterization –Future changes in waste composition, major legislation, monitoring responsibilities.

UNIT II

Basic Elements In Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste Collection of Solid Waste: Types and methods of waste collection systems, analysis of collection system – optimization of collection routes.

UNIT III

Transfer and Transport: Need for transfer operation, compaction of solid waste – transport means and methods, transfer station types and design requirements.

UNIT IV

Separation and Transformation of Solid Waste: Unit operations used for separation and transformation: shredding – materials separation and recovery, source reduction and waste minimization.

UNIT V

Processing and Treatment: Processing of solid waste – Waste transformation through combustion and composting, anaerobic methods for materials recovery and treatment – Energy recovery – biogas generation and cleaning– Incinerators.

UNIT VI

Disposal of Solid Waste: Methods of Disposal, Landfills: Site selection, design and operation, drainage and leachate collection systems –designated waste landfill remediation.

Text Books:

1. George Tchobanoglous “Integrated Solid Waste Management”, McGraw Hill Publication, 1993
2. Gerard Kiely “ Environmental Engineering”, McGraw Hill Publication, 2007
3. J Glynn Henry,. Gary W.Heinke “Environmental Science and Engineering”, Prentice-Hall of India Pvt Ltd, 1996

References:

1. Vesilind, P.A., Worrell, W., Reinhart, D. “Solid Waste Engineering”, Cenage learning, New Delhi, 2004
2. Charles A. Wentz; “Hazardous Waste Management”, McGraw Hill Publication, 1995.
3. Mackenzie L Davis, David A.Cornwell :Introduction to Environmental Engineering” McGraw Hill Publication, 2017

VIII Sem	Water Quality And Conservation Systems (Civil Engineering)	Course Code: V18CEO06	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Describe the Engineering Hydrology and application	(K2)
CO2:	Assess the importance and necessity of water supply systems	(K3)
CO3:	Relate different sources of surface and ground water	(K3)
CO4:	Predict the quality of water in reference to IS and WHO standards	(K3)
CO5:	Design of plumbing and sanitary fittings	(K3)
CO6:	Employ different conservation techniques	(K3)

SYLLABUS

UNIT I

Introduction to Hydrology: Engineering hydrology, applications, Hydrologic cycle, evaporation, evapotranspiration, precipitation, run off, infiltration, hydrological data-sources

UNIT II

Sources of Water: Surface water, Lakes, Rivers, Reservoirs, comparison of sources with reference to quality, quantity and other considerations.

Groundwater, types of water bearing formations, springs, Wells and Infiltration galleries, Yields from infiltration galleries.

UNIT III

Importance and Necessity: Protected Water Supply systems, Flow chart of public water supply system, Water borne diseases. Estimation of water usages in different purpose.

UNIT IV

Quality and Analysis of Water: Characteristics of water–Physical, Chemical and Biological-Analysis of Water – Physical, Chemical and Biological characteristics. Comparison of sources with reference to quality- I.S. Drinking water quality standards and WHO guidelines for drinking water.

UNIT V

Plumbing Systems: Systems of plumbing-types of pipes and sanitary fittings and other accessories–one pipe and two pipe systems – Design parameters and factors.

UNIT VI

Water conservation: importance and necessity, objectives, systems-rainwater harvesting, recharge pits, watershed.

Text Books:

1. Environmental Engineering – Howard S. Peavy, Donald R. Rowe, George George Tchobanoglous – Mc-Graw-Hill Book Company, New Delhi, 1985
2. Elements of Environmental Engineering, K. N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

3. Water Supply and Sanitary Engineering – G. S. Birdie and J. S. Birdie

References:

1. Water Supply Engineering – P. N. Modi.
2. Water Supply Engineering – B. C. Punmia
3. Water Supply and Sanitary Engineering – G. S. Birdie and J. S. Birdie

VI Sem	Energy Audit & Conservation	Course Code: V18EEOE1	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Describe the concepts and procedures for Energy Audit.	(K2)
CO2:	Explain the necessity of Energy efficient lighting systems.	(K2)
CO3:	Discuss the role of Energy instruments in Energy Audit.	(K2)
CO4:	Describe the impact of harmonics on electrical systems.	(K2)
CO5:	Discuss various space heating methods.	(K2)
CO6:	Explain the necessary steps to take for energy conservation.	(K2)

UNIT-I: BASIC OF ENERGY AUDIT

Energy audit – Definitions – Concept – Types of audit-Preliminary audit -Main audit– Energy index – Cost index – Pie charts –Sankey diagrams – Load profiles — Numerical problems.

UNIT-II: LIGHTING

Definition of terms and units– Polar curve – Types of lamps - construction and working of- Incandescent lamp-Compact Florescent Lamp-sodium vapour lamp-Neon vapour lamp-LED - advantages and disadvantages – Types of lighting –Types of luminaries -- Replacement of existing lighting systems.

UNIT-III:ENERGY INSTRUMENTS

Energy Instruments – construction and working of -Watt-hour meter – Data loggers – Thermocouples – Pyrometers – Lux meters – Tong testers – Power analyzer-advantages and disadvantages

UNIT-IV:POWER FACTOR AND HARMONICS

Power factor – Methods of improvement – Location of capacitors – Power factor with non-linear loads – harmonics-Sources of harmonics- Effect of harmonics.

UNIT-V: HEAT VENTILATION AND AIR CONDITIONING (HVAC)

Introduction –Transfer of Heat–Space heating methods – Water heating systems -Ventilation – Air Conditioner-construction and working principle–Cooling load

UNIT-VI: ENERGY CONSERVATION AND ENERGY POLICY

Energy conservation schemes and energy saving potential-Energy conservation in Domestic Buildings- Energy conservation in commercial Buildings –comparison of Standard motors and Energy efficient motors–Energy policy-Energy Policy of an Industry(case study)

Text Books:

1. Energy management by W.R. Murphy & G. McKay Butter worth, Elsevier publications. 2012.
2. Electric Energy Utilization and Conservation by S C Tripathy, Tata McGraw hill publishing company Ltd. New Delhi, 1991.

Reference Books:

1. Hand Book of Energy Audit by Sonal Desai- Tata McGraw hill, 2015.
2. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd–2nd edition, 1995.

VI Sem	Electrical Measuring Instruments	Course Code: V18EEOE2	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1** choose right type of instrument for measurement of voltage and current for ac and dc. (K3)
- CO2** choose right type of instrument for measurement of power and energy – able to calibrate energy meter by suitable method. (K3)
- CO3** calibrate ammeter and potentiometer. (K3)
- CO4** select suitable bridge for measurement of electrical parameters. (K3)
- CO5** use the ballistic galvanometer and flux meter for magnetic measuring instruments . (K3)
- CO6** measure frequency and phase difference between signals using CRO. Able to use digital instruments in electrical measurements. (K4)

UNIT-I: MEASURING INSTRUMENTS

Classification – Deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type, dynamometer and electrostatic instruments – Expression for the deflecting torque and control torque – Errors and compensations– Extension of range using shunts and series resistance – Numerical problems.

UNIT –II: MEASUREMENT OF POWER AND ENERGY

Single phase and three phase dynamometer wattmeter – LPF and UPF – Expression for deflecting and control torques - Single phase induction type energy meter – Driving and braking torques – errors and compensations – Three phase induction type energy meter.

UNIT – III: POTENTIOMETERS

Principle and operation of D.C. Crompton’s potentiometer – Standardization – Measurement of unknown Resistance, Current and Voltage.AC Potentiometers: polar and coordinate types – Applications.

UNIT – IV: MEASUREMENTS OF PARAMETERS

Method of measuring low, medium and high resistance – Sensitivity of Wheat stone’s bridge – Kelvin’s double bridge for measuring low resistance– Megger– Measurement of earth resistance – Measurement of inductance and Quality Factor by Anderson’s bridge–Measurement of capacitance and loss angle by Schering Bridge.

UNIT – V: MAGNETIC MEASUREMENTS

Ballistic galvanometer – Equation of motion – Flux meter – Constructional details–Determination of B–H Loop methods of reversals six point method – AC testing – Iron loss of bar samples– Core loss measurements by bridges and potentiometers.

UNIT – VI: DIGITAL METERS

Digital Voltmeters: Successive approximation type – Measurement of phase difference and Frequency using lissajous patterns in CRO–Digital multimeter –Digital Tachometer.

TEXT BOOKS:

1. Electrical & Electronic Measurement & Instruments by A. K. Sawhney Dhanpat Rai & Co. Publications, 2013.
2. Modern Electronic Instrumentation and Measurement Techniques – A. D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.
3. Electrical Measurements and measuring Instruments – by E.W. Golding and F. C. Widdis, fifth Edition, Wheeler Publishing, 2011.

REFERENCE BOOKS:

1. Electrical and Electronic Measurements and instrumentation by R. K. Rajput, S. Chand, 2007.
2. Electrical Measurements – by Buckingham and Price, Prentice – Hall, 1988.
3. Electrical Measurements by Forest K. Harris. John Wiley and Sons, 1952.
4. Electrical Measurements: Fundamentals, Concepts, Applications – by Reissland, M.U, New Age International (P) Limited, Publishers, 1967.

