University College of Engineering

ACADEMIC REGULATIONS (R19)

B.Tech FOUR YEAR DEGREE Programme

(Applicable for the batches admitted from the **A.Y. 2019-20**)

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (A)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA – 533003, ANDHRA PRADESH, INDIA

Website : https://www.jntucek.ac.in/

University College of Engineering

ACADEMIC REGULATIONS (R19) FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2019-20 onwards

1. **Award of B. Tech. Degree**

A student will be declared eligible for the award of B. Tech. Degree if he fulfils the followingacademic regulations:

1. A student shall be declared eligible for the award of the B. Tech Degree, if he pursues a course of study in not less than four and not more than eight academic years
2. The candidate shall register for 160 credits and secure all the 160 credits.
3. A student will be eligible to get Under Graduate degree with ***Honors or additional Minor Engineering***[1], if he/she completes an additional 20 credits. These could be acquired through recommended NPTEL/SWAYAM MOOC courses recommended by the respective Board of Studies. To award Honors degree, student should not have any backlog history with other requirements.

2. **Courses of study**

The following courses of study are offered at present as specializations for the
B. Tech. Courses:

S. No	**Branch**
01	Civil Engineering
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering
06	Petroleum Engineering
07	Chemical Engineering

3. Distribution and Weightage of Marks

(i) The performance of a student in each semester shall be evaluated subject – wise with a maximum of **100 marks for theory subject** and **50 marks for practical subject**. The project work shall be evaluated for 200 marks.

(ii) For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks forthe End - Examinations.

(iii) For theory subjects, during the semester there shall be 2 tests. The weightage of Internal marks for 30 consists of Descriptive – 15, Assignment - 05 (Theory, Design, Analysis, Simulation, Algorithms, Drawing, etc. as the case may be and for *Engineering / Applied Physics Virtual Lab to be considered as Assignment – internal evaluation only*) Objective -10.

[1] *As per J.N.T.U.K. University approval*

The objective examination is for 20 minutes duration. The subjective examination is for 90 minutes duration conducted for 15 marks. Each subjective type test question paper shall contain **3 questions** and all questions need to be answered. The Objective examination conducted for 10 marks and subjective examination conducted for 15 marks are to be added to the assignment marks of 5 for finalizing internal marks for 30. **Internal Marks** can be calculated with 80% weightage for best of the two Mids and 20% weightage for other Mid Exam. ***As the syllabus is framed for 5 units, the 1st mid examination (both Objective and Subjective) is conducted in 1-2½ units and second test in 2½-5 units of each subject in a semester***. For *Audit Courses viz., Engineering / Applied Physics Virtual Lab, Physical fitness activities* satisfactory report is mandatory. If any student fails to achieve report/certificate, he/she need to submit it at later stage.

(iv) The end semester examination is conducted covering the topics of all Units for 70 marks. **End Exam Paper containing FIVE mandatory questions** (one question from one unit) with internal choice, each carrying 14 marks gives for 70 marks.

(v) For **practical subjects there shall be continuous evaluation during the semester for 20 internal marks and 30 end examination marks**. The internal 20 marks shall be awarded as follows: day to day work and record-10 marks and the remaining 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacherconcerned and external examiner as follows:

	Procedure	*Experimentation*	*Result*	*Viva-voce*	*Total*
Marks	5	15	5	5	30

(vi) For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (20 marks for day-to-day work, and 10 marks for internal tests) and 70 marks for end examination. *There shall be two internal tests in a Semester and the Marks for 10 can becalculated with 80% weightage for best of the two tests and 20% weightage for other test andthese are to be added to the marks obtained in day to day work*.

*(vii)*For the seminar, each student has to be evaluated based on the presentation of any latest topicwith report of 10-15 pages and a presentation (viz., ppt or any of min 10 slides). The student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall 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, 40% marks are mandatory to declare as pass. There shall be no external examination for seminar.*

(vii) *Socially Relevant Projects* (0.5 credits each) is evaluated internally for 50 marks in each semester. *However, student has to get 40% marks in a semester to declare as pass*.

(viii) *Industrial Training / Skill Development Programmes / Research Project* in higher learning institutes for 1.0 credit in seventh semester. Work starts in the end of sixth semester and complete by beginning of seventh semester. *This shall be internally evaluated in seventh semester for 50 marks. Student has to secure minimum 40% marks to declare as pass*

(ix) Project work starts in seventh semester with 02 credits (50 marks to be given – internal marks). The marks are awarded based on: *Selection of Area, Defining the problem, Submission of the Abstract and Presentation of seminar*

(x) Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination. The End Semester Examination (Viva-Voce) shall be conducted by the committee. The committee consists 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 the IV year. 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.

4. Attendance Requirements

1. A student is eligible to write the External examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
2. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee, ***and one is eligible for condonation a maximum of THREE times during the entirecourse work.***
3. Shortage of Attendance below 65% in aggregate shall not be condoned.
4. A student who is short of attendance in semester may seek re-admission into that semester when offered within 4 weeks from the date of the commencement of class work.
5. Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class.
6. A stipulated fee shall be payable towards condonation of shortage of attendance.
7. A student will be promoted to the next semester if he satisfies the (i) attendance requirement of the present semester and (ii) minimum required credits.
8. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

5. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendancerequirements mentioned in item no.4.

A student is deemed to have satisfied the minimum academic requirements if he has **earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the internal marks and end semester examination marks.**

A student shall be promoted from first year to second year if he fulfills the minimum attendance requirement.

A student will be **promoted from II year to III year** if he fulfills the academic requirement**of 50% of the credits from all the examinations up to II year I semester (i.e., including).**

A student shall be **promoted from III year to IV year** if he fulfils the academic requirements of **50% of the credits from all the examinations up to III year I semester (i.e., including).**

A student shall register and put up minimum attendance in all 160 credits and earn all160 credits.

6. Course Pattern

1. The entire course of study is for four academic years, all the years are on semester pattern.

2. A student eligible to appear for the end semester examination in a subject, but absent from it or has failed in the end semester examination, may write the exam inthat subject when conducted next.
3. When a student is detained for lack of credits / shortage of attendance, he may be re- admitted into the same semester / year in which he has been detained. However, the academic regulations under which he was first admitted shall continue to be applicable to him.
4. To encourage students towards Entrepreneurship: Gap year concept for student entrepreneur in residence for outstanding students who wish to pursue entrepreneurship is allowed to take a break of one year at any time after IV Sem to pursue full time entrepreneurship. This period may be extended to two years at most and these two years would not be counted while calculating duration of study. For thisCAC approval is mandatory.

7. Cumulative Grade Point Average (CGPA)

Marks Range Theory (Max – 100)	**Marks Range Lab (Max – 50)**	**Letter Grade**	**Level (G)**	**Grade Point**
≥ 90	≥ 45	>90	Outstanding (O)	10
≥80 to <90	≥40 to <45	90-80	Excellent (S)	9
≥70 to <80	≥35 to <40	80-70	Very Good (A)	8
≥60 to <70	≥30 to <35	70-60	Good (B)	7
≥50 to <60	≥25 to <30	60-50	Fair (C)	6
≥40 to <50	≥20 to <25	50-40	Satisfactory (D)	5
<40	<20	<40	Fail (F)	0
			Absent	0

Computation of SGPA

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

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

SGPA (Si) = $\sum$ (Ci X Gi) / $\sum$ Ci

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

Computation of CGPA

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

CGPA = $\sum$ (Ci X Si) / $\sum$ Ci

Where Si is the SGPA of the i^{th} semester and Ci is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to TWO decimal points and reported in the transcripts.

8. Award of Class

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

Class Awarded	CGPA to be secured	
First Class with Distinction	≥ 7.75 without backlog history	**From the CGPA secured from 160 Credits.**
First Class	≥ 6.75 < 7.75 without backlog history ≥ 6.75 with backlog history	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

9. ***Honors Degree***[2]: A student

i. Should complete an **additional 20 credits** by doing Board of Studies recommended NPTEL/SWAYAM MOOC courses

ii. Students should complete all the courses in the **first attempt** and in four years(*excluding any authorized break*) with CGPA of at least 8.00

10. ***Minor Engineering***: A student

i. Should complete an **additional 20 credits** by doing respective Board of Studies recommended NPTEL/SWAYAM MOOC courses

11. If any of the course is reappeared under MOOCS (NPTEL/SWAYAM), those will notbe considered for awarding honors degree

12. Minimum Instruction Days: The minimum instruction days for each semester shall be 90 working days.

13. There shall be no branch transfers after the completion of the admission process.

14. There shall be no transfer from one college/stream to another within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Kakinada.

15. Withholding of Results

If the student has not paid the dues, if any, to the university or if any caseof indiscipline is pending against him, the result of the student will be withheld. His degree will be withheld in such cases.

16. Transitory Regulations

1. Discontinued or detained candidates are eligible for readmission as and when next offered.
2. The readmitted students will be governed by the regulations under which the candidate has been admitted.

17. General

1. Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
2. The academic regulation should be read as a whole for the purpose of any interpretation.
3. In case of any doubt or ambiguity in the interpretation of the above rules, the decisionof the Vice-Chancellor is final.
4. The University may change or amend the academic regulations or syllabi at any timeand the changes or amendments made shall be applicable to all the students with effect from the dates notified by the University.

[2] *J.N.T.U.K. University criteria will supersede this*

University College of Engineering

ACADEMIC REGULATIONS (R19) FOR B. TECH. (LATERAL ENTRY SCHEME)

Applicable for the students admitted into II year B. Tech. from the Academic Year **2020-21** onwards

1 Award of B. Tech. Degree

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

A student shall be declared eligible for the award of the B. Tech Degree, if he pursues a course of study in not less than three academic years and not more than six academic years.

The candidate shall register for **121 CREDITS** and secure all the credits.

2. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech.

3. Promotion Rule

A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

A student shall be promoted from III year to IV year if he fulfils the academic requirements of 50% of the credits from all the examinations up to III year I semester.

4. Award of Class

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

Class Awarded	**CGPA to be secured**	**From the CGPA secured from 121 Credits from II Year to IV Year**
First Class with Distinction	≥ 7.75 with no failures	
First Class	≥ 6.75 to <7.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

5. All the other regulations as applicable to **B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)**.

University College of Engineering

Examination branch
Appointment of Subject Expert

From: Date: XX-XX-XXXX.
Dr. M.H.M. Krishna Prasad
Vice- Principal

To:

I am advised to inform you that you are appointed as subject expert to set the question papers as per the details noted below. You are requested to set the question papers in MS word document format and send a soft copy **oie2.ucek@jntucek.ac.in**. The hard copies of the question paper shall be sent along with the remuneration bill.

You are requested to set the Question Paper(s) by following OBE pattern, as per the revisedBloom's Taxonomy herewith enclosed. Keep this appointment strictly confidential.

1. You are requested to prepare a **balanced question paper** within the prescribed syllabus **covering the entire syllabus**. The duration of the examination is 3 hours and you are requested to prepare the questions in such a way that student must be able to write each question in about 35-45 minutes.
2. It is informed that each question paper covering the topics of all FIVE units for 70 marks. Each question paper shall be set as per the format enclosed, containing ***ten main questions (two question from each unit) from 5 units with internal choice*** and 14 marks for each question. The main question shall contain sub questions like 1(a), 1(b) etc.
3. The student has to answer **Five mandatory questions** (***One question from one unit***).
4. The requirement of **data books, codes, graphs** etc. may please be indicated on the question paper.
5. **You are requested to give the distribution of the marks in each question**
6. You are requested not reproduce questions from previous question papers.
7. Remuneration for setting one question paper for B.Tech programme Rs **1,000/-** per set
8. You are requested to confirm your acceptance through e-mail.