VI Sem	Industrial Safety	Course Code: V18EEOE3	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- | | | |
|------------|--|-------------|
| CO1 | Understand the overview of industrial safety . | (K2) |
| CO2 | Understand the importance and role of industrial safety. | (K2) |
| CO3 | Understand the industrial safety training methods | (K2) |
| CO4 | Explain the role of management in industrial safety. | (K2) |
| CO5 | Choose proper design of electrical systems in order to control the Physical Hazards. | (K2) |
| CO6 | Describe the safety legalization. | (K2) |

UNIT-1: INTRODUCTION TO INDUSTRIAL SAFETY

Concept of Safety, Goals of safety engineering, Need for safety engineering, definitions of Accident, injury, unsafe actions & conditions. Responsibility of Safety - Society, Govt., Management, Duties of safety officer. Safety Committee -Membership, Functions & Scope of Safety committee.

UNIT -II: SAFETY AND HEALTH MANAGEMENT

Occupational Health Hazards, Promoting Safety, Safety and Health training, Stress and Safety. Ergonomics - Introduction, Definition, Objectives, Advantages. Ergonomics Hazards, Importance of Industrial safety, role of safety department.

UNIT -III : SAFETY AWARENESS & TRAINING

Training for Safety: Assessment of needs. Design & development of training programme. Training methods and strategies. Human behaviour and safety: Human factors contributing to accidents.

UNIT -IV : SAFETY ASSESSMENT AND CONTROL

Safety Management: Role of management in Industrial Safety. Safety Management- Principles & Practices. Safety Organization: Role of safety committee and its formation, Safety awareness programme: motivation, education and training, Appraisal of plant safety and measurement of safety performance, Total loss control concept, Introduction to productivity, Quality, Reliability, and Safety (PQRS) theory.

UNIT -V : INDUSTRIAL SAFETY AND CONTROL

Control of Physical Hazards: Purpose of lighting. Advantages of good illumination. Lighting and safety. Lighting and the work. Control of Chemical Hazards Hazardous properties of chemicals and appreciation of information provided in Material safety data sheets. Classification of dangerous materials with pictorial symbols, common hazard and common precautions for each class Control of Electrical Hazards Dangers from electricity. Safe limits of amperages, Voltages Safe distance from lines. Capacity and protection of conductors, Joints and connections, Means of cutting of power

overload and short circuit protection. Factors contributing towards fire. Chemistry of fire. Classification of fires. Common causes of industrial fires.

UNIT -VI : SAFETY LEGALISATION

Legal Provisions regarding safety, Accident prevention & Compensation to affected employees as under Factories Act-1948, Factories Act(Amendment)1987, The Workmen Compensation Act-1923, ESI Act, Public Liabilities Insurance Act-1991, Fatal Accident Act.

TEXT BOOKS

1. Industrial Safety, Health and Environment Management Systems by R.K.Jain and Sunil S.Rao, Khanna Publishers, New Delhi, 2006.
2. Safety Management by Grimaldi and Simonds, AITBS Publishers, New Delhi, 2001.
3. Industrial Safety -National Safety Council of India, 2000.

REFERENCE BOOKS

1. Loss of prevention in Process Industries , Vol. 1 and 2 by Frank P. Lees, Butterworth-Heinemann Ltd., London, 1991.
2. Handbook of Occupational Safety and Health by Slote.L, John Willey and Sons, New York,1987.

VII Sem	Non Conventional Energy Sources (Open Elective-II) Common to all except EEE	Course Code: V18EETOE4	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Understand the solar radiation and calculate geometric angle.	K3
CO2:	Understand the working of solar thermal collectors.	K2
CO3:	Understand the working of solar photo voltaic systems and develop the maximum power point techniques.	K3
CO4:	Understand the wind energy conversion systems, Betz coefficient and tip speed ratio.	K2
CO5:	Understand the basic principle and working of hydro and tidal systems.	K2
CO6:	Understand the basic principle and working of, biomass, fuel cell and geothermal systems.	K2

UNIT-I: FUNDAMENTALS OF SOLAR ENERGY AND ENERGY CONSERVATION PRINCIPLE

Energy scenario (world and India) – various forms of renewable energy - Solar radiation: Outside earth's atmosphere –Earth surface– Analysis of solar radiation data –Geometry–Radiation on tilted surfaces– Numerical problems.

UNIT-II: SOLAR THERMAL SYSTEMS

Liquid flat plate collectors: Performance analysis –Transmissivity– Absorptivity product collector efficiency factor –Collector heat removal factor – Numerical problems. Introduction to solar air heaters – Concentrating collectors, solar pond and solar still–solar thermal plants.

UNIT-III: SOLAR PHOTOVOLTAIC SYSTEMS

Solar photovoltaic cell, module, array – construction – Efficiency of solar cells – Developing technologies – Cell I-V characteristics – Equivalent circuit of solar cell – Series resistance – Shunt resistance – Applications and systems –Balance of system components - System design: storage sizing – PV system sizing – Maximum power point techniques: Perturb and observe(P&O)technique–Hill climbing technique.

UNIT-IV: WIND ENERGY

Sources of wind energy - Wind patterns – Types of turbines –Horizontal axis and vertical axis machines - Kinetic energyofwind–Betzcoefficient–Tip–speedratio–Efficiency–Poweroutputofwindturbine–Selection of generator(synchronous,induction) –Maximum power point tracking –wind farms–Power generation for utility grids.

UNIT-V: HYDRO AND TIDAL POWER SYSTEMS

Basic working principle – Classification of hydro systems: Large, small, micro–measurement of head and flow–Energy equation – Types of turbines – Numerical problems. Tidal power – Basics – Kinetic energy equation – Turbines for tidal power - Numerical problems – Wave power – Basics – Kinetic energy equation – Wave power devices – Linear generators.

UNIT-VI: BIOMASS AND GEOTHERMALSYSTEMS

Fuel classification – Pyrolysis – Direct combustion of heat– Different digesters and sizing. Geothermal: Classification – Dry rock and hot aquifer–Energy analysis–Geothermal based electric power generation

TEXT BOOKS:

1. Solar Energy: Principles of Thermal Collection and Storage, S.P. Sukhatme and J.K. Nayak, TMH, New Delhi, 3rd edition , 2013.

2. Renewable Energy Resources, John Twidell and Tony Weir, Taylor and Francis-2nd edition, 2013.

REFERENCE BOOKS:

1. Energy Science: Principles, Technologies and Impacts, John Andrews and Nick Jelly, Oxford University Press, 2nd edition, 2013.
2. Renewable Energy-Edited by Godfrey Boyle- oxford University. Press, 3rd edition, 2013.
3. Hand book of renewable technology Ahmed and Zobaa, Ramesh C Bansal, World scientific, Singapore, 1st edition, 2011.
4. Renewable Energy Technologies, Ramesh & Kumar, Narosa, 1st edition, 1997.
5. Renewable energy technologies– A practical guide for beginners –Chetong Singh Solanki, PHI, 1st edition, 2008.
6. Non-conventionalenergysource–B.H.khan-TMH-2nd edition, 2017.
7. <https://nptel.ac.in/courses/121/106/121106014/>.

VII Sem	Electrical Engineering Materials (Open Elective-II) Common to all except EEE	Course Code: V18EEOE5	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Familiarise the properties of different conducting materials and their applications.	K2
CO2: Analyse the properties of Insulating materials.	K2
CO3: Understand semi conducting and dielectric materials and their properties.	K2
CO4: Understand Magnetic materials and their properties.	K2
CO5: Comprehend the working function of Special purpose materials.	K2
CO6: Understand and analyse the working of Various Batteries.	K3

UNIT-I: CONDUCTING MATERIALS

Conducting Materials – Properties -Hardening, Annealing – Its effects- Low Resistive Materials – Requirements – Properties and applications of Copper and Aluminum - Comparison between Copper and Aluminum - ACSR Conductors, AAAC, - High Resistive Materials – Requirements-Properties and applications of Manganin, Eureka, Constantan, Nichrome, Tungsten, Mercury and Carbon-colour coding of resistor.

UNIT-II: INSULATING MATERIALS

Properties -Insulation resistance - Factors effecting Insulation resistance - Classification of Insulating materials - Properties & Applications i) Impregnated paper ii) Wood iii) Cardboard iv) Asbestos v)Mica vi)Ceramics and vii) Glass- Thermo Plastics, Thermo Setting resins – PVC- Effects on PVC- Properties and Applications of Insulating Gases(Air, Nitrogen, Hydrogen and Sulphur Hexa Fluoride).

UNIT- III: SEMICONDUCTING & DIELECTRIC MATERIALS

Semiconductors - Intrinsic and Extrinsic semiconductors- 'P' and 'N' type materials- Distinguish between P-type and N- type Semi-Conductors. Permittivity of different Di-electric materials-Polarization-Dielectric Loss– Applications of Dielectrics- Colour coding of capacitors.

UNIT-IV: MAGNETIC MATERIALS

Classification of magnetic materials - Soft & Hard magnetic materials- B-H Curves – Hysteresis loop - Hysteresis loss - Steinmetz constant - Eddy Current Loss -- Curie Point – Magneto striction.

UNIT-V: SPECIAL PURPOSE MATERIALS

Need of Protective materials – List of Special Purpose Materials (Lead, Paints, Steel Tapes) - Thermocouple - Bi-metals- Fabrication -Soldering- Fuses -Galvanizing and Impregnating-Importance of Nano Materials.

UNIT-VI: BATTERIES

Primary cell and Secondary cells-Lead-Acid, Nickel iron and Nickel - cadmium -Chemical reactions during charging and discharging– Charging of Batteries- Constant Current method and Constant Voltage method-Trickle charging- Capacity of Battery - Ampere-Hour efficiency and Watt-Hour efficiency- Numerical problems on Ampere-Hour efficiency and Watt-Hour efficiency - Maintenance free batteries

TEXT BOOKS:

1. Electrical Engineering Materials – N.I.T.T.T.R Publications, 1st edition, 1959.
2. Introduction to Engineering materials – B. K. Agarwal, 1st edition, 2006.
3. Electrical Engineering Materials by PL Kapoor, Khanna Publishers, New Delhi, 1st edition, 1988.
4. Electrical & Electronics Engineering Materials BR Sharma and Others, Satya Parkashan, New Delhi, 1st edition, 2013.

REFERENCE BOOKS

1. Electronic Components -Dr. K. Padmanabham, laxmi publications (p) Ltd, 1st edition, 2016.
2. Electronic Components -D. V. Prasad
3. Material science for Electrical and Electronic Engineers – Ian P. Jones, Oxford Publications, 1st edition, 2000.
4. Electrical and Electronic Engineering Materials by SK Bhattacharya, Khanna Publishers, New Delhi Electronic Components and Materials by Grover and Jamwal, Dhanpat Rai and Co., New Delhi, 1st edition, 1996.
5. Electrical Engineering Materials by Sahdev, Unique International Publications
6. Electronic Components and Materials by SM Dhir, Tata McGraw Hill, New Delhi, 1st edition, 2006.
7. Electronic Engineering Materials by ML Gupta, Dhanpat Rai & Sons, New Delhi

VII Sem	Servicing of Electrical Appliances (Open Elective-II) Common to all except EEE	Course Code: V18EEOE6	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1	Understand Testing of Electrical Domestic Appliances.	K2
CO2	Understand maintenance of U.P.S and SMPS.	K2
CO3	Understand Maintenance of Electrical Power devices.	K2
CO4	Understand Safety procedure.	K2
CO5	Understand Departmental Tests.	K2
CO6	Understand Rural electrification and Indian Electricity Act.	K2

UNIT-I: TESTING OF ELECTRICAL DOMESTIC APPLIANCES

Tools & meters required for testing and repair of Domestic appliances-Principle, construction & working with fault finding, dismantling, assembling and testing after repair of the Domestic appliances.

Note: Suitable tests to be conducted on the above Electrical Domestic appliances are Open circuit, Short circuit, Earth fault and Leakage tests.

UNIT-II: U.P.S AND SMPS

Commercial power supply-Disturbances and Spikes in voltages-UPS-SMPS

UNIT- III: MAINTENANCE OF ELECTRICAL POWER DEVICES

Preventive and periodical maintenance schedule of the following electrical power devices. i.e Batteries (Dry / Wet), UPS / Inverters, DC & AC Motors, Motor starters (AC & DC), Air conditioners, Power transformers, Pole mounted & Plinth mounted transformer yards, Circuit breakers.

UNIT-IV: SAFETY

Need of safety - Equipment used in Electrical and general safety - Different types of Electrical hazards / accidents - Causes of different Electrical hazards / accidents - Methods to avoid Electrical hazards / accidents - First-Aid methods followed to rescue a person met with Electric shock - Do's & Don't's of Electrical supervisor at Electrical substations - Different fire extinguishers- operation and application of different fire extinguishers.

UNIT-V: DEPARTMENTAL TESTS

Electrical installation testing - departmental procedure for testing before giving service connection – departmental procedure for obtaining service connection - desirable insulation resistance for domestic and power circuits – Tests for measuring insulation resistance - procedure for conducting insulation resistance test and continuity tests, earth continuity test

UNIT-VI: RURAL ELECTRIFICATION AND INDIAN ELECTRICITY ACTS.

Design of rural electrification scheme - Load survey-determination of capacity of transformer - estimation of quantity of materials required for the erection of distribution lines and 11 kV feeder from a nearby 11 kV feeder - determining the economic feasibility of the scheme as per the procedure laid out in NEC, - Indian Electricity Act-2003 rules related to domestic and Industrial lighting- power, agricultural and earthing installations, erection of 11 kV, 400 Volt

TEXT BOOKS:

1. Operation & Maintenance of Electrical Machines Vol – I by B.V.S. Rao - Media Promoters & Publisher, 1963.
2. Operation & Maintenance of Electrical Machines Vol – II by B.V.S. Rao - Media Promoters & Publisher, 1967.
3. Study of Electrical Appliances and devices by K. B. Bhatia, Khanna Publishers, New Delhi, 1st edition, 1988.

REFERENCE BOOKS:

1. Preventive Maintenance by C.J. Hubert, zs
2. Testing, Commissioning Operation & Maintenance of Electrical equipment by S. Rao
3. Indian Electricity Act-2003
4. APERC regulation Act (www.aperc.gov.in)
5. Electrical Installation design and drawing by CR Dargar -New Asian publishers

VIII Sem	Energy Storage Systems (Open Elective-III) Common to all except EEE	Course Code: V18EEOE7	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Identify the Factors for the Need of Energy Storage.	K2
CO2: Classify various types of energy Storages.	K2
CO3: Describe the performance factors of Energy Storage Systems.	K2
CO4: Describe charging patterns in Battery Storage Systems.	K2
CO5: Identify Various Types of Fuel Cells.	K2
CO6: Identify various applications of Electrical Storage.	K2

UNIT – I: NEED FOR ENERGY STORAGE

Electricity and the roles of EES, High generation cost during peak-demand periods, Long distance between generation and consumption-Variations in Energy Demand Variations in Energy Supply - Interruptions in Energy Supply - Transmission Congestion - Demand for Portable Energy

UNIT-II: TYPES OF ENERGY STORAGE SYSTEMS

Potential energy -pumped hydro, compressed air, springs - Kinetic energy -mechanical flywheels - Thermal energy with phase change-ice, molten salts, steam - Chemical energy-hydrogen, methane, gasoline, coal, oil - Electrochemical energy-batteries, fuel cells, Electrostatic energy -capacitors, Electromagnetic energy-superconducting magnets.

UNIT-III: PERFORMANCE FACTORS OF ENERGY STORAGE SYSTEMS

Energy capture rate and efficiency - Discharge rate and efficiency - Dispatch ability and load flowing characteristics, scale flexibility, durability – Cycle lifetime, mass and safety – Risks of fire, explosion, toxicity - Ease of materials, recycling and recovery -Environmental consideration and recycling

UNIT-IV: BATTERY STORAGE SYSTEM

Introduction with focus on Lead Acid and Lithium - Chemistry of Battery Operation, Power storage calculations, Reversible reactions, Charging patterns, Battery Management system.

UNIT-V: FUEL CELL

Fuel Cell-Construction-Working Principle-Types of Fuel Cells-Polymer electrolyte membrane Fuel Cell-Alkaline Fuel Cell-Solid oxide Fuel Cell-Merits and Demerits

UNIT – VI: APPLICATIONS OF ELECTRICAL ENERGY STORAGE

Waste heat recovery-Solar energy storage- Power plant applications-Energy storage in automotive applications

TEXT BOOKS:

1. Doughty Liaw, Narayan and Srinivasan, "Batteries for Renewable Energy Storage".
2. The Electrochemical Society, Jiu-Jun Zhang, Lei Zhang, Hansan Liu, Andy Sun, Ru-Shi Liu, "Electrochemical Technologies for Energy Storage and Conversion", John Wiley and Sons, 2012. Chemical Society, New Jersey, 2010.
3. Detlef Stolten, "Hydrogen and Fuel Cells: Fundamentals, Technologies and Applications ", Wiley, 2010.

REFERENCE BOOKS:

1. The Electrical Energy Storage by IEC Market Strategy Board.
2. "James M. Eyer, Joseph J. Iannucci and Garth P. Corey ", "Energy Storage Benefits and Market Analysis", Sandia National Laboratories, 2004.
3. <https://nptel.ac.in/content/storage2/courses/108103009/download/M9.pdf>

VIII Sem	Basics of Electrical Power Generation (Open Elective-III) Common to all except EEE	Course Code: V18EETOES	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1	Understand the various energy sources, substations and switchgear devices.	K2
CO2	Understand the principle of operation of different components of thermal power stations.	K2
CO3	Understand the principle of different components of a Nuclear power stations.	K2
CO4	Understand the principle of operation of different components of hydro power stations.	K2
CO5	Understand the working of solar photo voltaic systems and applications.	K3
CO6	Understand the wind energy conversion systems, efficiency and power generation.	K2

UNIT-I: FUNDAMENTALS OF ELECTRICAL POWER SYSTEM

Energy scenario (world and India) – various Conventional and non-conventional energy sources– structure of electric power system: generation, transmission, distribution- classification of substations- switchgear devices: switches, fuses, relay, MCB.