You are requested to reject the offer and intimate the same to the **Vice Principal**, if any of your relatives are writing the examination or if you are involved in any extra assignment in any tutorial/coaching centers. **Please send the question paper in the enclosed model (model is attached for reference).**

Question Paper Details		**R19 OBE Pattern**			
Course	**B.Tech**	**Question No.**	**Unit/CO's**	**Bloom's Taxonomy Level**	**Marks**
Name of the Examination	**I B.Tech I Sem (R19) Regular End Exams, January-2020**	1	**U1/CO1**	**L2/L3/L4**	**14**
Subjects		2	**U2/CO2**	**L2/L3/L4**	**14**
Branch	----	3	**U3/CO3**	**L2/L3/L4**	**14**
No of Question Papers	**1 (One)**	4	**U4/CO4**	**L2/L3/L4**	**14**
Last Date for submission		5	**U5/CO5**	**L2/L3/L4**	**14**

Note: U1: Unit 1, CO1: Course Outcome 1, L1: Level 1(Bloom's Cognitive Level)
L2: Understanding Level; L3: Apply Level; L4: Analyze Level;

University College of Engineering

R19

Course Code

:

University College of Engineering Kakinada (Autonomous)
Jawaharlal Nehru Technological University Kakinada

( ) B. Tech. ( ) Semester (R19) Regular Examinations, ( )

NAME OF COURSE

(Branch)

Time: 3 hrs. Max Marks: 70

Answer all five questions **5X14=70**

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Q.No	Question	Marks	CO	BL
	UNIT–1			
1(a)				
1(b)				
	(OR)			
2(a)				
2(b)				
	UNIT–2			
3(a)				
3(b)				
	(OR)			
4(a)				
4(b)				
	UNIT–3			
5(a)				
5(b)				
	(OR)			
6(a)				
6(b)				
	UNIT–4			
7(a)				
7(b)				
	(OR)			
8(a)				
8(b)				
	UNIT–5			
9(a)				
9(b)				
	(OR)			
10(a)				
10(b)				

Note: CO: Course Outcome, BL: Bloom's Cognitive Level;

University College of Engineering

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
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 acase 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.
3.	Impersonates any other candidate in connection with theexamination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all External examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all External examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all External examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

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Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

B. Tech R19 Course Structure &Syllabus

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

I YEAR I SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	BS1101	Mathematics-I	3	0	0	3
2	HS1101	Communicative English	3	0	0	3
3	BS1102	Applied Chemistry	3	0	0	3
4	ES1101	Essential of Electrical & Electronics Engineering	3	0	0	3
5	ES1102	Engineering Drawing	1	0	3	2.5
6	HS1102	English Communication Skills Lab-I	0	0	2	1
7	BS1103	Applied Chemistry Lab	0	0	3	1.5
8	ES1103	IT workshop	0	0	2	1
9	ES1104	Essential of Electrical & Electronics Engineering Lab	0	0	2	1
10	MC1101	Environment Science	3	0	0	0
11	MC1102	Physical Fitness Activities	2	0	0	0
		Total	18	0	12	19

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I YEAR II SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	BS1201	Mathematics-II	3	0	0	3
2	BS1202	Mathematics-III	3	0	0	3
3	BS1203	Applied Physics	3	0	0	3
4	ES1201	Problem Solving and Programming Using C	3	0	0	3
5	ES1202	Digital Logic Design	3	0	0	3
6	BS1204	Applied Physics Lab	0	0	3	1.5
7	HS1201	English Communication Skills Lab-II	0	0	3	1.5
8	BS1205	Applied Physics Virtual Lab	0	0	2	0
9	ES1203	Problem Solving and Programming Using C Lab	0	0	3	1.5
10	HS1202	Engineering Exploration Project- Design Thinking (15 Hrs Per Semester)	0	0	0	0.5
11	MC1201	Constitution of India	3	0	0	0
		Total	18	0	11	20

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II YEAR I SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	PCC2101	Mathematical Foundations of Computer Science	3	0	0	3
2	PCC2102	Software Engineering	3	0	0	3
3	PCC2103	OOP Through Java	3	0	0	3
4	PCC2104	Data Structures through C	3	0	0	3
5	ES2101	Computer Organization	3	0	0	3
6	ES2102	Computer Graphics	3	0	0	3
7	PCC2105	OOP Through Java Lab	0	0	3	1.5
8	PCC2106	Data Structures through C Lab	0	0	3	1.5
9	MC2101	Essence of Indian Traditional Knowledge	3	0	0	0
10	MC2102	Employability Skills-I*	3	0	0	0
		Total	24	0	6	21
***Internal Evaluation**						

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II YEAR II SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	BS2201	Probability and Statistics	3	0	0	3
2	PCC2201	Web Technologies	3	0	0	3
3	PCC2202	Operating Systems	3	0	0	3
4	PCC2203	Data Base Management Systems	3	1	0	4
5	PCC2204	Formal Languages and Automata Theory	3	0	0	3
6	PCC2205	Operating System & LINUX Lab	0	0	3	1.5
7	PCC2206	Web Technologies Lab	0	0	3	1.5
8	PCC2207	Data Base Management Systems Lab	0	0	3	1.5
9	PR2201	Socially Relevant Projects (15 Hrs /Semester)	0	0	1	0.5
10	MC2201	Human Values & Professional Ethics	3	0	0	0
11	MC2202	Physical Fitness Activities	0	0	2	0
		Total	18	1	12	21
***Internal Evaluation**						

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III YEAR I SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	PCC3101	Data Warehousing and Data Mining	3	0	0	3
2	PCC3102	Computer Networks	3	0	0	3
3	PCC3103	Compiler Design	3	0	0	3
4	PCC3104	Artificial Intelligence	3	0	0	3
5	PE3101	**Professional Elective-I** 1. Principles of Programming Languages 2. Digital Image Processing 3. Advanced Unix Programming 4. Advanced Computer Architecture 5. Object Oriented analysis and design	3	0	0	3
6	PCC3105	Computer Networks & Compiler Design Lab	0	0	3	1.5
7	PCC3106	AI Tools & Techniques Lab	0	0	3	1.5
8	PCC3107	Data Warehousing and Data Mining Lab	0	0	3	1.5
9	PR3101	Socially Relevant Projects(15 Hrs /Semester)	0	0	1	0.5
10	MC3101	Employability Skills-II*	3	0	0	0
11	MC3102	Physical Fitness Activities	0	0	2	0
		Total	18	0	12	20
***Internal Evaluation**						

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University College of Engineering, JNT University Kakinada

III YEAR II SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	PCC3201	Machine Learning using Python	3	0	0	3
2	PCC3202	Design and Analysis of Algorithms	3	0	0	3
3	HS3201	Universal Human Values 2: Understanding Harmony	3	0	0	3
4	PE3201	**Professional Elective-II** 1. Operations Research 2. Advanced computer Networks 3. Mobile Application and Development 4. Distributed Systems	3	0	0	3
5	PE3202	**Professional Elective-III** 1. Software Project Management 2. Network Programming 3. Design patterns 4. MOOCS-NPTEL/SWAYAM **Duration: 12 Weeks Minimum**	3	0	0	3
6	OE3201	**Open Elective-I** (Inter Disciplinary)	3	0	0	3
7	PCC3203	Machine Learning using Python Lab	0	0	3	1.5
8	PCC3204	Data Analytics using R lab	0	0	3	1.5
9	MC3201	IPR & Patenting	3	0	0	0
		Total	21	0	6	21

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IV YEAR I SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	PCC4101	Cryptography and Network Security	3	0	0	3
2	PCC4102	Big Data Analytics	3	0	0	3
3	PE4101	**Professional Elective-IV** 1. Mobile Computing 2. Mean Stack Development 3. Internet of Things 4. Parallel Computing	3	0	0	3
4	PE4102	**Professional Elective-V** 1. Cloud computing 2. Social Networks &Semantic web 3. Ad-hoc and Sensor Networks 4. Cyber Security & Forensic	3	0	0	3
5	OE4101	**Open Elective-II** (Inter Disciplinary)	3	0	0	3
6	PCC4103	Big Data Analytics Lab	0	0	3	1.5
7	PCC4104	Cryptography & Network Security Lab	0	0	3	1.5
8	PR4101	Project-I	-	-	-	2
9	PR4102	Industrial Training / Internship/Research Project in National Laboratories/Academic Institutions	0	0	0	1
10	MC4101	Physical Fitness Activities	0	0	2	0
		Total	15	0	8	21

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IV YEAR II SEMESTER						
S.No	**Course Code**	**Courses**	**L**	**T**	**P**	**C**
1	PE4201	**Professional Elective-VI** 1. MOOCS-NPTEL/SWAYAM * 2. Natural Language Processing 3. Deep Learning Techniques 4. Neural Networks and Soft Computing	3	0	0	3
2	PE4202	**Professional Elective-VII** 1. MOOCS-NPTEL/SWAYAM * 2. Wireless Network Security 3. Ethical hacking 4. Digital Marketing	3	0	0	3
3	OE4201	**Open Elective-II** (Inter Disciplinary)	3	0	0	3
4	PR4201	Project-II	-	-	-	8
* **Duration: 12 Weeks Minimum (BOS Suggested Courses)**						
		Total	9	0	0	17

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

Open Electives to be offered by CSE for Other Branches

Open Elective-I: 1. Data Structures 2. Java Programming 3. Data Base Management Systems 4. Computer Graphics 5. C++ Programming 6. Stimulation & Modeling	**Open Elective-II:** 1. Operating Systems 2. Python Programming 3. Web Technologies 4. Soft Computing 5. Distributed Computing 6. AI and ML for Robotics
Open Elective-III: 1. Big Data 2. AI Tools & Techniques 3. Image Processing 4. Information Security 5. Mobile Application Development 6. Sensor Networks	**Open Elective-IV:** 1. Cyber Security 2. Deep Learning 3. Data Science 4. Block Chain Technologies 5. Game Theory 6. Internet of Things

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Open Electives to be offered by Other Departments for Computer Science & Engineering

Electronics &Communication Engineering 1. Information Coding Theory 2. VLSI 3. Signals &Systems 4. Digital Signal Processing 5. Medical Image Processing 6. RFID, Sensors &Data Acquisition	**Mathematics** 1. Optimization Techniques 2. Statistics with R 3. Cryptography, number theory and Cryptanalysis 4. Fuzzy Sets, Logic and Systems
Electronics and Electronics Engineering 1. Network Analysis 2. Fuzzy Systems & Controllers 3. Green Energy Models 4. Power Systems for Data Centers 5. Power Safety and Management	**Civil Engineering** 1. Intelligent transportation Engineering 2. Geospatial Systems(GIS, Remote Sensing etc.,) 3. Engineering Mechanics 4. Smart City Planning 5. Smart & Safety Building Design
Mechanical Engineering 1. Industrial Management 2. Robotics and Autonomous Driving Systems 3. CAD and MATLAB 4. Basics of Mechatronics 5. Alternative Energy Systems	**HSS** Managerial Economics and Financial Accountancy

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

APPENDIX – I

MATHEMATICS-I (Calculus)
(Common to ALL branches of First Year B.Tech.)

Course Objectives:

- This course will illuminate the students in the concepts of calculus.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- utilize mean value theorems to real life problems (L3)
- solve the differential equations related to various engineering fields (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- Apply double integration techniques in evaluating areas bounded by region (L3)
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5)
- Conclude the use of special function in multiple integrals (L4)

UNIT I: Sequences, Series and Mean value theorems: **(10 hrs)**

Sequences and Series: Convergences and divergence – Ratio test – Comparison tests – Integral test – Cauchy's root test – Alternate series – Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem – Lagrange's mean value theorem – Cauchy's mean value theorem – Taylor's and Maclaurin's theorems with remainders.

UNIT II: Differential equations: **(15 hrs)**

Linear differential equations – Bernoulli's equations – Exact equations and equations reducible to exact form – Non-homogeneous equations of higher order with constant coefficients with non-homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, e^{ax} V(x) and x^nV(x) – Method of Variation of parameters

Applications: Orthogonal trajectories – Electrical circuits (RL, RC, RLC) – Simple Harmonic motion.

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UNIT III: Partial differentiation: **(10 hrs)**

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Jacobian – Functional dependence – Taylor's and Mc Laurent's series expansion of functions of two variables.
Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

UNIT IV: Multiple integrals: **(8 hrs)**

Double and Triple integrals – Change of order of integration – Change of variables.
Applications: Finding Areas and Volumes.

UNIT V: Special functions: **(5 hrs)**

Introduction to Improper Integrals-Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals.

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. **Joel Hass, Christopher Heil and Maurice D. Weir,** Thomas calculus, 14th Edition, Pearson.
3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press, 2013.
4. **Srimantha Pal, S C Bhunia,** Engineering Mathematics, Oxford University Press.

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UNIVERSITY COLLEGE OF ENGINEERING KAKINDA (AUTONOMOUS)
JAWAHARLAL NEHTU TECHONOLOGICAL UNIVERSITY KAKINADA

ENGLISH Syllabus for Semester-I (R19)

Communicative English (Theory)

L	T	P	C
3	0	0	3

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Learning Outcomes

At the end of the module, the learners will be able to

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

P. Rajendra Kumara 28/06/19 (28/6/19) 28/6/19

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Unit 1:

Lesson-1: A Drawer full of happiness from "**Infotech English**", Maruthi Publications

Lesson-2: Deliverance by Premchand from "**The Individual Society**", Pearson Publications. (Non-detailed)

Listening: Listening to short audio texts and identifying the topic. Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introductions and introducing others.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural basic sentence structures; simple question form - wh-questions; word order in sentences.

Pronunciation: Vowels, Consonants, Plural markers and their realizations

Unit 2:

Lesson-1: Nehru's letter to his daughter Indira on her birthday from "**Infotech English**", Maruthi Publications

Lesson-2: Bosom Friend by Hira Bansode from "**The Individual Society**", Pearson Publications. (Non-detailed)

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

P. Rajendra Karmarkar 28/06/19 (28/6/19) 28/6/19

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks. Functional English: Greetings and leave takings.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read: avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary Analogies (20 words) (Antonyms and Synonyms, Word applications)

Grammar: Use of articles and zero article; prepositions.

Pronunciation: Past tense markers, word stress-di-syllabic words

Unit 3:

Lesson-1: Stephen Hawking-Positivity 'Benchmark' from **"Infotech English"**, Maruthi Publications

Lesson-2: Shakespeare's Sister by Virginia Woolf from **"The Individual Society"**, Pearson Publications. (Non-detailed)

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed. Functional English: Complaining and Apologizing.

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. Letter writing-types, format and principles of letter writing. E-mail etiquette, Writing CV's.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, sequencing of words

Grammar: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

P. Rajendra Karmakar 28/06/19 (28/6/19)

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

Pronunciation: word stress-poly-syllabic words

Unit 4:

Lesson-1: Liking a Tree, Unbowed: Wangari Maathai-biography from "**Infotech English**", Maruthi Publications

Lesson-2: Telephone Conversation-Wole Soyinka from "**The Individual Society**", Pearson Publications. (Non-detailed)

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio); listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: Permissions, Requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Writing SOP, writing for media.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Cloze Encounters.