UNIT-II: THERMAL POWER STATIONS

Schematic arrangement- Selection of site- general layout of a thermal power plant showing paths of coal, steam, water, air, ash handling system: generation, transmission, distribution and flue gasses, ash handling system- Brief description of components: Boilers, Super heaters, Economizers, electrostatic precipitators Condensers, feed water circuit, Cooling towers and Chimney.

UNIT-III: NUCLEAR POWER STATIONS

Location of nuclear power plant, Working principle, Nuclear fission, Nuclear fuels, Nuclear chain reaction, nuclear reactor Components: Moderators, Control rods, Reflectors and Coolants. Types of Nuclear reactors, Radiation: Radiation hazards and Shielding, nuclear waste disposal.

UNIT-IV: HYDRO POWER STATIONS

Schematic arrangement, advantages and disadvantages, choice of site constituents of hydro power plant, Hydro turbine. Environmental aspects for selecting the sites and locations of hydro power stations.

UNIT-V: SOLAR POWER PLANT

Solar photovoltaic cell, module, array – construction of power plant– Efficiency of solar cells – Cell I-V characteristics – Equivalent circuit of solar cell – Series resistance – Shunt resistance – Applications and systems - System design: storage sizing – PV system sizing.

UNIT-VI: WIND POWER PLANT

Sources of wind energy - Wind patterns – Types of turbines –Horizontal axis and vertical axis machines - construction of power plant –Efficiency–Poweroutputofwindturbine– Selectionofgenerator(synchronous,induction) –Power generation for utility grids.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M. L. Soni, P. V. Gupta, U. S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co. Pvt. Ltd.- 2nd edition, 2013.
2. Renewable Energy Resources, John Twidell and Tony Weir, Taylor and Francis-2nd edition, 2013.

REFERENCE BOOKS:

1. Elements of Electrical Power Station Design by – M V Deshpande, PHI, New Delhi- 3rd edition, 2010.
2. Renewable Energy – Edited by Godfrey Boyle – oxford university Press, 3rd edition, 2013.
3. Electrical Power Systems by C. L. Wadhwa, 6th Edition, New Age International Publishers, 2018.
4. Non-conventional energy source – B.H.khan-TMH-2nd edition, 2017.
5. [https://nptel.ac.in/content/storage2/courses/108105053/pdf/L-02\(TB\)\(ET\)%20\(\(EE\)NPTEL\).pdf](https://nptel.ac.in/content/storage2/courses/108105053/pdf/L-02(TB)(ET)%20((EE)NPTEL).pdf)

VIII Sem	Industrial Automation (Open Elective-III) Common to all except EEE	Course Code: V18EEOE9	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Understand the basic concepts of control systems.	K3
CO2: Understand the concepts of industrial automation and components of control system.	K3
CO3: Illustrate the concepts of electrical actuators and controllers.	K3
CO4: Analyse the Control Procedures in Control systems	K4
CO5: Analyse the Process control	K4
CO6: Understand the concept of PLC and its application	K3

UNIT-I: BASIC CONCEPTS OF CONTROL SYSTEMS

Basic concepts-Definition of open loop and closed loop system, examples with block diagrams. Terms used in the control systems-Types of feedback-Transfer function Definition & derivation control systems- Equivalence of physical system components

UNIT-II: INTRODUCTION TO INDUSTRIAL AUTOMATION

Need of Automation and its requirements, Structure & components Industrial Automation systems, Architectural levels of Industrial controls. Components of control systems-Contact types-Normally open & Normally closed, Solenoids-AC/DC, Input devices Push button, Selector switch, Photo electric, Level Control, Pressure sensing device, Output devices- contactors, valves, Pilot lamps, Relays-Electromagnetic and Reed Relay

UNIT- III: ELECTRICAL ACTUATORS AND CONTROLLERS

Potentiometers –working principle, AC & DC Servomotors-working principle, working of Synchro's - transmitter, control transformer, concept and purpose of a Tacho –generator

UNIT-IV: CONTROL PROCEDURES IN CONTROL SYSTEMS

Types of control systems-Time Variant/ Invariant systems, Continuous data and sampled data system, Linear and Non-Linear control system, Digital Control system Concept of controllers- P Controller, I Controller, PI Controller, PD Controller, PID Controller

UNIT-V: PROCESS CONTROL

Introduction to process control, PID control, controller tuning, implementation of PID controllers, speed control structures- feed forward and ratio control, predictive control, cascade, override and split range control.

UNIT-VI: PLC AND ITS APPLICATIONS

PLC Definition-advantages-Block diagram-Ladder diagrams for AND, OR, NOT, NAND, NOR-Instruction set-Ladder diagram for DOL starter, Star-Delta Starter, Stair case lighting, Traffic light control, Temperature controller-Special control systems DCS, SCADA.

TEXT BOOKS:

1. I J Nagarath & Gopal- Control Systems Engineering, New Age International Publishers, 6th edition, 2017.
2. Webb J.W-Programmable controllers: Principle and Applications, PHI publishers, 5th edition, 2002.
3. B.C. Kuo – Automatic Control Systems –John Wiley and Sons, 9th edition, 2014.

REFERENCE BOOKS:

1. Gary Dunning- Introduction to PLC - Delmar Cengage learning publisher, 3rd edition, 2005.
2. Jon Sterenson-Industrial automation and process control, Pearson publisher, 1st edition, 2002.
3. Ogata-Modern Control Engineering, Pearson publisher, 5th edition,2009.
4. <https://nptel.ac.in/noc/courses/noc16/SEM1/noc16-ee02/>

V18MEOE1	BASIC MECHANICAL ENGINEERING (OPEN ELECTIVE-I)	L	T	P	C
		3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Understand classification and working of major components in thermal power plants.	K2
CO2: Discuss various metal joining processes	K2
CO3: Classify types of air compressors and refrigeration systems.	K2
CO4: Illustrate the working of internal combustion engines	K2
CO5: Understand basics of heat transfer	K2
CO6: Discuss about functions and operations of machine tools including milling, shaping, grinding and lathe machines	K2

UNIT-I

Steam boilers: Definition, Classification of boilers, essentialities of boilers, working of boilers, boiler mountings and accessories.

UNIT-II

Metal casting- Pattern design, types of sands, moulding tools and mould making.
Metal joining: Arc welding, gas welding, brazing and soldering.
Sheet metal operations: Rolling and extrusion principles.

UNIT-III

Reciprocating and rotary air compressors: uses of compressed air, types, working principle, work done, simple problems. Refrigeration: concepts, principle of refrigeration and types of refrigeration.

UNIT-IV

Internal combustion engines: Classification of IC engines, basic engine components and nomenclature, working principle of engines- Four stroke and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, problems on indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT-V

Heat Transfer: Modes and governing laws of heat transfer, Thermal Resistance Concept, Composite Walls, Cylinders, Overall Heat Transfer Co-efficient, simple Problems on Heat Transfer.

UNIT-VI

Machine Tools and Machining Processes: Lathe Machine, types, Lathe Operations, Milling Machine-Types, Milling Operations, Drilling Machine, types, Operations, Grinding Machine, types, Operations.

TEXT BOOKS:

1. Elements of Mechanical Engineering – M. L. Mathur, F. S. Mehta and R. P. Tiwari, Jain Brothers, New Delhi.
2. Engineering Heat Transfer - Gupta & Prakash, Nem Chand & Brothers, New Delhi.
3. Workshop Technology (Vol. 1 and 2) – B. S. Raghuvanshi, Dhanpath Rai and Sons, New Delhi.
4. Mechanical Engineering Science K R Gopala Krishna, Subhas publications

REFERENCE BOOKS:

1. Thermal Engineering, Ballaney, P.L., Khanna Publishers, 2003
2. Elements of Mechanical Engineering, A.R. Asrani, S.M. Bhatt and P.K. Shah, B.S. Pubs.
3. Production Technology by P.N. Rao by I & II McGraw-Hill publications

V18MEOE2	GREEN ENGINEERING SYSTEMS (OPEN ELECTIVE-I)	L	T	P	C
		3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Understand about solar radiation and its collection	K2
CO2: Discuss about various solar energy storage systems and applications.	K2
CO3: Explain about bio-mass, geothermal energy and ocean energy	K2
CO4: Classify the energy efficient systems.	K2
CO5: Describe different energy efficient processes.	K2
CO6: Discuss about features of green buildings	K2

UNIT-I

INTRODUCTION: SOLAR RADIATION: Role and potential of new and renewable sources, Environmental impact of solar power, structure of the sun, the solar constant, instruments for measuring solar radiation. Photo voltaic energy conversion – types of PV cells.

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, advanced collectors.

UNIT – II

SOLAR ENERGY STORAGE AND APPLICATIONS: Sensible, latent heat, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

WIND ENERGY: Sources, basic principle of wind energy conversion, basic components, horizontal and vertical axis windmills.

UNIT – III

BIO-MASS: Principles of bio-conversion, types of bio-gas plants, bio fuels.

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy.

OCEAN ENERGY: OTEC, Principles of utilization, OTEC plants.

Tidal and wave energy: Tidal power plants, hydel power plants.

UNIT-IV

ENERGY EFFICIENT SYSTEMS:

(A) **ELECTRICAL SYSTEMS:** Energy efficient motors, energy efficient lighting and control, selection of luminaire, controls for HVAC (heating, ventilation and air conditioning), demand site management.

(B) **MECHANICAL SYSTEMS:** Fuel cells- principle, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

ENERGY EFFICIENT PROCESSES: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, vegetable based cutting fluids, zero waste manufacturing.

UNIT – VI

GREEN BUILDINGS: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Solar Energy – Principles of Thermal Collection and Storage, Sukhatme S.P. and J.K.Nayak, TMH.
2. Non-Conventional Energy Resources, Khan B.H., Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai / Wiley Eastern.
4. Renewable Energy Technologies / Ramesh & Kumar / Narosa
5. Renewable Energy Technologies / G.D Roy

V18MEOE3	INTRODUCTION TO ROBOTICS (OPEN ELECTIVE-I)	L	T	P	C
		3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Explain various automations and components.	K2
CO2: Discuss the anatomy of the robot with its components	K2
CO3: Illustrate robot configurations	K3
CO4: compute trajectory planning system	K3
CO5: Discuss various robot actuation and feedback sensors	K2
CO6: Explain different robot applications in industrial purpose	K2

UNIT-I

INTRODUCTION: Automation principle and objectives, Reasons for automation, steps in automation strategy, drawbacks of conventional Manufacturing, elements of automation system, input/output devices for discrete data, application of automation.

UNIT – II

ROBOTICS: Definition of Robot, History of robotics, Robotics market and the future prospects, Robot Anatomy, Robot motions, Joints, Work volume, work space, Robot drive systems.

UNIT – III

Robot configurations: Polar, Cartesian, cylindrical and Jointed-arm configuration. Precision of movement – Spatial resolution, Accuracy, Repeatability, End effectors – Tools and grippers, Degrees of freedom – Asimov's laws of robotics dynamic stabilization of robots.

UNIT IV

TRAJECTORY: Introduction to trajectory, path description and generation. Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion –straight line motion.

UNIT –V

Robot actuation and feedback components
Position sensors – Potentiometers, resolvers, encoders, velocity sensors. Proximity and tactile sensor in robotics. Actuators - Pneumatic and Hydraulic Actuators, Electric Motors, Stepper motors, Servomotors, Power Transmission systems.

UNIT –VI

Robots Technology of the future: Artificial Intelligence, Goals of AI research, Telepresence and related technologies, Mechanical design features, Mobility, locomotion and navigation, system integration and networking.

TEXT BOOKS:

1. Automation, Production systems, and computer integrated manufacturing-MikellP.Groover 3rd edition, Pearson 2009
2. Industrial Robotics-Groover, Weiss, Nagel, McGraw Hill International, 2nd edition, 2012

REFERENCES:

1. Robotics / Fu K S/ McGraw Hill.
2. Robotic Engineering / Richard D. Klafter, Prentice Hall.
3. Robot Analysis and Intelligence / Asada and Slow time / Wiley InterScience.

VII Sem	Computer Aided Design (Open Elective-II) Mechanical Engineering	Course Code: V18MEOE4	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Explain the basic fundamentals of CAD tools	K2
CO2: Find the characteristics of curves, Representation and continuity requirements	K3
CO3: Illustrate the Geometric Transformations.	K3
CO4: Demonstrate various types of surfaces and Representation.	K3
CO5: Differentiate between the methods of representing Solid Modelling.	K4
CO6: Apply the local and global properties for product development	K3

UNIT – I

CAD Introduction: Need of machine design, use of computer, computer fundamentals, computer aided design process, CAD configuration, and CAD tools, positive and negative points of CAD, CAD and CAM integration.

UNIT – II

DESIGN OF CURVES: Fundamental of Curve Design, Parametric Space of a Curve, Representation, Parametric cubic curve, Blending functions, Truncation, extension, and subdivision, composite curve: continuity requirements .

UNIT – III

GEOMETRIC TRANSFORMATIONS: Translation, Rotation, Scaling Symmetry and Reflection, Homogeneous Transformations. Orthographic Projections, Axonometric Projections, Oblique Projections, Perspective Transformation.

UNIT – IV

DESIGN OF SURFACES: Fundamental of Surface Design, Parametric Space of a Surface, Representation of a Surface patch, sixteen point form, Four Curve Form, Plane.

UNIT – V

SOLID MODELLING: Solid Modelling fundamentals, topology and geometry. Geometric Modelling Method, Constructive Solid Geometry (CSG), Boundary Representation (Brep), Introduction to Wireframe, surface and solid modelling techniques. Introduction CAD data exchange format IGES, STEP

UNIT – VI

GEOMETRIC PROPERTIES: Local and global properties of a curve, Local and global properties of a surface, Global properties of complex solids, Relational properties, intersections. Applications in Product Development and other areas.

REFERENCE BOOKS:

1. Geometric Modeling: Michael E. Mortenson, Third Edition, Industrial Press Inc.2006.
2. Mathematical Elements of Computer Graphics, Rogers and Adams, McGraw Hill. 1994
3. CAD CAM Theory and Practice: I. Zeid, Tata-McGraw Hill, 2006
4. Computer-Aided Engineering Design, B Sahay and ASaxena, Springer, 2005.
5. Differential Geometry of Curves and Surfaces, Thomas F. Banchoff and Stephen T. Lovett, Thomas Banchoff-Stephen Lovett, 2010.
6. Computational Geometry for Design and Manufacture, I.D. Faux and M.J. Pratt, John Wiley, 1980.
7. Lectures on Classical Differential Geometry, Dirk J. Struick, Addison Wesley, 1980.

VII Sem	Condition Monitoring and Machine Learning (Open Elective – II) Mechanical Engineering	Course Code: V18MEOE5	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Understand various condition monitoring techniques	K2
CO2:	Demonstrate the construction and principle of working of sensors for condition monitoring.	K3
CO3:	Interpret the concepts of signal processing analysis	K3
CO4:	Assess various failure analysis and maintenance.	K3
CO5:	Examine the elements of Machine condition monitoring	K3
CO6:	Examine the concepts of machine learning systems for signal analysis and fault detection systems	K3

UNIT – I

CONDITION MONITORING TECHNIQUES: Introduction, Condition Monitoring in manufacturing industries; Noise monitoring, Wear and debris Analysis, Thermography, Cracks monitoring, Ultrasonic techniques - Case studies.

UNIT – II

SENSORS FOR CONDITION MONITORING: Accelerometers, strain gauges, eddy current probes, LVDT for measurement of displacement, velocity and acceleration; Temperature transducers, radiation pyrometers and thermal imaging devices.

UNIT – III

SIGNAL PROCESSING: Study of periodic and random signals, probability distribution, statistical properties, auto and cross correlation and power spectral density functions.

SIGNAL ANALYSIS: Time domain and Frequency domain and Time-frequency domain analysis

UNIT – IV

FAILURE ANALYSIS AND MAINTENANCE: Maintenance Principles, Failure mode analysis - Equipment down time analysis – Breakdown analysis - condition based maintenance.

UNIT – V

MACHINE CONDITION MONITORING: Vibration, Acoustic emission and vibro-acoustics signal analysis; intelligent fault detection system, Case studies.

UNIT – VI

MACHINE LEARNING: Vibration, Acoustic emission and vibro-acoustics signal analysis; intelligent fault detection system, Case studies.

TEXT BOOKS:

1. EthemAlpaydin, Introduction to Machine Learning (2010), The MIT Press, Cambridge, London.

REFERENCE BOOKS:

1. K. P. Soman, Data mining theory and practice (2006), Prentice-Hall of India.
2. Amiya RanjanMohanty, Machinery Condition Monitoring: Principles and Practices (2015), CRC Press
3. Mishra, R.C., Pathak, K., Maintenance Engineering and Management (2012), Prentice Hall of India.
4. Clarence W. De Silva, Sensors and Actuators: Control System Instrumentation (2007), CRC Press – Taylor and Francis Group.
5. Boualem Boashash, Time Frequency Signal Analysis and Processing: A Comprehensive Reference (2015), Elsevier.

VIII Sem	Power Plant Engineering Open Elective – III Mechanical Engineering	Course Code: V18MEOE6	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Explain the working and layout of steam power plant and the different systems comprising the plant. **K2**
- CO2:** Outline the working principle of diesel power plant and its layout. **K2**
- CO3:** Illustrate the working and layout of gas turbine power plant and various auxiliaries comprising the plant. **K3**
- CO4:** Construct the working principle and basic components of the hydro electric plants. **K3**
- CO5:** Describe the and basic components and working principle of different reactors of nuclear power plant. **K2**
- CO6:** Outline the power plant economics . **K4**

UNIT – I

Introduction to the Sources of Energy.

Steam Power Plant: Plant layout, working of different circuits, coal handling equipment, ash handling systems, overfeed and underfeed fuel beds, types of stokers, dust collectors, cooling towers and feed water treatment.

UNIT – II

Diesel power Plant: IC Engines, types, Plant layout with auxiliaries – fuel supply system, air starting equipment, lubrication and cooling system, super charging.

UNIT – III

Gas Turbine Plant: Introduction, classification, construction, Layout with auxiliaries, Principles of working of closed and open cycle gas turbines, combined cycle power plants and comparison.