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Pronunciation: Contrastive Stress

Unit 5:

Lesson-1: Stay Hungry-Stay foolish from "**Infotech English**", Maruthi Publications

Lesson-2: Still I Rise by Maya Angelou from "**The Individual Society**", Pearson Publications. (Non-detailed)

P. Rajendra Kumar 28/06/19 (28/6/19) 28/6/19

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques.

Reading for Writing: Writing academic proposals- writing research articles: format and style.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Coherence, matching emotions.

Grammar: Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Pronunciation: Stress in compound words

Prescribed text books for theory for Semester-I:
1. **"Infotech English"**, Maruthi Publications. (Detailed)
2. **"The Individual Society"**, Pearson Publications. (Non-detailed)

Prescribed text book for Laboratory for Semesters-I & II:
1. **"Infotech English"**, Maruthi Publications. (with Compact Disc)

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students.* Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2).* CUP, 2012.

P. Rajendra Kumar 28/6/19

(28/6/19)

28/6/19

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

UNIVERSITY COLLEGE OF ENGINEERING

Annexure - V

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

I B. Tech. APPLIED CHEMISTRY (circuit branches)

Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

Learning Objectives:

- ***Importance*** of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- ***Outline*** the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- ***Express*** the increase in demand as wide variety of advanced materials are introduced; which have excellent engineering properties.
- ***Explain*** the crystal structures, and the preparation of semiconductors. Magnetic properties are also studied.
- ***Recall*** the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.

POLYMER TECHNOLOGY

Polymerisation:- Introduction-methods of polymerization (emulsion and suspension)-physical and mechanical properties.

Plastics: Compounding-fabrication (compression, injection, blown film, extrusion) - preparation, properties and applications of PVC, polycarbonates and Bakelite-mention some examples of plastic materials used in electronic gadgets, recycling of e-plastic waste.

Elastomers:- Natural rubber-drawbacks-vulcanization-preparation, properties and applications of synthetic rubbers (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics-conducting polymers-biodegradable polymers-biopolymers-biomedical polymers.

Learning Outcomes: ***At the end of this unit, the students will be able to***

- ***Outline*** the properties of polymers and various additives added and different methods of forming plastic materials.
- ***Explain*** the preparation, properties and applications of some plastic materials.
- ***Interpret*** the mechanism of conduction in conducting polymers .
- ***Discuss*** natural and synthetic rubbers and their applications.

UNIT II: ELECTROCHEMICAL CELLS AND CORROSION

Single electrode potential-Electrochemical series and uses of series-standard hydrogen electrode, calomel electrode-concentration cell-construction of glass electrode-Batteries: Dry cell, Ni-Cd cells, Ni-Metal hydride cells, Li ion battery, zinc air cells–Fuel cells: H_2-O_2, CH_3OH-O_2, phosphoric acid, molten carbonate.

Corrosion:-Definition-theories of corrosion (chemical and electrochemical)-galvanic corrosion, differential aeration corrosion, stress corrosion, waterline corrosion-passivity of metals-galvanic series-factors influencing rate of corrosion-corrosion control (proper designing, cathodic protection)-Protective coatings: Surface preparation, cathodic and anodic coatings, electroplating, electroless plating (nickel). Paints (constituents, functions, special paints).

Learning Outcomes: ***At the end of this unit, the students will be able to***

- ***Explain*** the theory of construction of battery and fuel cells.
- ***Categorize*** the reasons for corrosion and study some methods of corrosion control.

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- *Categorize* the reasons for corrosion and study some methods of corrosion control.

UNIT III: MATERIAL CHEMISTRY

Part I : ***Non-elemental semiconducting materials***:- Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion, ion implantation) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Insulators & magnetic materials: electrical insulators-ferro and ferri magnetism-Hall effect and its applications.

Part II:

Nano materials:- Introduction-sol-gel method- characterization by BET, SEM and TEM methods-applications of graphene-carbon nanotubes and fullerenes: Types, preparation and applications

Liquid crystals:- Introduction-types-applications.

Super conductors:-Type –I, Type II-characteristics and applications

Learning Outcomes: ***At the end of this unit, the students will be able to***

- ***Understand*** the importance of materials like nanomaterials and fullerenes and their uses.
- ***Understand*** liquid crystals and superconductors.
- ***Understand*** the preparation of semiconductors.

UNIT IV: ADVANCED CONCEPTS/TOPICS IN CHEMISTRY

Computational chemistry: Introduction, Ab Initio studies, DFT; TD-DFT calculations using Guassian software

Molecular switches: characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid-base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor

Learning Outcomes: ***At the end of this unit, the students will be able to***

- ***Obtain*** the knowledge of computational chemistry
- ***Understand*** importance molecular machines

UNIT V: SPECTROSCOPIC TECHNIQUES & NON CONVENTIONAL ENERGY SOURCES

Part A: **SPECTROSCOPIC TECHNIQUES**

Electromagnetic spectrum-UV (laws of absorption, instrumentation, theory of electronic spectroscopy, Frank-condon principle, chromophores and auxochromes, intensity shifts, applications), FT-IR (instrumentation and IR of some organic compounds, applications)-magnetic resonance imaging and CT scan (procedure & applications).

Part B: NON CONVENTIONAL ENERGY SOURCES

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, organic photo-voltaics, hydropower, geothermal power, wind power, tidal and wave power, ocean thermal energy conversion.

Learning Outcomes: ***At the end of this unit, the students will be able to***

- understand the principles of different analytical instruments.
- explain the different applications of analytical instruments.
- design sources of energy by different natural sources.

Text Books:

3. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co. Latest edition
4. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2019 edition

Reference Books:

3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Engineering Chemistry by Shashi Chawla; Dhanpat Rai Publicating Co. Latest edition

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		L	T	P	C
I Year I Sem	**ESSENTIALS OF ELECTRICAL AND ELECTRONICS ENGINEERING (Common for Civil Engg. & CSE)**	3	0	0	3

Preamble:
This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines and electronic components to perform well in their respective fields.

Course objectives:

- To learn the basic principles of electrical circuital law's and analysis of networks.
- To understand principle of operation and construction details of DC machines & Transformers.
- To understand principle of operation and construction details of alternator and 3-Phase induction motor.
- To study operation of PN junction diode, half wave, full wave rectifiers andOP-AMPs.
- To learn operation of PNP and NPN transistors and various amplifiers.

Unit – I: Electrical Circuits- Basic definitions – types of network elements – Ohm's Law – Kirchhoff's Laws – inductive networks – capacitive networks – series – parallel circuits – star-delta and delta-star transformations-Numerical Problems.

Unit – II: DC Machines- Principle of operation of DC generator – EMF equation – types of DC machines – torque equation – applications – three point starter – speed control methods of DC motor – Swinburne's Test-Numerical Problems.

Unit – III: AC Machines: Transformers- Principle of operation and construction of single phase transformers – EMF equation – Losses – OC & SC tests – efficiency and regulation-Numerical Problems.

AC Rotating Machines: Principle of operation and construction of alternators – types of alternators –Regulation of alternator by synchronous impedance method- principle of operation of synchronous motor – principle of operation of 3-Phase induction motor – slip-torque characteristics – efficiency – applications-Numerical Problems.

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Unit IV: Rectifiers and Linear ICs and Transistors- PN junction diodes – diode applications (half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) – application of OP-AMPs (inverting, non-inverting, integrator and differentiator) - Numerical Problems.

Unit V : Transistors- PNP and NPN junction transistor, transistor as an amplifier – transistor amplifier – frequency response of CE amplifier – concepts of feedback amplifier- Numerical Problems.

Course Outcomes:

The student should be able to:

- Analyse various electrical networks.
- Understand operation of DC generators,3-point starter and DC machine testing by Swinburne's Test.
- Analyse performance of single-phase transformer.
- Explain operation of 3-phase alternator and 3-phase induction motors.
- Analyse operation of half wave, full wave bridge rectifiers and OP-AMPs and Explain single stage CE amplifier and concept of feedback amplifier.

Text Books:

1. Electrical Technology by Surinder Pal Bali, Pearson Publications.
2. Electronic Devices and Circuits by R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI 2006.

Reference Books:

1. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group
2. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications,2nd edition
4. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications,2nd edition
5. Industrial Electronics by G.K. Mittal, PHI.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (AUTONOMOUS)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA, KAKINADA
B.TECH (COMMON FOR CE,ECE,EEE,CSE,PE,PCE)
EFFECTIVE FROM 2019 BATCH

I BTech - II Semester

ENGINEERING DRAWING

Course Objective: Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves. scales

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents & normals for the curves,

Scales: Plain scales, diagonal scales and vernier scales

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines.

Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.

Unit III

Objective: The objective is to make the students draw the projections of the lines inclined to both the planes.

Part-A: Projections of straight lines inclined to both the planes.

Part-B: determination of true lengths of a line inclined to both the planes, angle of inclination and traces.

Unit IV

Objective: The objective is to make the students draw the projections of the plane inclined to both the planes and projections of Prism & Cylinder with axis inclined to one plane

Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

Projections of Solids – Prisms & Cylinders with the axis inclined to one of the plane.

Unit V

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the plane and 3D views to 2D and vice-versa

Pyramids & Cones with the axis inclined to one of the plane.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

2/8/19
HEAD
Mechanical Engineering Department
University College of Engineering

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

Course Outcome: After undergoing this course, the student learnt the scales, various engineering curves and drawing the 2D and 3D objects.

HEAD
Mechanical Engineering Departmen
University College of Engineering
J.N.T. University Kakinada
KAKINADA

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

UNIVERSITY COLLEGE OF ENGINEERING KAKINDA (AUTONOMOUS)
JAWAHARLAL NEHTU TECHONOLOGICAL UNIVERSITY KAKINADA

ENGLISH Syllabus for Semester-I (R19)

L	T	P	C
0	0	3	1.5

Semester-I

English Communication Skills Laboratory-I

TOPICS

UNIT I:
Pronunciation: Vowels, Consonants, Phonetic Transcription

UNIT II:

Past tense markers, word stress-di-syllabic words, Poly-Syllabic words

UNIT III:

Rhythm & Intonation

UNIT IV:

Contrastive Stress (Homographs)

UNIT V:

Word Stress: Weak and Strong forms
Stress in compound words

Prescribed text book: "Infotech English", Maruthi Publications.

References:

1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
6. English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

P. Rajendra Kumar 28/06/2019

28/6/19

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ANNEXURE – III

UNIVERSITY COLLEGE OF ENGINEERING
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

COURSE CODE	APPLIED CHEMISTRY/ENGINEERING CHEMISTRY LAB	CATEGORY	3-0-0	1.5

Introduction to Chemistry laboratory – Molarity, normality, primary, secondary standard solutions, volumetric titrations, quantitative analysis

1. Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of Mn (II) using standard oxalic acid solution.
4. Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.
5. Determination of copper (II) using standard hypo solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of iron (III) by a colorimetric method.
8. Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).
9. Determination of the concentration of strong acid vs strong base (by conductometric method).
10. Determination of strong acid vs strong base (by potentiometric method).
11. Determination of Mg^{+2} present in an antacid.
12. Determination of $CaCO_3$ present in an egg shell.
13. Estimation of Vitamin C.
14. Determination of phosphoric content in soft drinks.
15. Adsorption of acetic acid by charcoal.
16. Preparation of nylon-6, 6 and Bakelite (demonstration only).

Of the above experiments at-least 10 assessment experiments should be completed in a semester.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.

28/6/19 28/6/19

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IT WORKSHOP

Objectives:

- **PC Hardware:** Identification of basic peripherals, Assembling a PC, Installation of system software like MS Windows, device drivers, etc. Troubleshooting of PC Hardware and Software issues.
- **Internet & World Wide Web:** Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums. Awareness of cyber hygiene (protecting the personal computer from getting infected with the viruses), worms and other cyber attacks.
- **Productivity Tools:** Understanding and practical approach of professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite office tools.

Course Outcomes:

List of Exercises:

(Faculty to consolidate the workshop manuals using the textbook and references)

Task 1: Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage.

Task 2: Practicing disassembling and assembling components of a PC

Task 3: Installation of Device Drivers, MS windows, Linux Operating systems and Disk Partitioning

Task 4: Introduction to Memory and Storage Devices, I/O Port, Assemblers, Compilers, Interpreters, Linkers and Loaders.

Task 5: Demonstration of Hardware and Software Troubleshooting

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

Task 7: Awareness of various threats on the Internet and its solutions

Task 8: Demonstration and Practice on Microsoft Word

Task 9: Demonstration and Practice on Microsoft Excel

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Task 10: Demonstration and Practice on Microsoft Power Point

Task 11: Demonstration and Practice on LaTeX

TEXT BOOK:

1 Computer Fundamentals, Anita Goel, Pearson India Education, 2017
2 PC Hardware Trouble Shooting Made Easy, TMH

REFERENCE BOOK:

1. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson,2008
2. Comdex Information Technology, Vikas Gupta, Dreamtech.
3. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu
4. Information Technology Workshop, 3e, G Praveen Babu, M V Narayana BS Publications

L. Suralatty

28.06.2019

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
UNIVERSITY COLLEGE OF ENGINEERING KAKINADA(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I Year – I SEMESTER

ESSENTIALS OF ELECTRICAL & ELECTRONICS ENGINEERING LAB
(Common for Civil Engg. & CSE)

L	T	P	C
0	0	2	1

Course objectives:

- To predetermine the efficiency of dc shunt machine using Swinburne's test.
- To predetermine the efficiency and regulation of 1-phase transformer with O.C and S.C tests.
- To obtain performance characteristics of DC shunt motor &3-phase induction motor.
- To find out regulation of an alternator with synchronous impedance method.
- To control speed of dc shunt motor using Armature voltage and Field flux control methods.
- To find out the characteristics of PN junction diode & transistor
- To determine the ripple factor of half wave & full wave rectifiers.