UNIT – IV

Hydro Electric Power Plant: Water power , hydrological cycle, hydrographs, classification of dams and spill ways.

Hydro Projects and Plant: Classification – typical layouts – plant auxiliaries – plant operation pumped storage plants.

UNIT – V

Nuclear Power Station: Nuclear fuel – breeding and fertile materials, nuclear reactor – reactor operation. Types of reactors and their operation - Pressurized water reactor, boiling water reactor, sodium-graphite reactor, fast breeder reactor. Radiation hazards and shielding, radioactive waste disposal.

UNIT – VI

Power Plant Economics: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, load curves, load duration curve, definitions of connected load, maximum demand, demand factor, average load, load factor, diversity factor – related exercises.

TEXT BOOKS:

1. A course in Power Plant Engineering /Arora and Domkundwar/Dhanpatrai& Co.
2. Power Plant Engineering /P.C.Sharma / S.K.Kataria Pub

REFERENCE BOOKS:

1. Power Plant Engineering: P.K.Nag/ TMH.
2. Power station Engineering – M.M.Ei-Wakil / McGrawHill.

VIII Sem	Mechatronics Open Elective – III Mechanical Engineering	Course Code: V18MEOE7	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1 :** Understand the elements of Mechatronics & levels and explain various types of sensors , transducers and Mechatronics design process. **K2**
- CO2:** Sketch and explain various types of solid state devices like Diode, BJT, MOSFET, etc., **K3**
- CO3:** Illustrate and explain basic principles of Hydraulic, pneumatic, electro hydraulic, electro hydraulic servo actuating systems. **K3**
- CO4:** Illustrate and explain microprocessors, microcontrollers and PLC **K3**
- CO5:** Sketch and explain System interfacing and data acquisition systems. **K3**
- CO6:** Sketch and explain Digital Controllers and Design of mechatronics systems. **K3**

UNIT – I

MECHATRONICS SYSTEMS – elements & levels of mechatronics system, Mechatronics design process, system, measurement systems, control systems, advantages and disadvantages of mechatronics systems. Sensors and transducers, types, displacement, velocity, force, acceleration, liquid flow, liquid level, temperature and light sensors.

UNIT– II

SOLID STATE ELECTRONIC DEVICES - PN junction diode, BJT, FET, Analog signal conditioning, operational amplifiers, filters.

UNIT– III

HYDRAULIC AND PNEUMATIC ACTUATING SYSTEMS - Fluid systems, Hydraulic systems, and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems.

UNIT– IV

DIGITAL ELECTRONICS AND SYSTEMS - Digital logic control, micro processors and micro controllers, programming, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT– V

SYSTEM AND INTERFACING AND DATA ACQUISITION – Data Acquisition Systems, Analog to Digital and Digital to Analog conversions; Digital Signal Processing.

UNIT– VI

DYNAMIC MODELS AND ANALOGIES - System response. Process Controllers – Digital Controllers, Programmable Logic Controllers, Design of mechatronics systems & future trends.

TEXT BOOKS:

1. MECHATRONICS Integrated Mechanical Electronics Systems/KP Ramachandran, GK Vijaya Raghavan & MS Balasundaram/WILEY India Edition

REFERENCE BOOKS:

1. Mechatronics /Smaili A, Mrad F/ Oxford Higher Education, Oxford University Press
2. Mechatronics Source Book / Newton C Braga/Thomson Publications,Chennai.
3. Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.
4. Mechatronics System Design / Devdas shetty/Richard/Thomson.
5. Mechatronics/M.D.Singh/J.G.Joshi/PHI.
6. Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg. 4th Edition / W. Bolton/ Pearson, 2012
7. Mechatronics – Principles and Application / Godfrey C. Onwubolu/Elsevier, Indian print.

VI Sem.	Internet of Things Open Elective- I	Course Code: V18ECTO E1	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Describe M2M and IOT Technologies. (K2)
- CO 2:** Identify the layers and protocols in IOT. (K2)
- CO 3:** Describe various communication technologies used in IOT. (K2)
- CO 4:** Demonstrate various hardware components required for IOT applications. (K2)
- CO 5:** Identify the cloud technologies. (K2)
- CO6:** Explain the applications of IoT. (K2)

UNIT I – INTRODUCTION

Introduction from M2M to IoT - An Architectural Overview, building architecture, Main design principles and needed capabilities, An IoT architecture outline, M2M and IoT Technology Fundamentals - Devices and gateways

UNIT II – IOT PROTOCOLS

Functionality of Layers in IoT –Study of protocols - Wireless HART, Z-Wave, 6LoWPAN, RPL, CoAP, MQTT.

UNIT III - COMMUNICATION TECHNOLOGIES IN IOT

IoT Connectivity – IEEE 802.15.4, Wi-Fi, Bluetooth, Zigbee, LPWAN, 5G Era.

UNIT IV - SYSTEM HARDWARE

Sensors, Actuators, Radio Frequency Identification, Introduction to Embedded Devices for IoT - RASPBERRY PI.

UNIT V – Cloud Computing

Data Collection, Storage and Computing Using a Cloud Platform for IoT Applications/Services.

UNIT VI - IOT APPLICATIONS

Real time applications of IoT - Smart and Connected Cities, Public Safety, Irrigation.

TEXTBOOKS:

1. “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, by Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatios Karnouskos, David Boyle, Academic Press, 2014.
2. IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, Cisco Press 800 East 96th Street Indianapolis, Indiana 46240 USA.

REFERENCE BOOKS:

1. From Internet of Things to Smart Cities: Enabling Technologies - edited by Hongjian Sun, Chao Wang, Bashar I. Ahmad, CRC Press -2018.
2. "Architecting the Internet of Things" by Bernd Scholz-Reiter, Florian Michahelles, , ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer.
3. IOT (Internet of Things) Programming: A Simple and Fast Way of Learning IOT by David Etter.
4. "Internet of Things (A Hands-on- Approach)" by Vijay Madiseti and Arshdeep Bahga, 1 st Edition, VPT, 2014.
5. Internet of Things by Raj Kamal, McGraw-Hill Education. Copyright.

VI Sem.	Principles of Communication Systems (Open Elective- I)	Course Code: V18ECTO E2	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate the fundamentals of communication systems. (K2)
- CO2:** Compare the various analog modulation and demodulation schemes. (K2)
- CO3:** Compare the various digital modulation and demodulation schemes. (K2)
- CO4:** Explain the wireless communication system concepts. (K2)
- CO5:** Outline the satellite communication system principles. (K2)
- CO6:** Outline the Optical communication system principles. (K2)

Unit-I

Fundamentals of Communication systems: Block diagram of communication system; types of communications-analog and digital; Noise–types of noise, sources of noise, and calculation of noise in linear systems, and noise figure.

Unit-II

Fundamentals of Analog Communication: Need for modulation; Types of modulation, generation and detection of AM, Angle modulation: frequency & phase modulations, comparison of AM, FM & PM. Sampling theorem, Nyquist criteria, introduction to PAM, PWM and PPM.

Unit-III

Fundamentals of Digital Communication: Advantages; Working principle of PCM; comparison of PCM, DM; introduction to digital modulation techniques-ASK, FSK, PSK.

UNIT-IV:

Fundamentals of Wireless Communication : Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Concepts of 2G, 3G, 4G. Wireless Local Loop(WLL), Wireless Local Area network(WLAN), Bluetooth and Personal Area Networks. Introduction to 5G.

Unit-V

Fundamentals of Satellite communication: Brief history of Satellite systems; Principles, architecture, advantages, disadvantages, applications and frequency bands used for satellite communication.

UNIT VI:

Fundamentals of Optical Communication: Evolution of fiber optic system- Element of an Optical Fiber Transmission link and Reception link- Total internal reflection-Acceptance angle –Numerical aperture Optical Fiber Modes and Configurations - Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure.

Textbooks:

1. Principles of Communications by H. Taub and D. Schilling, TMH, 2003.
2. Wireless Networks: Applications and Protocols by T. S. Rappaport, Pearson Education
3. Satellite Communications by Timothy Pratt, Charles Bostian and Jeremy Allnut, WSE, Wiley Publications, 2nd Edition, 2003.
4. Optical Fiber Communication by John M. Senior (Pearson)

References:

1. Electronic Communication Systems by Kennedy and Davis, TMH, 4th edition, 2004.
2. Wireless Communication and Networks: 3G and Beyond by I. Saha Misra, TMH Education.
3. Satellite Communications: Design Principles by M. Richharia, B S publications, 2nd Edition, 2003.
4. Optical Fibre Communication by Gerd Kaiser (TMH)

VI Sem.	Introduction to VLSI Design (Open Elective- I)	Course Code: V18ECTO3	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Demonstrate the fundamentals of IC technology such as various MOS fabrication technologies. (K2)
- CO2:** Compute electrical properties of MOS circuits such as $I_{ds} - V_{ds}$ relationship, And MOS circuit parameters. (K3)
- CO3:** Develop stick diagrams, layouts using design rules of various MOS Technologies. (K3)
- CO4:** Compute the sheet resistance, area capacitance of various MOS layers And inverter delays. (K3)
- CO5:** Explain the various MOS circuit parameters scaling and assess the Effects of scaling. (K2)
- CO6:** Demonstrate VHDL synthesis, simulation, design capture tools design Verification tools. (K2)

UNIT –I Introduction

Introduction to IC technology – The IC era – MOS and related VLSI technology – Basic MOS transistors – Enhancement and depletion modes of transistor action – IC production process – MOS and CMOS fabrication process – BiCMOS technology – Comparison between CMOS and bipolar technologies.

UNIT – II

Basic electrical properties of MOS and BiCMOS circuits $I_{ds} - V_{ds}$ relationships – Aspects of MOS transistor threshold voltage – MOS Trans-conductance and output conductance – MOS Transistor – Figure of merit – The pMOS transistor – The nMOS inverter – Determination of pull-up to pull-down ratio for nMOS inverter driven by another nMOS inverter for an nMOS inverter driven through one or more pass Transistors – Alternative forms of pull up – The CMOS Inverter MOS transistor Circuit model – Bi-CMOS Inverters.

UNIT – III

MOS and BiCMOS circuit design process

MOS layers – Stick diagrams – Design rules and layout – General observation on the design rules, 2 μ m double metal, double poly – CMOS/BiCMOS rules, 1.2 μ m Double metal, Double poly CMOS rules – Layout diagrams of NAND and NOR gates and CMOS inverter – Symbolic Diagrams – Translation to MaskForm.

UNIT – IV

Basic circuit concepts

Sheet resistance – Sheet resistance concept applied to MOS transistor and inverters – Area capacitance of layers – Standard unit of capacitance – Some area capacitance calculations – The delay unit – Inverter delays – Driving large capacitive loads – Propagations Delays – Wiring Capacitance – Fan-in and Fan-out characteristics – Choice of layers – Transistor switches – Realization of gates using nMOS, pMOS and CMOS technologies.

UNIT – V**Scaling of MOS circuit**

Scaling models and scaling factors – Scaling factors for device parameters – Limitations of scaling – Limits due to sub threshold currents – Limits on logic level and supply voltage due to noise – Limits due to current density.

UNIT – VI :**VHDL MODELLING:**

Simulation – Logic Synthesis – Inside a logic synthesizer – Constraints – Technology libraries – VHDL and logic synthesis – Functional gate – Level verification – Place and route – Post layout timing simulation – Static timing
– Major net list formats for design representation – VHDL synthesis – Programming approach.

Text Books:

1. Essentials of VLSI Circuits and Systems by Kamran Eshraghian, Douglas and A.Pucknell and SholehEshraghian, Prentice–Hall of India Private Limited, 2005Edition.
2. VLSI Design by K. LalKishor and V.S.V.Prabhakar, I.K. International Publishing House Private Limited, 2009 First Edition.
3. VLSI Design by A.Shanthi and A.Kavitha, New Age International Private Limited, 2006 FirstEdition.

References Books:

1. VLSI Design By Debaprasad Das, Oxford University Press, 2010.
2. VLSI Design By A.Albert Raj & T. Latha, PHI Learning Private Limited, 2010.

VII Sem.	Principles of Wireless Comm. (Open Elective-II)	Course Code: V18ECTO E4	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Discuss the cellular system evolution of mobile radio systems. [K2]
CO2: Illustrate the basic cellular concepts. [K2]
CO3: Explain the Various Propagation models. [K2]
CO4: Discuss the need of modulation, diversity and equalization in cellular & Mobile Communication. [K2]
CO5: Demonstrate the knowledge about GSM architecture, multiple access schemes like FDMA, TDMA, CDMA. [K2]
CO6: Summarize the concepts of upcoming technologies like 3G, 4G etc. [K2]

UNIT-I: Introduction of Wireless Communication

History and evolution of mobile radio systems: Types of mobile wireless services/systems-Cellular, WLL, Paging, Satellite systems, Future trends in personal wireless systems.

UNIT-II: Cellular Concepts and System Design Fundamentals

Cellular concept and frequency reuse, channel assignment, handoff strategies, Interference and system capacity, Trunking and GOS, cell splitting, cell sectoring.

UNIT-III: Mobile radio Propagation Models

Radio wave propagation issues in personal wireless systems, Propagation models, Multipath fading, parameters of mobile multipath channels and Antenna systems in mobile radio.

UNIT-IV: Overview analog and digital modulation techniques

Need For Modulation. Different Analog and Digital modulation techniques used in Cellular and mobile communication systems.

UNIT-V DIGITAL CELLULAR NETWORKS: GSM architecture, GSM Services, multiple access schemes; FDMA, TDMA, CDMA, OFDMA;

UNIT-VI Higher Generation Cellular Standards: 3G System architecture (UMTS), 4G System Architecture, Introduction to 5G.

Text Books

1. Theodore S. Rappaport, "wireless communications Principles and Practices", PHI, 2005
2. Jochen Schiller, "Mobile Communications", Pearson Education, second edition, 2009.

Reference Book

1. Lee W.C.Y, "Mobile communication Engineering Theory and Applications", 2/e McGraw-Hill, New York, 2003
2. Andreas F. Molisch, "Wideband Wireless Digital Communication", Pearson Education 2001.

4. Blake, "Wireless Communication Technologies," Thomson Delmer, 2003

VII Sem.	Medical Electronics (Open Elective-II)	Course Code:V18ECTOES	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1:** Explain the basics concepts of Bio-Medical Instrumentation. [K2]
- CO2:** Explain the concepts of electrode theory, classification of Electrodes and Transducers used in Bio-Medical Applications. [K2]
- CO3:** Explain the Anatomy and Physiology of Cardiovascular system and Illustrate the application of Bio-Medical Instruments to measure the Physiological Parameters of Cardiovascular System. [K2]
- CO4:** Discuss the elements used for Patient's Health care & monitoring. [K2]
- CO5:** Explain the Principles of Diagnostic Techniques and the concepts of Bio-Telemetry. [K2]
- CO6:** Classify different types of monitors, discuss the principles of recorders and Illustrate the methods of accident preventions. [K2]

UNIT-I:

INTRODUCTION TO BIOMEDICAL INSTRUMENTATION: Age of Biomedical Engineering, Development of Biomedical Instrumentation, Man Instrumentation System, Components of the Man-InstrumentSystem, Physiological System of the Body, Problems Encountered in Measuring a Living System, Sources of Bioelectric Potentials, Muscle, Bioelectric Potentials, Sources of Bioelectric Potentials, Resting and Action Potentials, BioelectricPotentials-ECG,EEGandEMG,

UNIT-II:

ELECTRODES AND TRANSDUCERS: Introduction, Electrode Theory, Biopotential Electrodes, Examplesof Electrodes, Basic TransducerPrinciples, Active Transducers, Passive Transducers, Transducers for Biomedical Applications, Pulse Sensors, Respiration Sensor, Transducers with Digital Output.

UNIT-III:

CARDIOVASCULAR SYSTEM AND MEASUREMENTS: The Heart and Cardiovascular System, ElectroCardiography, Blood Pressure Measurement, Measurement of Blood Flow and Cardiac Output, Measurement ofHeartSounds, Plethysmography.

UNIT-IV:

PATIENTCAREANDMONITORING:Elements of Intensive-Care Monitoring, Patient Monitoring Displays, Diagnosis, Calibration and Repair ability of Patient-Monitoring Equipment, Other Instrumentation forMonitoring Patients, Organization of the Hospitalfor Patient-Care Monitoring, Pacemakers, Defibrillators.

UNIT-V:

DIAGNOSTIC TECHNIQUES AND BIO-TELEMETRY: Principles of Ultrasonic Measurement, UltrasonicImaging, Ultrasonic Applications of The rapeutic Uses, Ultrasonic Diagnosis, X-Ray and Radio-Isotope Instrumentations, CATScan, Emission Computerized To mography, MRI,IntroductiontoBiotelemetry,Physiological Parameters Adaptable to Biotelemetry, The Components of

Biotelemetry System, Implantable Units, Telemetry for ECG Measurements during Exercise, Telemetry for Emergency Patient Monitoring.

UNIT-VI:

MONITORS, RECORDERS AND SHOCK HAZARDS: Bio potential Amplifiers, Monitors, Recorders, Shock Hazards and Prevention, Physiological Effects and Electrical Current, Shock Hazards from Electrical Equipment, Methods of Accident Prevention.

TextBooks:

1. "Bio-Medical Electronics and Instrumentation", Onkar N. Pandey, Rakesh Kumar, Katson Books.
2. "Bio-Medical Instrumentation", Cromewell, Wiebell, Pfeiffer

References:

1. "Hand Book of Bio-Medical Instrumentation", Khandapur. McGrawHill
2. "Introduction to Bio-Medical Equipment Technology", 4th Edition, Joseph J. Carr, John M. Brown, Pearson Publications.