Section A: Electrical Engineering:

The following experiments are required to be conducted as compulsory experiments:

1. Swinburne's test on D.C. Shunt machine (predetermination of efficiency of a given D.C. shunt machine working as motor and generator).
2. OC and SC tests on single phase transformer (predetermination of efficiency and regulation at given power factors).
3. Brake test on 3-phase Induction motor (determination of performance characteristics)
4. Regulation of alternator by Synchronous impedance method.
5. Speed control of D.C. Shunt motor by
   a) Armature Voltage control b) Field flux control method
6. Brake test on D.C. Shunt Motor.

Dr.Ch.Saibabu (Member)	Dr.S.SivanagaRaju (Member)	Dr.R.SrinivasaRao (Member)	Dr.V.V.N.Murthy (Member)	Dr.B.Sarvesh (Member)	Dr.K.S.Rama Rao (Member)
Dr.K.Ramasudha (Member)	Dr.D.Suryanarayana (Member)	Dr.D.M.Vinod Kumar (Member)	Sri K.Praveen Kumar (Member)	Dr.M.Siva Kumar (Member)	Dr.K.Sri Kumar (Chairman)

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
UNIVERSITY COLLEGE OF ENGINEERING KAKINADA(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Section B: Electronics Engineering:

The following experiments are required to be conducted as compulsory experiments:

1. PN junction diode characteristics a) Forward bias b) Reverse bias (Cut in voltage and resistance calculations)
2. Transistor CE characteristics (input and output)
3. Half wave rectifier with and without filters.
4. Full wave rectifier with and without filters.
5. CE amplifiers.
6. OP- amp applications (inverting, non inverting, integrator and differentiator)

Course Outcomes:

The student should be able to:

- Compute the efficiency of DC shunt machine without actual loading of the machine.
- Estimate the efficiency and regulation at different load conditions and power factors for single phase transformer with OC and SC tests.
- Analyse the performance characteristics and to determine efficiencyof DC shunt motor & 3-Phase induction motor.
- Pre-determine the regulation of an alternator by synchronous impedance method.
- Control the speed of dc shunt motor using Armature voltage and Field flux control methods.
- Draw the characteristics of PN junction diode & transistor
- Determine the ripple factor of half wave & full wave rectifiers.

Dr.Ch.Saibabu (Member)	Dr.S.SivanagaRaju (Member)	Dr.R.SrinivasaRao (Member)	Dr.V.V.N.Murthy (Member)	Dr.B.Sarvesh (Member)	Dr.K.S.Rama Rao (Member)
Dr.K.Ramasudha (Member)	Dr.D.Suryanarayana (Member)	Dr.D.M.Vinod Kumar (Member)	Sri K.Praveen Kumar (Member)	Dr.M.Siva Kumar (Member)	Dr.K.Sri Kumar (Chairman)

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UNIVERSITY COLLEGE OF ENGINEERING, KAKINADA

(AUTONOMOUS)

TECHNOLOGICAL UNIVERSITY
KINADA
ering) Meeting: 28th June 2019 (R19).

DEPARTMENT OF CIVIL ENGINEERING

I Year - II emester

L	T	P	C
3	0	0	0

ENVIRONMENTAL SCIENCE (MC1201)

Learning Objectives:
The obj

- s.
- diversity.
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- An understanding of the environmental impact of developmental activities.
- Awareness on the social issues, environmental legislation and global treaties.

UNIT-I:
Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance –Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects;. Role of information technology in environment and human health.
Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT-II:
Natural Resources: Natural resources and associated problems.
Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.
Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.
Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

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University College of Engineering, JNT University Kakinada

UNIT-III:

Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social- Biodiversity at national and local levels. India as a mega-diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his well being.

Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT – V Social Issues and Environmental Management: Urban problems related to energy - Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green business and Green politics.

The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

Text Books:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Reference:

1. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014

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I B Tech II Sem – R19

APPENDIX – . .2

MATHEMATICS-II (Linear algebra and Numerical Methods)
(Common to ALL branches of First Year B.Tech.)

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate approximating the roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations (L3)

Unit I: Solving systems of linear equations, Eigen values and Eigen vectors: (10 hrs)

Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non-homogeneous equations linear equations – Gauss Elimination for solving system of equations – Eigen values and Eigen vectors and their properties.
Applications: Free vibration of a two-mass system.

Unit-II: Cayley-Hamilton theorem and Quadratic forms: (10 hrs)

Cayley-Hamilton theorem (without proof) – Finding inverse and power of a matrix by Cayley-Hamilton theorem – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation.

4

Singular values of a matrix, singular value decomposition (Ref. Book – 1).

UNIT III: Iterative methods: **(8 hrs)**

Introduction – Bisection method – Secant method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations) – Jacobi and Gauss-Seidel methods for solving system of equations – Power Method for finding Largest Eigenvalue –Eigenvector.

UNIT IV: Interpolation: **(10 hrs)**

Introduction – Errors in polynomial interpolation – Finite differences – Forward differences – Backward differences – Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula – Newton's divide difference formula.

UNIT V: Numerical integration and solution of ordinary differential equations: **(10 hrs)**

Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rule – Solution of ordinary differential equations by Taylor's series – Picard's method of successive approximations – Euler's method – Runge-Kutta method (second and fourth order) – Milne's Predictor and Corrector Method.

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, 43^{rd} Edition, Khanna Publishers.
2. **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. **David Poole,** Linear Algebra- A modern introduction, 4^{th} Edition, Cengage.
2. **Steven C. Chapra,** Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education.
3. **M. K. Jain, S. R. K. Iyengar and R. K. Jain,** Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
4. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press.

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University College of Engineering, JNT University Kakinada

I B Tech II Sem – R19

APPENDIX – .3

MATHEMATICS-III (Vector Calculus, Transforms and PDE)

(Common to ALL branches of First Year B.Tech.)

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

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

- interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- estimate the work done against a field, circulation and flux using vector calculus (L5)
- apply the Laplace transform for solving differential equations (L3)
- find or compute the Fourier series of periodic signals (L3)
- know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
- identify solution methods for partial differential equations that model physical processes (L3)

Unit –I: Vector calculus: **(10 hrs)**

Vector Differentiation: Gradient – Directional derivative – Divergence – Curl – Scalar Potential.

Vector Integration: Line integral – Work done – Area – Surface and volume integrals – Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof).

Unit –II: Laplace Transforms: **(10 hrs)**

Laplace transforms of standard functions – Shifting theorems – Transforms of derivatives and integrals – Unit step function – Dirac's delta function – Inverse Laplace transforms – Convolution theorem (with out proof).

Applications: Solving ordinary differential equations (initial value problems) and integro differential equations using Laplace transforms.

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Unit –III: Fourier series and Fourier Transforms: **(10 hrs)**

Fourier Series: Introduction – Periodic functions – Fourier series of periodic function – Dirichlet's conditions – Even and odd functions – Change of interval – Half-range sine and cosine series.

Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals – Sine and cosine transforms – Properties – inverse transforms – Finite Fourier transforms.

Unit –IV: PDE of first order: **(8 hrs)**

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

UNIT V: Second order PDE and Applications: **(10 hrs)**

Second order PDE: Solutions of linear partial differential equations with constant coefficients – RHS term of the type $e^{ax+by}, \sin(ax+by), \cos(ax+by), x^m y^n$.

Applications of PDE: Method of separation of Variables – Solution of One dimensional Wave, Heat and two-dimensional Laplace equation.

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. **Dean. G. Duffy,** Advanced Engineering Mathematics with MATLAB, 3rd Edition, CRC Press.
3. **Peter O' Neil,** Advanced Engineering Mathematics, Cengage.
4. **Srimantha Pal, S C Bhunia,** Engineering Mathematics, Oxford University Press.

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University College of Engineering Kakinada (Autonomous)

R19

APPLIED PHYSICS
(for circuital branches like CSE, ECE, EEE etc)

Course Objectives:
Physics curriculum which is re-oriented to the needs of Circuital branches of graduate engineering courses offered by Jawaharlal Nehru Technological University Kakinada that serves as a transit to understand the branch specific advanced topics. The course is designed to:

- Impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.
- Impart the knowledge of materials with characteristic utility in appliances.

UNIT-I **(10hrs)**
WAVE OPTICS: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry).

Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order – resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

Unit Outcomes:

The students will be able to

- **explain** the need of coherent sources and the conditions for sustained interference.
- **analyze** the differences between interference and diffraction with applications.
- **illustrate** the resolving power of various optical instruments.

UNIT-II **(9hrs)**
QUANTUM MECHANICS: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

Unit Outcomes:

The students will be able to

- **explain** the fundamental concepts of quantum mechanics.
- **analyze** the physical significance of wave function.
- **apply** Schrödinger's wave equation for energy values of a free particle .

Dr.G.Padmaja Rani Dr.P.Dakshina Murthy Dr.V.R.K.Murthy Dr.S.V.S.Ramana Reddy

Dr.R.Padmasuvarna Dr.K.Samatha

Dept of Computer Science & Engineering
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UNIT-III **(10hrs)**

FREE ELECTRON THEORY & BAND THEORY OF SOLIDS : Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy - Density of states .

Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

Unit Outcomes:

The students will be able to

- **explain** the various electron theories.
- **calculate** the Fermi energy.
- **analyze** the physical significance of wave function .
- **interpret** the effects of temperature on Fermi Dirac distribution function.
- **summarise** various types of solids based on band theory.

UNIT-IV **(9hrs)**

SEMICONDUCTOR PHYSICS: Introduction – Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

Learning Outcomes:

The students will be able to

- **classify** the energy bands of semiconductors.
- **outline** the properties of n-type and p-type semiconductors.
- **identify** the type of semiconductor using Hall effect.

UNIT-V **(10 hrs)**

MAGNETISM & DIELECTRICS: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

Dr.G.Padmaja Rani Dr.P.Dakshina Murthy Dr.V.R.K.Murthy Dr.S.V.S.Ramana Reddy

Dr.R.Padmasuvarna Dr.K.Samatha

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Unit Outcomes:

The students will be able to

- **explain** the concept of polarization in dielectric materials.
- **summarize** various types of polarization of dielectrics .
- **interpret** Lorentz field and Claussius- Mosotti relation in dielectrics.
- **classify** the magnetic materials based on susceptibility and their temperature dependence.
- **explain** the applications of dielectric and magnetic materials .
- **Apply** the concept of magnetism to magnetic devices.

TEXT BOOKS:

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G.Kshirsagar - S.Chand Publications, 2017.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

REFERENCE BOOKS:

1. "Engineering Physics" by M.R.Srinivasan, New Age international publishers (2009).
2. "Optics" by Ajoy Ghatak, 6th Edition McGraw Hill Education, 2017.
3. "Solid State Physics" by A.J.Dekker, Mc Millan Publishers (2011).

1. Dr.G.Padmaja Rani	**Chairperson**	
2. Dr.P.Dakshina Murthy	**Member**	
3. Dr.V.R.K.Murthy	**External Member**	
4. Dr.S.V.S.Ramana Reddy	**External Member**	
5. Dr.K.Samatha	**External Member**	
6. Dr.R.Padmasuvarna	**External Member**	

Dept of Computer Science & Engineering
University College of Engineering, JNT University Kakinada

I B Tech II Sem – R19

Submitted to the Principal, UCEK 28.06.2019

Problem Solving and Programming Using C

Objectives:

The objectives of this course are to make the student familiar with problem solving using computers, development of algorithms, usage of basic flowchart symbols and designing flowcharts.

The students can also understand programming language basic concepts, reading and displaying the data, earn the programming skills using selection, iterative control structures, functions, arrays, pointers and files. After completion of this course the student is expected to analyze the real life problem and write programs in C language to solve the problems.

Course Outcomes:

After completion of this course

- Student will be able to develop efficient algorithm for solving a problem.
- Use various constructs of C programming language efficiently.
- Student will be able to develop programs using modular approach such as functions. And also able to develop programs to perform matrix and mathematical applications.
- Student will be able to understand dynamic memory management and problems using pointers and solving the problems.
- Student will be able to develop programs for real life applications using structures and also learn about handling the files for storing the data permanently.

UNIT I: Problem Solving: Problem solving aspects, Problem solving techniques, Computer as a Problem solving tool, Algorithms-definition, features, criteria. Flowchart-definition, basic symbols, sample flowcharts. Top down design, Implementation of program verification, The efficiency of algorithms, Analysis of algorithms, computational complexity of algorithm, order(O) notation, Worst case & Average case Analysis.

UNIT II: Basics of C programming language: Introduction to C, structure of a C program, basic data types and sizes, constants, variables, unary, binary and ternary operators, expressions, type conversions, conditional expressions, precedence and order of evaluation, Input and Output statements, Sample Programs.

SELECTION-DECISION MAKING CONDITIONAL CONTROL STRUCTURES: simple-if, if-else, nested if-else, if-else ladder and switch-case.

ITERATIVE: while-loop, do-while loop and for loop control structures, goto, break and continue statements. Sample Programs.

L. Suralatty 28.06.2019

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University College of Engineering, JNT University Kakinada

UNIT III: FUNCTIONS-basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs

ARRAYS-concepts, declaration, definition, accessing elements, storing elements, 1-D arrays, 2-D arrays and character arrays, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix, Passing 1-D arrays, 2-D arrays to functions, Strings and String Manipulations

UNIT IV: POINTERS-pointers concepts, initialization of pointer variables, pointers and function arguments, passing by address-dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V: ENUMERATED, STRUCTURE AND UNION TYPES: Derived types-structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications

FILEHANDLING: Concept of a file, text files and binary files, Formatted I/O, File I/O operations

Text Books:

1. How to Solve it by Computer, R. G. Dromey, Pearson Education, 2019
2. Programming in C, Ashok N Kamthane, Amit Ashok Kamthane, 3rd Edition, Pearson Education, 2019

Reference Books:

1. The C programming Language by Dennis Richie and Brian Kernighan
2. Programming in C, Reema Thareja, OXFORD
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, Cengage

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University College of Engineering, JNT University Kakinada

I B Tech II Sem – R19

Digital Logic Design
ES1202

Course Objectives:

The objective o f this course is to make student familiarize with basic number systems, codes and logical gates, the concepts of Boolean algebra, use of minimization logic to solve the Boolean logic expressions, design of combinational and sequential circuits, state reduction methods for Sequential circuits.

Course Outcomes:

After the course the student will be able to :

- understand number systems and codes
- solve Boolean expressions using Minimization methods.
- design the sequential and combinational circuits.
- apply state reduction methods to solve sequential circuits.

UNIT – I: Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, Floating point number representation, binary codes, Error detection and correction, binary storage and registers, binary logic, Boolean algebra and logic gates , Basic theorems and properties of Boolean Algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

UNIT – II: Gate–Level Minimization, The K-Map Method, Three-Variable Map, Four-Variable Map, Five-Variable Map , sum of products , product of sums simplification, Don't care conditions, NAND and NOR implementation and other two level implementations, Exclusive-OR function.

UNIT – III: Combinational Circuits, Analysis procedure, Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-multiplexers.

UNIT – IV: Synchronous Sequential Circuits- Latches, Flip-flops, analysis of clocked sequential circuits, Registers, Shift registers, Ripple counters, Synchronous counters, other counters.

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UNIT – V: Asynchronous Sequential Circuits -Introduction, Analysis procedure, Circuits with latches, Design procedure, Reduction of state and follow tables, Race- free state assignment, Hazards.

Text Books:

1. Digital Design, M. Morris Mano, M.D.Ciletti, 5th edition, Pearson.
2. Computer System Architecture, M.Morris Mano, 3rd edition, Pearson.
3. Switching and Finite Automata Theory, Z. Kohavi, Tata McGraw Hill.

Reference Books:

1. Fundamentals of Logic Design, C. H. Roth, L. L. Kinney, 7th edition, Cengage Learning.
2. Fundamentals of Digital Logic & Micro Computer Design, 5TH Edition, M. Rafiquzzaman, John Wiley.

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I B Tech II Sem – R19

R19

APPLIED PHYSICS LAB
(Any 10 of the following listed 15 experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients
7. Determination of dielectric constant by charging and discharging method
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10 Measurement of magnetic susceptibility by Quincke's method.
11. Dispersive power of diffraction grating.
12. Resolving Power of telescope
13. Resolving power of grating
14. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect.
15. Variation of dielectric constant with temperature.

1. Dr.G.Padmaja Rani	**Chairperson**	
2. Dr.P.Dakshina Murthy	**Member**	
3. Dr.V.R.K.Murthy	**External Member**	
4. Dr.S.V.S.Ramana Reddy	**External Member**	
5. Dr.K.Samatha	**External Member**	

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I B Tech II Sem – R19

UNIVERSITY COLLEGE OF ENGINEERING KAKINDA (AUTONOMOUS)
JAWAHARLAL NEHTU TECHONOLOGICAL UNIVERSITY KAKINADA

ENGLISH Syllabus for Semester-I (R19)

L	T	P	C
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Semester-II

English Communication Skills Lab-II

TOPICS

UNIT I:
Oral Activity: JAM, Hypothetical Situations, Self/Peer Profile
Common Errors in Pronunciation, Neutralising Accent

UNIT II:
Oral Activity: Telephonic Etiquette, Role Plays
Poster Presentations

UNIT III:
Oral Activity: Oral Presentation skills, Public speaking
Data Interpretation

UNIT IV:
Oral Activity: Group Discussions: Do's and Don'ts- Types, Modalities

UNIT V:
Oral Activity: Interview Skills: Preparatory Techniques, Frequently asked questions, Mock Interviews.
Pronunciation: Connected speech (Pausing, Tempo, Tone, Fluency etc.,)

References:

1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
6. English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.
7. Technical Communication- Meenakshi Raman, Sangeeta Sharma, Oxford University Press.
8. Technical Communication- Gajendrea Singh Chauhan, Smita Kashiramka, Cengage Publications.

P. Rajendra Karmarkar 28/06/19

28/6/19

28/6/19

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R19

APPLIED PHYSICS - VIRTUAL LAB – ASSIGNMENTS
(Constitutes 5 marks of 30 marks of Internal-component i.e,.Assignment component)
(Any 3 of the following listed 12 experiments)

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel –moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

URL: ***www.vlab.co.in***

1. Dr.G.Padmaja Rani	**Chairperson**	
2. Dr.P.Dakshina Murthy	**Member**	
3. Dr.V.R.K.Murthy	**External Member**	
4. Dr.S.V.S.Ramana Reddy	**External Member**	
5. Dr.K.Samatha	**External Member**	
6. Dr.R.Padmasuvarna	**External Member**	

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Problem Solving and Programming using C Lab

Exercise 1

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

Exercise 2

a) Write a C program to find the 2's complement of a binary number.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and, also, find the reverse of the given number.
b) Write a C program to generate the first *n* terms of the Fibonacci sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4

a) Write a C Program to print the multiplication table of a given number.
b) Write a C Program to read a decimal number and find its equivalent binary number.
c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5

a) Write a C program to interchange the largest and smallest numbers in the given array.
b) Write a C program to implement a liner search on a given set of values.
c) Write a C program to implement binary search on a given set of values.

Exercise 6

a) Write a C program to implement sorting of an array of elements.
b) Write a C program to input two m x n matrices, check the compatibility and perform addition and multiplication of them.

Exercise 7

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

i. To insert a sub-string into given main string at a given position.
ii. To delete n characters from a given position in a given string.
iii. To replace a character of string either from beginning or ending or at a specified location.

Exercise 8

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

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers

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Exercise 9

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

Exercise 10

a) Write C Program to find the number of characters in a given string including and excluding spaces.
b) Write C Program to copy the contents of one string to another string without using string handling functions.
c) Write C Program to find whether a given string is palindrome or not.
d) Write a C program to find both the largest and smallest number of an array of integers using call by value and call by reference.

Exercise 11

Write a C program using recursion for the following:
a) To display sum of digits of given number
b) To find the factorial of a given integer
c) To find the GCD (greatest common divisor) of two given integers.
d) To find Fibonacci sequence

Exercise 12

a) Write C Program to reverse a string using pointers
b) Write a C Program to compare two 2D arrays using pointers
c) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

Exercise 13

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

Exercise 14

a) Write a C program which copies one file to another.
b) Write a C program to count the number of characters and number of lines in a file.
c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

L. Suracetty

28.06.2019

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I B Tech II Sem – R19

Engineering Exploration Project – Design Thinking
(Common for CE, EEE, ME, ECE, & CSE)

(15 Hrs per Sem.)

COURSE OBJECTIVES:

- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating illdefined problems.
- Undergo several design challenges and work towards the final design challenge

Apply Design Thinking on the following Streams to

- Project Stream 1: Electronics, Robotics, IOT and Sensors
- Project Stream 2: Computer Science and IT Applications
- Project Stream 3: Mechanical and Electrical tools
- Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

HOW TO PURSUE THE PROJECT WORK?

- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human- centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

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TASKS TO BE DONE:

Task 1: Everyone is a Designer
- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast
- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems
- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems

Task 4: Empathizing
- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating
- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping
- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing
- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8:
- Final Report Submission and Presentation

Note: The colleges may arrange for Guest Speakers from Various Design Fields: Graphic Design, Industrial Design, Architecture, Product Design, Organizational Design, etc to enrich the students with Design Thinking Concept.

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REFERENCES:

1. Tom Kelly, *The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm* (Profile Books, 2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)
3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:

- Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
- Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
- Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/
  - uploads/2016/03/CAT_2.0_English.pdf
- Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

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I B Tech II Sem – R19

Constitution of India

Code: MC1201

Course Objectives:

Students will be able to:

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

Course Outcomes:

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.	K6
CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.	K6
CO3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.	K6
CO4	Discuss the passage of the Hindu Code Bill of1956.	K6

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	1				2				2	1	2	3	1
CO2		2			2			3	2		2	1	2	
CO3			3		2		1				1	1	2	
CO4				2	1	3			3			1	2	3
CO5	1					2		3	2					

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT – I: History of Making of the Indian Constitution: History, Drafting Committee, (Composition& Working), **Philosophy of the Indian Constitution:** Preamble, Salient, Features.

UNIT – II: Contours of Constitutional Rights &Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT – III: Election Commission: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

UNIT – IV: Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, **Executive:** President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

UNIT – V: Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative CEO of Municipal Corporation.Pachayati raj: Introduction, PRI: ZilaPachayat.Elected officials and their roles, CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

TEXT BOOKS:

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

REFERENCES:

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

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II B Tech I Sem – R19

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Code: PCC2101

Course Objectives:

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

Course Outcomes (COs):

CO	Course Outcomes	Knowledge Level (K)#
CO1	Student will be able to demonstrate skills in solving mathematical problems	K2
CO2	Student will be able to comprehend mathematical principles and logic	K4
CO3	Student will be able to demonstrate knowledge of mathematical modelling and proficiency in using mathematical software	K6
CO4	Student will be able to manipulate and analyze data numerically and/or graphically using appropriate Software	K3
CO5	Student will be able to communicate effectively mathematical ideas/results verbally or in writing	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2						2	2		1	2	3	1
CO2	2	2	3					2	1		2	1	2	
CO3	1		1	3					2		1	1	2	
CO4	1		1	2	1							1	2	3
CO5	2	2	2	1				2	1					

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

UNIT-I: Mathematical Logic: *Propositional Calculus*: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof, *Predicate Calculus*: Predicates, Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.

UNIT-II: Set Theory: *Sets*: Operations on Sets, Principle of Inclusion-Exclusion, *Relations:* Properties, Operations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering, Hasse Diagrams, *Functions:* Bijective, Composition, Inverse, Permutation, and Recursive Functions, Lattice and its Properties, *Algebraic Structures:* Algebraic Systems, Properties, Semi Groups and Monoids, Group, Subgroup and Abelian Group, Homomorphism, Isomorphism,

UNIT-III: Combinatorics: Basis of Counting, Permutations, Permutations with Repetitions, Circular and Restricted Permutations, Combinations, Restricted Combinations, Binomial and Multinomial Coefficients and Theorems, *Number Theory:* Properties of Integers, Division Theorem, Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic, Fermat's and Euler's Theorems

UNIT-IV: Recurrence Relations: Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

UNIT-V: Graph Theory: Basic Concepts, Graph Theory and its Applications, Sub graphs, Graph Representations: Adjacency and Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite and Planar Graphs, Euler's Theorem, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Prim's and Kruskal's Algorithms, BFS and DFS Spanning Trees

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rd Edition, Tata McGraw Hill.
3. Theory and Problems of Discrete Mathematics, Schaum's Outline Series, Seymour Lipschutz and Marc Lars Lipson, 3rd Edition, McGraw Hill.

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Reference Books:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby and Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.
4. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

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II B Tech I Sem – R19

SOFTWARE ENGINEERING
Code: PCC2102

Course Objectives:

- Demonstrate the software life cycle, process models, software requirements and Software Requirement Specification Document.
- Designing robust software products with quality control and how to ensure good quality software.
- Assume the planning and estimation of software projects.
- Show the maintenance of software and software reuse

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate software process, various models and Agile methodologies	K2
CO2	Develop a software project from Requirement Analysis and Planning	K6,K3
CO3	Make use of design process, concepts and tools for engineering practice	K3
CO4	Examine various coding and testing techniques in real time applications of quality maintenance	K4
CO5	Acquire and develop many valuable skills such as the ability to use computer aided software and reuse components	K6,K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	1				2				2	**1**	**2**	**3**	**1**
CO2		2			2			3	2		**2**	**1**	**2**	
CO3			3		2		1				**1**	**1**	**2**	
CO4				2	1	3			3			**1**	**2**	**3**
CO5	1					2		3	2					

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT- I: Introduction to Software Engineering: Nature of Software, legacy software, The Software Process, Software myths, Challenges.
Software Process Models - Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, Specialized Process Models, The Unified Process.