VII Sem.	Concepts of Embedded Systems (Open Elective-II)	Course Code:V18ECTO6	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

- CO1 Describe the Basic Concepts of embedded systems- (K2).
 CO2 Describe the characteristics of Embedded Systems - (K2)
 CO3 Explain the Architecture and Pin Description of 8051- (K2)
 CO4 Explain various Addressing Modes and Instructions of 8051- (K2)
 CO5 Discuss the various Interrupts , Modes of Timers/Counters in 8051- (K2)
 CO6 Discuss the fundamentals of RTOS based embedded firmware design -(K2)

UNIT-I - INTRODUCTION TO EMBEDDED SYSTEMS:

Introduction to Embedded Systems, Embedded Systems vs. General Computing Systems, Classification of Embedded systems, Major application areas of embedded systems, Purpose of embedded Systems, The Typical embedded system - core of the embedded system, Difference between RISC and CISC, Types of Memories.

UNIT-II - CHARACTERISTICS OF EMBEDDED SYSTEM:

Characteristics of an embedded system, Quality attributes of embedded systems, Application-specific and Domain-Specific examples of an embedded system.

UNIT-III-8051 Micro Controller – Architecture, Pin Description

Introduction, 8051 Architecture, Registers in 8051, Pin Diagram – Description, Parallel I/O Ports and Memory Organization

UNIT-IV - 8051 Micro Controller – Addressing Modes and Instructions:

8051 Addressing Modes, 8051 Instruction Set, Instructions and Sample Programs, Stack Pointer

UNIT-V - 8051 Micro Controller – Interrupts, Timer/ Counter:

Interrupts in 8051, Timers and Counters, Timer/ Counter Modes, Serial Communication – Modes

UNIT-VI- REAL TIME OPERATING SYSTEM:

Operating System basics, Types of operating systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling, Inter Task communication.

Text Books:

1. Embedded Systems-By Shibu. K.V-Tata McGraw Hill Education Private Limited,2013.
2. Micro Controllers [Theory and Applications] – Ajay V Deshmukh – Tata McGraw-Hill Education Private Limited,2012

References:

1. The 8051 Micro Controller- Kenneth Ayala – CENGAGE- 3rd Edition
2. Embedded/Real Time Systems by KVKK Prasad by Dreamtech Publication

VIII Sem.	Fundamentals of Digital Image & Video Processing (Open Elective-III)	Course Code:V18ECTOE7	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Analyse Image transforms for various Image processing operations (K4)

CO2: Examine Spatial & frequency domain filtering like smoothing & sharpening Operations on Images(K4)

CO3: Estimate Image degradation functions and Analyze various Image Restoration Techniques on Images (K4)

CO4: Analyze various Image segmentation techniques (K4)

CO5: Describe various Image compression techniques (K3)

CO6: Explain basic concepts regarding to motion estimation, video filtering and Video standards. (K2)

UNIT-I

IMAGE FUNDAMENTALS & TRANSFORMS: Fundamental steps in digital image processing, components of an image processing system, image sensing and acquisition, image sampling and quantization. Two dimensional orthogonal transforms: DFT, WHT, Haar transform, DCT and DST

UNIT-II

Intensity Transformations, Spatial Filtering and frequency domain filtering: Some basic intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters, sharpening spatial filters, Image smoothing and sharpening in frequency domain filtering

UNIT-III

IMAGE RESTORATION: Degradation Models, Linear Position –Invariant Degradations, Estimating the degradation function, inverse filtering, Minimum mean square error (Wiener) filtering and geometric mean filter.

UNIT-IV

IMAGE SEGMENTATION: Pixel classification, Bi-level Thresholding, Multi-level Thresholding, Adaptive Thresholding, Spectral & spatial classification, Edge detection, Hough transform, Region growing.

UNIT-V

IMAGE COMPRESSION: Compression models, Huffman Coding, Arithmetic coding, Bit plane coding, run length coding, Lossy compression: Transform coding, Image compression standards.

UNIT-VI

VIDEO PROCESSING: Representation of Digital Video, Spatio-temporal sampling, Motion Estimation. Video Filtering, Video Compression, Video coding standards.

Text Books:

1. R.C.Gonzalez, R.E.Woods, "DigitalImageProcessing", Pearson Education. 2ndedition, 2002
2. M.Tekalp, "DigitalVideoProcessing", Prentice-Hall, 1995

Reference Books:

1. AnilK.Jain, "Fundamentals of Digital Image Processing", Prentice Hall of India, 9th Edition, Indian Reprint, 2002.
2. B.Chanda, D.DuttaMajumder, "Digital Image Processing and Analysis", PHI, 2009.
3. Bovik, "Handbook of Image & Video Processing", Academic Press, 2000.
4. Khalid Sayood, Introduction to data compression, third edition, The Morgan Kaufmann publishers, 2005

VIII Sem.	Embedded RTOS (Open Elective-III)	Course Code:V18ECTOE8	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Describe the basics of Real time OS.	[K2]
CO2: Explain the tasks, Interrupts, Security.	[K2]
CO3: Describe the basics of μ COS-II RTOS.	[K2]
CO4: Describe the basics of μ COS-II RTOS.	[K2]
CO5: Illustrate the mechanism of target image creation and porting.	[K2]
CO6: Explain the Application of RTOS.	[K2]

UNIT-I: Introduction

OS Basics, Task, Process, Threads, Multiprocessing & Multitasking, Process Management, Timer Functions, Event Functions, Memory Management, Device, File and IO Systems Management, Interrupt Routines in RTOS Environment and Handling of Interrupt Source Calls.

UNIT-II: RTOS

Basic Design Using an RTOS, RTOS Task Scheduling Models, Interrupt Latency and Response of the Tasks as Performance Metrics, OS Security Issues. Basic Functions and Types of RTOS.

UNIT-III: RTOS μ COS-II

Introduction, Task Service, Task Scheduling, Memory Allocation, IPC – Semaphore, Mailbox, Queue, Interrupt Handling.

UNIT-IV: RTOS Vx Works

Introduction, Task Service, Task Scheduling, Memory Allocation, IPC – Semaphore, Mailbox, Queue, Interrupt Handling.

UNIT-V: Embedded OS & Target Image Creation

Off-The-Shelf Operating Systems, Embedded OS, Handheld OS, Operating System Software, Target Image Creation for Window XP Embedded, Porting RTOS on a Micro Controller based Development Board.

UNIT-VI: Program Modeling – Case Studies

Case study of embedded system design and coding for an Automatic Chocolate Vending Machine (ACVM) Using μ COS-II RTOS, Case study of digital camera hardware and software architecture, Using RTOS Vx Works, Case Study of Embedded System for an Adaptive Cruise Control (ACC) System in Car, Case Study of Embedded System of Mobile Phone Software for Key Inputs.

TEXT BOOKS:

1. Shibu K V: "Introduction to Embedded Systems", Tata McGraw Hill Publications, Second Edition.
2. Dr. K.V.K.K. Prasad: "Embedded/Real-Time Systems", Dream Tech Publications, Black pad.
3. Raj Kamal: "Embedded Systems-Architecture, Programming and Design", Tata McGraw Hill Publications, Second Edition.

REFERENCES:

1. Labrosse, "Embedding system building blocks ", CMP publishers.
2. Rob Williams," Real time Systems Development", Butterworth Heinemann Publications.

VIII Sem.	Principles of Digital TV Engineering (Open Elective-III)	Course Code:V18ECTO9	L	T	P	C
			3	0	0	3

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1:	Illustrate the fundamentals of television engineering.	[K2]
CO2:	Explain about TV signal transmission.	[K2]
CO3:	Explain the colour TV fundamentals.	[K2]
CO4:	Classify Digital TV transmission standards.	[K2]
CO5:	Explain the operation of Digital TV receiver.	[K2]
CO6:	Describe the working of LCD and Plasma screens.	[K2]

UNIT-I

Introduction: TV transmitter and receivers, synchronization **Television Pictures:** Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution

UNIT-II

Composite video signal: Horizontal and vertical sync details **TV Signal Transmission:** VSB transmission, standard channel BW, TV transmitter

UNIT-III

Colour Television: Perception of brightness and colours, additive colour mixing, video signals for colours, luminance signal, colour difference signals, encoding of colour difference signals, formation of chrominance signals, PAL encoder, PAL colour receiver

UNIT-IV

Digital Television Transmission Standards: ATSC terrestrial transmission standard, vestigial sideband modulation, DVB -T transmission standard, ISDB-T transmission standard

UNIT-V

Digital Television: Digital Satellite Television, Direct to Home Satellite Television, Digital TV Receiver, Merits of Digital TV Receivers

UNIT-VI

LCD Screens: LCD Technology, LCD Matrix types and operation, LCD Screens for Television, LCD color receiver

Plasma Screens: Plasma and conduction of charge, Plasma TV Screens, Plasma Color Receiver

Text Books:

1. Television engineering and video systems – R G Gupta, Tata McGraw Hill Publishers.
2. Television and Video Engineering – A.M.Dhake, 2nd Edition, Tata McGraw Hill Publishers.
3. Modern Television Practice: Transmission, Reception and Applications- R RGulati, 4th revised edition, New Age International Publishers.
4. Fundamentals of Digital Television Transmission- Gerald W. Collins, John Wiley & Sons.

References

1. Basic Television and Video Systems – Bernard Grob, McGrawHill Publishers.
2. Monochrome and Colour Television - R RGulati, New Age International Publishers.
3. Colour Television, Theory and Practice - S.P.Bali, Tata McGraw-Hill Publishers.