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Agile Development-Agility, Agile process, Extreme Programming (XP), Other Agile Process Models - Adaptive Software Development, Scrum, Crystal, Agile Unified Process

UNIT-II: Software Requirement Analysis And Specification: Value of good Software Requirement Specification, requirement process, requirement specification, functional specification with use-cases, other approaches for analysis, validation.
Planning a Software Project: Effort Estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

UNIT-III: Software Design: Overview of the Design Process, Design Concepts, Design Model, Architectural Design-styles, design, Component-Level Design-designing class-based components, designing traditional components
User Interface Design: The Golden Rules, user interface analysis and design steps, WebApp Interface design.

UNIT–IV: Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing
Software Reliability and Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model. **Software Quality Assurance** – Elements of Quality assurance, statistical software quality assurance-Six Sigma for software

UNIT–V: Computer Aided Software Engineering: Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment
Software Maintenance: Software maintenance, Maintenance Process Models, Maintenance Cost, Software Configuration Management, and **Software Reuse**: Basic Issues in Reuse Approach, Reuse at Organization Level.

Text Books:

1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGrawHill International Edition
2. An Integrated Approach to Software Engineering, Third Edition, Pankaj Jalote, Springer International Edition.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education

Reference Books:

1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

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II B Tech I Sem – R19

OOPS THROUGH JAVA
Code: PCC2103

Course Objectives:

- To learn the object oriented programming concepts.
- To introduce the principles of inheritance and polymorphism and demonstrate how they are related to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concept of multithreading and exception handling
- To introduce the design of Graphical User Interface using applets and swing controls

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understands the use of OOP concepts	K2
CO2	Apply OOP concepts to solve real world problems	K3
CO3	Develop multithreaded programs using synchronization concept.	K6
CO4	Understands the concept of packages and exception handling mechanism.	K2
CO5	Design GUI based applications using AWT and Swings	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2		3	2	2		2	2		1	2	3	1
CO2	2	2	3	2	2	2		2	1		2	1	2	
CO3	1		1	2	2	1			1		1	1	2	
CO4	1		1	1	2							1	2	3
CO5	1	2	2	3	2	2		2	1					

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT–I: Basics of Object Oriented Programming (OOP): The history and evolution of java-java Buzzwords –The OOP principles-Encapsulation, Inheritance,

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Polymorphism, Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, sample java program and compilation, classes and objects- concepts of classes, objects, constructors, access control, this keyword, garbage collection, overloading methods and overloading constructors , parameter passing, recursion, Exploring the string handling.

UNIT–II: Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Method binding, method overriding, Member access rules, super uses, using final keyword, polymorphism, abstract classes.
Packages and Interfaces: Defining, Creating and Accessing a package, Understanding CLASSPATH, Importing packages, differences between classes and interfaces, defining an interface, Implementing multiple inheritance using interfaces, applying interfaces variables in interface and extending interfaces. Exploring packages- java.util, java.io

UNIT–III: Exception handling : Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throws and finally, built in exceptions, creating own exception sub classes.
Multithreading: Differences between multithreading and multitasking, life cycle of a thread, creating threads – extending Thread, implementing Runnable, synchronizing threads, daemon threads, thread groups.

UNIT–IV: Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy , user-interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, list panes- scroll pane, dialogs, menu bar, graphics, layout manager- layout manager types- boarder, grid, flow, card and grid bag.

UNIT-V: Applets: Concepts of Applets, differences between applets and applications, lifecycle of an applet, types of applets, creating applets, passing parameters to applets, **Swings:** Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons-The JButton class, Check boxes, Radio Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees and Tables.

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Text Books:

1. Java: The Complete Reference, Eleventh Edition 11th Edition, Herbert Schildt
2. JAVA: How to program, 8/e, Dietal , Dietal,PHI
3. Introduction of programming with JAVA,S.Dean,TMH
4. Introduction to Java programming, 6/e, Y.Daniel Liang, Pearson

Reference Books:

1. Core Java 2, Vol 1(Vol 2) Fundamentals(Advanced), 7/e, Cay.S.Horstmann, Gary Cornell, Pearson
2. Big Java2,3/e, Cay.S. Horstmann, Wiley
3. Object Oriented Programming through Java, P.Radha Krishna, University Press
4. JAVA& Object Orientation an Introduction, 2/e, John Hunt, Springer
5. Introduction to JAVA Programming, 7/e, Y. Daniel Liang, Pearson. , TMH

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II B Tech I Sem – R19

DATA STRUCTURES THROUGH C
Code: PCC2104

Course Objectives:

- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVL Trees, and B Trees.

Course Outcomes: By the end of the course student will be able to understand

CO	Course Outcomes	Knowledge Level (K)#
CO1	Select appropriate data structures as applied to specified problem definition	K2
CO2	Summarize and understand the practical applications of several advanced techniques like Hashing	K2
CO3	Demonstrate the operations such as Insertion, Deletion and Search on Data structures like Binary Search Tree and AVL trees and solve the problems	K3
CO4	Demonstrate the operations such as Insertion, Deletion and Search on Advanced Data structures like Heaps, AVL trees and comparisons of trees like Red Black trees and B-Trees etc.	K3
CO5	Analyzing and Implement appropriate sorting/searching technique for given problem and Graph algorithms	K4

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2								1	2	3	1
CO2	2		3					3			2	1	2	
CO3	1	2	3		3						1	1	2	
CO4				2	3	1		3			1	1	2	3
CO5	2							2			2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT- I: Introduction to Data Structures, Abstract Data Types, The List ADT- simple array implementation of lists, linked lists, programming details, Doubly linked lists, circularly linked lists, **The Stack ADT**- the stack model, implementation of Stacks,

application, **The Queue ADT**- Queue Model, Array Implementation of Queues, Application of Queues. Stacks and Queue implementation using linked list.

UNIT-II: Searching-Linear and Binary Search Methods.
Sorting- Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort.
Hashing: Hash Function, Collision Resolution-Separate Chaining, Open Addressing-Linear Probing, Double Hashing, rehashing, Extendible Hashing.

UNIT- III: Trees: Binary Trees-implementation, Expression Trees,
Binary Search Trees- find, find Min and find Max, insert, delete operations,
AVL Trees- single and double rotation, operations,

UNIT- IV: B-Tree, Introduction to Red-Black and Splay Trees, Comparison of Search Trees. **Priority queues**- Model, simple Implementation, Binary Heap. Applications. Binomial Queues.

UNIT –V: The disjoint Set ADT: Equivalence relations, Basic data structure, smart Union algorithms **Graphs:** Introduction, Representation of graphs, **Graph Algorithms-** minimum spanning tree- prim's algorithm, kruskal's algorithm.

Text Books:

1. Data Structures And Algorithm Analysis, 2/e, Mark Allen Weiss,Pearson.
2. Data Structures: A PseudoCode Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon, Cengage.

References Books:

1. Data Structures, Algorithms and Applications in java, 2/e, Sartaj Sahni,University Press.
2. Data Structures using C, 2/e, Reema Thareja

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II B Tech I Sem – R19

COMPUTER ORGANIZATION
Code: ES2101

Course Objectives: Understand the architecture of a modern computer with its various processing units, performance measurement of the computer system, and memory management system of computer.

Course Outcomes: By the end of the course students can

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the architecture of a modern computer.	K2
CO2	Analyse the performance of a computer using performance equation.	K4
CO3	Organize and Determine the different types of instructions.	K3, K5
CO4	Determine the effective address of an operand by addressing modes.	K5
CO5	Evaluate the arithmetic operation of positive and negative numbers.	K5

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2		3	1							1	2	3	1
CO2	1	2	2	1		2					2	1	2	
CO3		3	2					1			1	1	2	
CO4	1	2	3			2					1	1	2	3
CO5	2	2	1	3		1		1			2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT I: Functional Unit, Basic Operational Concepts, Bus Structures. Computer Set Instructions (instruction set completeness), Timing Control, Instruction Cycle (Fetch and Decode, Determine the type of Instruction, Register reference instructions), Input Output Instructions.

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UNIT II: Instruction Formats: Three Address, Two Address, One Address, Zero Address Instructions, RISC Instructions. Addressing Modes, Data Transfer and Manipulation, Data Transfer Instructions, Data Manipulation Instructions, Arithmetic Instructions, Logical and Bit Manipulation Instructions, Shift Instructions. CISC and RISC characteristics.

UNIT III: INPUT OUTPUT ORGANIZATION: Peripheral Devices: ASCII Alphanumeric characters, **Input Output interface:** Input Output Bus and Interface modules, Input Output vs Memory Bus, Isolated vs Memory Mapped, Example of Input Output Interface Asynchronous Data Transfer: Strobe control, Handshaking, Asynchronous serial transfer, Asynchronous communication interface, First in First out Buffer. Modes of Transfer: Example of programmed input output, Interrupted initiated I/O, Software Considerations.

UNIT IV: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory.

UNIT V: Micro programmed Control: Control Memory, Address Sequencing: Conditional Branching, Mapping of Instructions, Subroutines Characteristics of Advanced Processors

Text Books:

1. "Computer Systems Architecture", M.Moris Mano, IIIrd Edition, Pearson/PHI
2. "Computer Organization" Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

Reference Books:

1. "Computer Organization and Architecture", William Stallings Sixth Edition, Pearson/PHI
2. "Structured Computer Organization" Andrew S. Tanenbaum, 4th Edition PHI/Pear
3. "Fundamentals or Computer Organization and Design", Sivaraama Dandamudi Springer Int. Edition.
4. "Computer Architecture a quantitative approach", John L. Hennessy and David A. Patterson, Fourth Edition Elsevier

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II B Tech I Sem – R19

COMPUTER GRAPHICS
Code: ES2102

Course Objectives:

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

Course Outcomes: After learning the course, the student will be able:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Acquire the basics of computer graphics, different graphics systems and applications of computer graphics with various algorithms for line, circle and ellipse drawing objects for 2D transformations	K3
CO2	Explain projections and visible surface detection techniques for display of 3D scene on 2D screen	K5
CO3	Develop scene with basic graphic primitive algorithms using OPENGL programming.	K3
CO4	Explain selected among models for lighting/shading: Color, ambient light; distant and light with sources; Phong reflection model; and shading (flat, smooth, Gourand, Phong).	K5
CO5	Illustrate able to create the general software architecture of programs that use 3D object sets with computer graphics.	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1								1	2	3	1
CO2		3			1	2					2	1	2	
CO3			3	3				1	1		1	1	2	
CO4	3		2	2		1					1	1	2	3
CO5				3	1	2					2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

UNIT-I: Introduction to Graphics: Application areas of Computer Graphics, overview of graphics systems, video-display devices, graphics monitors and work stations and input devices

2D Primitives: Output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformations - Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms

UNIT-II: 3D Concepts: Parallel and Perspective projections - Three dimensional object representation– Polygons, Curved lines, Splines, Quadric Surfaces, - Visualization of data sets - 3D transformations – Viewing -Visible surface identification.

UNIT-III: Graphics Programming : Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects - Drawing three dimensional scenes

UNIT- IV: Rendering: Introduction to shading models – Flat and Smooth shading – Adding texture to faces – Adding shadows of objects – Building a camera in a program – Creating shaded objects

UNIT- V: Overview of Ray Tracing: Intersecting rays with other primitives – Adding Surface texture – Reflections and Transparency – Boolean operations on Objects.

Text Books:

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education,2004.
2. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.
3. Schaum's Outline of Computer Graphics Second Edition, Zhigang Xiang, Roy A. Plastock.

Reference Books:

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007.

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II B Tech I Sem – R19

OOP THROUGH JAVA LAB
Code: PCC2105

Course Objectives:

- To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
- To implement method overloading and constructor overloading.
- To implement different levels of inheritance and implementing multiple inheritance using interfaces.
- To implement a program demonstrating the use of threads.
- To implement a program for creating and accessing packages.
- To implement Event handling mechanism using Applets and Swings.

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Apply OOP concepts to solve real world problems	K3
CO2	Implement programs to distinguish different forms of inheritance	K4
CO3	Create packages and to reuse them	K6
CO4	Develop multithreaded program using synchronization concepts	K3
CO5	Design GUI based applications using AWT and Swings	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2		3	2	2		2	1		1	2	3	1
CO2	1	2	3	3	2	2		2	1		2	1	2	
CO3	1		1	2	2	1			2		1	1	2	
CO4	1		1	2	2						1	1	2	3
CO5	1	2	2	3	2	2		2	1		2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java Program that uses both recursive and non-recursive functions to print the nth value of the Fibonacci sequence.

2. Write a Java Program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.

3. Write a Java Program that checks whether a given string is a palindrome or not. Ex. MALAYALAM is a palindrome

4. Write a Java Program to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.

5. Write a Java Program for sorting a given list of names in ascending order.

6. Write a Java program to implement constructor overloading and Method overloading.

7. Write a Java Program that illustrates how runtime polymorphism is achieved.

8. Write a Java Program that illustrates the use of super keyword.

9. Write a Java Program to create and demonstrate packages

10. Write a Java Program, using StringTokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.

11. Write a Java Program that reads on file name form the user then displays information about whether the file exists, whether the file is readable/ writable, the type of file and the length of the file in bytes and display the content of the using FileInputStream class.

12. Write a Java Program that displays the number of characters, lines and words in a text/text file.

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13. Write a Java Program that creates 3 threads by extending Thread class. First thread displays "Good Morning" every 1 sec, the second thread displays "Hello" every 2 seconds and the third displays "Welcome" every 3 seconds. (Repeat the same by implementing Runnable).

14. Write a Java Program to implement a Queue, using user defined Exception Handling (also make use of throw, throws).

15. Write a Java Program to implement Producer-Consumer problem using the concept of Inter Thread Communication.

16. Write an Applet that displays the content of a file.

17. Write a Java Program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +-*?% operations. Add a text field to display the result.

18. Write a Java Program illustrating action events and text events.

19. Write a Java Program for handling mouse events, keyboard events.

20. Write a Java Program illustrating windows events using adaptor classes.

21. Write a Java Program demonstrating the life cycle of a thread

22. Write a Java Program that allows user to draw lines, rectangles and ovals.

23. Write a Java Program that lets users create Pie charts. Design your own user interface (with Swings & AWT).

24. Write a Java Program to demonstrate all layout managers.

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II B Tech I Sem – R19

DATA STRUCTURES THROUGH C LAB
Code: PCC2106

Course Objectives: From the course the student will

- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVL Trees, and B Trees.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Implement basic operations such as Insertion, Deletion, and Search on Advanced Data structures like Heaps, AVL trees, and B-Trees	K4
CO2	Understand the practical applications of several advanced techniques like Hashing, Data compression techniques, and spanning trees in the domains of DBMS, Compiler design, and in Network routing.	K1
CO3	Identify the appropriate data structure for the given problem definition	K3
CO4	Apply advanced concepts and data structures to improve the efficiency of real time systems	K4

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3			2		3			1	2	3	1
CO2	2	2		3		3		2			2	1	2	
CO3						2		2	1		1	1	2	
CO4		2	2					3			1	1	2	3

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

List of experiments:

Experiment 1:

Write a C program to perform various operations on single linked list

Experiment 2:

Write a C program for the following

a) Reverse a linked list

b) Sort the data in a linked list
c) Remove duplicates
d) Merge two linked lists

Experiment 3:
Write a C program to perform various operations on doubly linked list.

Experiment 4:
Write a C program to perform various operations on circular linked list.

Experiment 5:
Write a C program for performing various operations on stack using linked list.

Experiment 6:
Write a C program for performing various operations on queue using linked list.

Experiment 7:
Write a C program for the following using stack
a) Infix to postfix conversion.
b) Expression evaluation.
c) Obtain the binary number for a given decimal number.

Experiment 8:
Write a C program to implement various operations on Binary Search Tree
Using Recursive and Non-Recursive methods.

Experiment 9:
Write a C program to implement the following for a graph.
a) BFS b) DFS

Experiment 10:
Write a C program to implement Merge & Heap Sort of given elements.

Experiment 11:
Write a C program to implement Quick Sort of given elements.

Experiment 12:
Write a C program to implement various operations on AVL trees.

Experiment 13:
Write a C program to perform the following operations:
a) Insertion into a B-tree b) Searching in a B-tree

Experiment 14:
Write a C program to implementation of recursive and non-recursive functions to Binary tree Traversals

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II B. Tech I Sem-R19

Employability Skills-I
Code: MC2102

COURSE OUTCOMES: The end of the course student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understand the corporate etiquette.	K2
CO2	Make representations effectively with appropriate body language	K3
CO3	Be composed with positive attitude	K3
CO4	Understand the core competencies to succeed in professional and personal life	K2

 # Based on suggested Revised BTL

UNIT – I:

1. Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - A Talk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.

2. **Communication Skills**: Verbal Communication; Non Verbal Communication (Body Language)

UNIT – II:

3. Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities

4. Etiquette: Social Etiquette, Business Etiquette, Telephone Etiquette, Dining Etiquette

UNIT – III

5. Standard Operation Methods: Note Making, Note Taking, Minutes Preparation, Email & Letter Writing

6 Verbal Ability: Synonyms, Antonyms, One Word Substitutes-Correction of Sentences-Analogies, Spotting Errors, Sentence Completion, Course of Action - Sentences Assumptions, Sentence Arguments, Reading Comprehension, Practice work

UNIT-IV:

7. Job-Oriented Skills –I: Group Discussion, Mock Group Discussions

8. Job-Oriented Skills –II: Resume Preparation, Interview Skills, Mock Interviews

Text books and Reference books:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.
2. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.
3. R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S.Chand & Company Ltd., 2018.
4. Raman, Meenakshi & Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

E-resources:

1. www. Indiabix.com
2. www.freshersworld.com

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II B Tech II Sem – R19

WEB TECHNOLOGIES
Code: PCC2201

Course Objectives:

From the course the student will learn

- Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
- Write backend code in PHP language and Writing optimized front end code HTML and JavaScript.
- Understand, create and debug database related queries and Create test code to validate the applications against client requirement.
- Monitor the performance of web applications & infrastructure and Troubleshooting web application with a fast and accurate a resolution.

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understand the basic concepts of HTML and CSS & apply those concepts to design static web pages.	K1,K3&K5
CO2	Identify and understand various concepts related to dynamic web pages and validate them using JavaScript	K2,K4&K5
CO3	Outline the concepts of Extensible mark up language & AJAX	K2,K4
CO4	Develop web Applications using Scripting Languages & Frameworks	K3,K6
CO5	Create and deploy secure, usable database driven web applications using PHP and RUBY	K5

 # Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3		2	2		2		1	1		1	2	3	1
CO2		2	1		1				3		2	1	2	
CO3	2	1	3	2		3		2			1	1	2	
CO4	3				2				2		1	1	2	3
CO5		3		3				2			2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT-I: HTML: Basic Syntax, Standard HTML Document Structure, Basic Text Mark up, Html styles, Elements, Attributes, Heading, Layouts, Html media, Iframes Images, Hypertext Links, Lists, Tables, Forms, GET and POST method, HTML 5, Dynamic HTML.
CSS: Cascading style sheets, Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model, Conflict Resolution, CSS3.

UNIT-II: Java script - Introduction to Java script, Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions, **Fundamentals** of Angular JS and NODE JS
Angular Java Script- Introduction to Angular JS Expressions: ARRAY, Objects, Strings, Angular JS Form Validation & Form Submission.
Node.js- Introduction, Advantages, Node.js Process Model, Node JS Modules, Node JS File system, Node JS URL module, Node JS Events.

UNIT-III: Working with XML: Document type Definition (DTD), XML schemas, XSLT, Document object model, Parsers - DOM and SAX.
AJAX A New Approach: Introduction to AJAX, Basics of AJAX, XML Http Request Object, AJAX UI tags, Integrating PHP and AJAX.

UNIT-IV: PHP Programming: Introduction to PHP**,** Creating PHP script, Running PHP script. Working with variables and constants**:** Using variables, Using constants, Data types, Operators.
Controlling program flow: Conditional statements, Control statements, Arrays, functions.

UNIT-V: Web Servers- IIS (XAMPP, LAMP) and Tomcat Servers. Java Web Technologies-Introduction to Servlet, Life cycle of Servlet, Servlet methods, Java Server Pages.
Database connectivity – Servlets, JSP, PHP, Practice of SQL Queries.
Introduction to Mongo DB and JQuery.
Web development frameworks – Introduction to Ruby, Ruby Scripting, Ruby on rails – Design, Implementation and Maintenance aspects.

Text Books:

1. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013
2. Web Technologies, 1st Edition 7th impression, Uttam K Roy, Oxford, 2012.
3. Pro Mean Stack Development, 1st Edition, ELad Elrom, Apress O'Reilly, 2016
4. Java Script & jQuery the missing manual, 2nd Edition, David sawyer mcfarland, O'Reilly, 2011
5. Web Hosting for Dummies, 1st Edition, Peter Pollock, John Wiley & Sons, 2013
6. RESTful web services, 1st Edition, Leonard Richardson, Ruby, O'Reilly, 2007

Reference Books:

1. Ruby on Rails Up and Running, Lightning fast Web development, 1st Edition, Bruce Tate, Curt Hibbs, Oreilly, 2006
2. Programming Perl, 4th Edition, Tom Christiansen, Jonathan Orwant, O'Reilly, 2012
3. Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1st Edition, Dream Tech, 2009
4. An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning, 2003

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OPERATING SYSTEMS
Code: PCC2202

Course Objectives:

- To understand the main components of an OS & their functions.
- To study the process management and scheduling and Inter Process Communication (IPC) and the role of OS in IPC.
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS
- To study the need for special purpose operating system with the advent of new emerging technologies

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Describe the important computer system resources and the role of operating system in their management policies and algorithms.	K2
CO2	Understand the process management policies and scheduling of processes by CPU	K1
CO3	Evaluate the requirement for process synchronization and coordination handled by operating system	K5
CO4	Describe and analyze the memory management and its allocation policies.	K3
CO5	Identify use and evaluate the storage management policies with respect to different storage management technologies.	K4

 # Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3		3			3			3		1	2	3	1
CO2		2	2	1		2		3		2	2	1	2	
CO3		3	2					2		3	1	1	2	
CO4					2			2			1	1	2	3
CO5	2	2			1				2	2	2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT-I: Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, operating systems structures and systems calls, Evaluation of Operating Systems.
Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms and their evaluation.

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

UNIT-III: Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation
Virtual Memory Management: virtual memory, demand paging, page-Replacement, page Replacement algorithms, Allocation of Frames, Thrashing

UNIT-IV: Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,
File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.
File System implementation- File system structure, allocation methods, free-space management

UNIT-V: Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling Introduction to Storage Area Networks (SAN), Introduction to Network Attached Storage.
Linux overview, Kernel Architecture, Process, memory, file and I/O management, Interprocess communication and synchronization, Security Windows XP, System Architecture, System management mechanisms, Process, thread, memory and file management, I/O subsystem, Interprocess communication - Security

Text Books:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Harvey M. Deitel, Paul J. Deitel, and David R. Choffnes, Operating Systems, Third Edition, Prentice Hall, 2003.
3. Operating Systems' – Internal and Design Principles Stallings, Sixth Edition– 2005, Pearson education
4. Architecture of Unix operating system, Maurice J.Bach, PHI.

Reference Books:

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating%20Systems/New_index1.html
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH
3. Operating System A Design Approach-Crowley, TMH.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.

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II B. Tech. II Sem-R19

DATA BASE MANAGEMENT SYSTEMS
Code: PCC2203

Course Objectives:

This Course will enable students to

- Explain the concept of databases, database management systems, database structures and how they work.
- Make use of Entity-Relationship Modeling and Relational Modeling for creating simple databases from the real world scenarios.
- Write relational algebra and structured query language (SQL) statements.
- Normalize a database using Normalization Rules.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Illustrate the concept of databases, database management systems, database languages, database structures and their work	K2
CO2	Apply ER modeling and Relational modeling for designing simple databases.	K3
CO3	Summarize the concepts related to relational model and SQL and Write database queries using relational algebra and structured query language.	K2
CO4	Design and develop databases from the real world by applying the concepts of Normalization.	K6
CO5	Outline the issues associated with Transaction Management and Recovery, Tree Structured and Hash-Based Indexing	K2

 # Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2		1	1			1			1	2	3	1
CO2	3	3	2	1		2		3	1	1	2	1	2	
CO3	3	1		2	1		1	3	1		1	1	2	
CO4	3	2	3	2					2		1	1	2	3
CO5	3	2	2		1	1			1		2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

UNIT-I: Introduction to Databases: Introduction, An Example, Characteristics of the Database Approach, Actors on Scene, Workers behind the scene, Advantages of Using the DBMS Approach, A Brief History of Database Applications, When Not to Use a DBMS **[TB-2]**
Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architecture for DBMSs, Classification of Database Management Systems **[TB-2]**

UNIT-II: Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model, Conceptual Design for Large Enterprises **[TB-1]**
Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/Altering Tables and Views **[TB-1]**

UNIT-III: Relational Algebra: Selection and Projection, Set Operations, Renaming, Joins, Division, More Examples of Algebra Queries **[TB-1]**
SQL: Queries, Constraints, Triggers: The Form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Stored Procedures, functions, Designing Active Databases **[TB-1]**

UNIT-IV: Introduction to Normalization Using Functional and Multi-valued Dependencies: Informal Design Guidelines for Relation Schema, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi-valued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form **[TB-2]**

UNIT V: Transaction Management and Concurrency Control: What is a Transaction?, Concurrency Control, Concurrency Control with Locking Methods, Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods, Database Recovery Management, Query Optimization and indexing**[TB-3]**
Tree Structured Indexing: Intuitions for Tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete, Duplicates, B+ Trees in Practice **[TB-1]**

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Hash-Based Indexing: Static Hashing, Extendible Hashing, Linear Hashing, Extendible vs Linear Hashing [**TB-1]**

Text Books:

1. Data base Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, Mc Graw-Hill
2. Database Systems, 6/e Ramez Elmasri, Shamkant B. Navathe, Pearson
3. Database Systems, 9/e, Carlos Coronel, Steven Morris, Peter Rob, Cengage

Reference Books:

1. Data base System Concepts, 6/e, Abraham Silberschatz, Henry F. Korth, S.Sudarshan, Mc Graw-Hill
2. Introduction to Database Systems, 8/e, C J Date, Pearson

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II B Tech II Sem – R19

FORMAL LANGUAGE AND AUTOMATA THEORY
Code: PCC2204

Course Objectives:

- Introduce the student to the concepts of Theory of computation in computer science
- The students should acquire insights into the relationship among formal languages, formal Grammars and automat.

Course Outcomes: By the end of the course students can

CO	Course Outcomes	Knowledge Level (K)#
CO1	Classify machines by their power to recognize languages.	K4
CO2	Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy	K2
CO3	Employ finite state machines to solve problems in computing	K3
CO4	Explain deterministic and non-deterministic machines	K2
CO5	Comprehend the hierarchy of problems arising in the computer science	K5

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	2				2	1		1	2	3	1
CO2	1	2	3	3	2			3		1	2	1	2	
CO3	2		2			1		2	2		1	1	2	
CO4		3		2	2			1			1	1	2	3
CO5		2		2				2	2		2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT-I: Finite Automata: Need of Automata theory, Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with Є-Transitions, Minimization of Finite Automata, Finite Automata with output-Mealy and Moore Machines, Applications and Limitation of Finite Automata

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UNIT-II: Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two RE, Manipulations of REs, Finite Automata and Regular Expressions, Inter Conversion, Equivalence between FA and RE, Pumping Lemma of Regular Sets, Closure Properties of Regular Sets, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Right and Left Linear Regular Grammars, Equivalence between RG and FA, Inter Conversion

UNIT-III: Context Free Grammars: Formal Languages, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, Є-Productions and Unit Productions, Normal Forms-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars

UNIT-IV: Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description, Language Acceptance of Pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars, Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata

UNIT-V: Turning Machine: Definition, Model, Representation of TMs-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a TM, Design of TMs, Types of TMs, Church's Thesis, Universal and Restricted TM, Decidable and Un-decidable Problems, Halting Problem of TMs, Post's Correspondence Problem, Modified PCP, Classes of P and NP, NP-Hard and NP-Complete Problems.

Text Books:

1. Introduction to Automata Theory, Languages and Computation, J. E. Hopcroft, R. Motwani and J. D. Ullman, 3rd Edition, Pearson, 2008
2. Theory of Computer Science-Automata, Languages and Computation, K. L. P. Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007
3. Elements of Theory of Computation, Lewis H.P. & Papadimition C.H., Pearson /PHI

Reference Books:

1. Formal Language and Automata Theory, K. V. N. Sunitha and N. Kalyani, Pearson, 2015
2. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu Kandar, Pearson, 2013
3. Theory of Computation, V. Kulkarni, Oxford University Press, 2013
4. Theory of Automata, Languages and Computation, Rajendra Kumar, McGraw Hill, 2014

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II B Tech II Sem – R19

OPERATING SYSTEM & LINUX LAB
Code: PCC2205

Course Objectives:

- To implement CPU scheduling algorithms
- To implement Disk scheduling algorithms
- To implement various page replacement algorithms
- To implement various file allocation strategies
- To execute various Linux commands and basic shell scripts

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Build various CPU scheduling algorithms and compare results	K6
CO2	Design various disk scheduling algorithms and compare results	K6
CO3	Implement page replace algorithms	K6
CO4	Develop various file allocation strategies	K4
CO5	Execute basic Linux commands and basic shell scripts	K2

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2		3	2	2					1	2	3	1
CO2	2	2	3	2	2	2			1		2	1	2	
CO3	1		1	2	2	1			1		1	1	2	
CO4	1		1	1	2						1	1	2	3
CO5	1		1	1	2				1		2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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List of Experiments:

Operating Systems Lab

1. Simulate the Following CPU Scheduling Algorithms
   A) FCFS B) SJF C) Priority D) Round Robin Scheduling
2. Simulate Bankers Algorithm for Dead Lock Avoidance
3. Multiprogramming-Memory Management- Implementation of fork (), wait (), exec () and exit ()
4. Simulate The Following Page Replacement Algorithms
   A) FIFO B) LRU C) LFU
5. Simulate the Following File Allocation Strategies
   A) Sequenced B) Indexed C) Linked
6. Developing Application using Inter Process communication (using shared memory, pipes or message queues)
7. Producer-Consumer Problem using Semaphore
8. Memory management Scheme-II Segmentation Concept

Linux Lab

1. Write a Shell program to check whether given number is prime or not.
2. Write a shell script which will display Fibonacci series up to the given range.
3. Write a shell script to check whether the given number is Armstrong or not.
4. Write a shell script to calculate the GCD of two numbers.
5. Write a shell script which will greet you "Good Morning" ,"Good Afternoon", "Good Evening" and "Good Night" according to current time.
6. Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade using the following rules:
   Avg>=80 then grade A
   Avg<80 && Avg>=70 then grade B
   Avg<70 && Avg>=60 then grade C
   Avg<60 && Avg>=50 then grdae D
   Avg<50 && Avg>=40 then grade E
   else grade F
7. Write a shell script to display the following menu options
   a. Display current directory path
   b. Display's today's date
   c. Display users who are connected to the Linux system
   d. Quit
8. Write a shell script to find minimum and maximum elements in the given list of elements.
9. Write a shell program to check whether the given string is palindrome or not.
10. Write an awk program to print sum, avg of students marks list

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II B Tech II Sem – R19

WEB TECHNOLOGIES LAB
Code: PCC2206

Course Objectives:

From the course the student will

- Learn the core concepts of both the frontend and backend programming course.
- Get familiar with the latest web development technologies.
- Learn all about PHP and SQL databases.
- Learn complete web development process.

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understand, analyze and apply the role of languages like HTML, CSS, XML.	K3
CO2	Review JavaScript, PHP and protocols in the workings of the web and web applications	K2
CO3	Recommend of Web Application Terminologies, Internet Tools, E – Commerce and other web services.	K5
CO4	Develop and Analyze dynamic Web Applications using PHP & MySql	K6
CO5	Installing & Using Frameworks.	K6

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2		3	2	1		1	1		1	2	3	1
CO2	2		1	3	2	2		2	3		2	1	2	
CO3	3	2		3	2	1		2			1	1	2	
CO4	1	2		3	2	2		3	2		1	1	2	3
CO5	1	1		2		1		2			2	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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).

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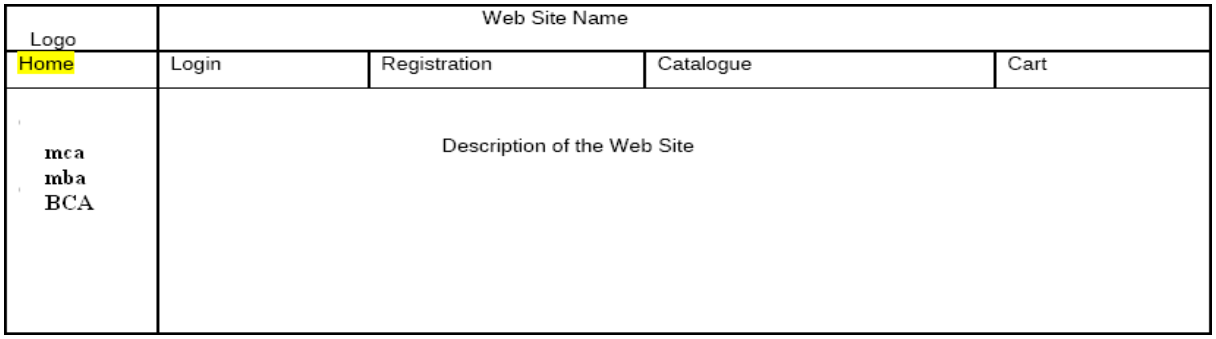
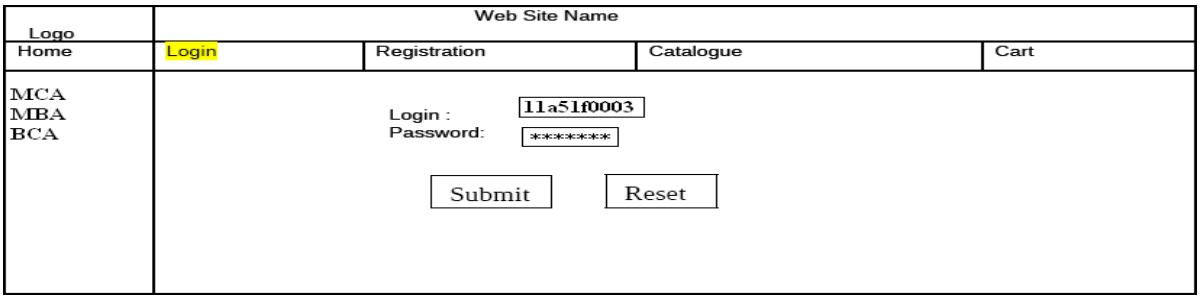
Left frame: At least four links for navigation, which will display the catalogue of respective links.

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.



(b) LOGIN PAGE:



(c) CATOLOGUE 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.

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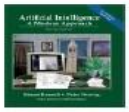
Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	Add to cart
BCA		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam	$ 50	Add to cart

(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)
8) Address (text area)

2. Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
Use different font, styles:
In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles

3. Design a dynamic web page with validation using JavaScript.

4. Design a HTML having a text box and four buttons viz Factorial, Fibonacci, Prime, and Palindrome. When a button is pressed an appropriate javascript function should be called to display

a. Factorial of that number
b. Fibonacci series up to that number
c. Prime numbers up to that number
d. Is it palindrome or not

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5. Write JavaScript programs on Event Handling
- a. Validation of registration form
- b. Open a Window from the current window
- c. Change color of background at each click of button or refresh of a page
- d. Display calendar for the month and year selected from combo box
- e. On Mouse over event

6. 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) to validate the above XML file.

7. Create Web pages using AJAX.

8. User Authentication:
Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.
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 ''.
Use init-parameters to do this.

9. Example PHP program for registering users of a website and login.

10. Install a database (Mysql or Oracle).
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 (week2).

11. Write a PHP which does the following job:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

12. Implement a Servlet program on request response processing.

13. Implement a Servlet program for Registration Page.

14. Connect to a database using JSP and practice SQL Queries (MySql or Oracle).

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II B. Tech. II Sem- R19

DATABASE MANAGEMENT SYSTEMS LAB
Code: PCC2207

Course Objectives:

This Course will enable students to

- Populate and query a database using SQL DDL/DML Commands.
- Declare and enforce integrity constraints on a database
- Writing Queries using advanced concepts of SQL
- Programming PL/SQL including procedures, functions, cursors and triggers

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Utilize SQL to execute queries for creating database and performing data manipulation operations	K3
CO2	Examine integrity constraints to build efficient databases	K4
CO3	Apply Queries using Advanced Concepts of SQL	K3
CO4	Build PL/SQL programs including stored procedures, functions, cursors and triggers.	K6

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2		3	2	1		1	1		1	2	3	1
CO2	2		1	3	2	2		2	3		2	1	2	
CO3	3	2		3	2	1		2			1	1	2	
CO4	1	2		3	2	2		3	2		1	1	2	3

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3

List of Exercises:

1. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.

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3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5.
   i. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
   ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
12. Create a table and perform the search operation on table using indexing and non-indexing techniques.

Text Books/Suggested Reading:

1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007

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II B. Tech. II Sem- R19

SOCIALLY RELEVANT PROJECTS (15 HRS)
Code: PR2201

1. Water Conservation Related Works
2. Swatch Bharath (Internal External)
3. Helping police
4. Traffic monitoring
5. Teaching Rural Kids (Sarva siksha Abhiyan)
6. Street light monitoring
7. Electricity Conservation
8. Solar panel utilization
9. E- policing & cyber solution
10. Pollution
11. Any social related

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III B. Tech – I Sem-R19

DATA WAREHOUSING AND DATA MINING

PCC3101

Course Objectives: At the end of the course student will be able to

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

COURSE OUTCOMES:

CO	COURSEOUTCOMES	Knowledge Levels(#)
CO1	Illustrate the importance of Data Warehousing, Data Miningand its functionalities.	K2
CO2	Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction	K2
CO3	Choose appropriate classification technique to perform classification, model building and evaluation.	K3
CO4	Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent itemsets generation.	K4
CO5	Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3	2	2		1	2		1	2	3	1
CO2		3	2	3	2			1	1		2	1	2	
CO3	2	3	2	3	3			1	2		1	1	2	
CO4	2	3	2	2	2				2		1	1	2	3
CO5		3	2	3	2			1			1	2	1	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

UNIT–I: Data Warehousing and Online Analytical Processing: Data Warehouse: Basic concepts, **Data Warehouse Modeling**: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Introduction: Why Data Mining?, What is data mining?, What kinds of data need to be mined?, What kinds of patterns can be mined?, Which technologies are used?, Which kinds of applications are targeted?, Major issues in data mining, Data Objects & Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity. **[Text Book 1]**

UNIT–II: DATA PRE-PROCESSING: Data Pre-processing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.**[Text Book 1]**

UNIT–III: CLASSIFICATION: Basic Concepts, General Approach to solving a classification problem, **Decision Tree Induction**: Attribute Selection Measures, Tree Pruning, Scalability and Decision Tree Induction, Visual Mining for Decision Tree Induction, **Bayesian Classification Methods:** Bayes Theorem, Naïve Bayes Classification, Rule-Based Classification, Model Evaluation and Selection.**[Text Book 1]**

UNIT–IV: ASSOCIATION ANALYSIS: Problem Definition, Frequent Item set Generation, Rule Generation: Confident Based Pruning, Rule Generation in Apriori Algorithm, Compact Representation of frequent item sets, FP-Growth Algorithm.. **[Text Book 2]**

UNIT–V: CLUSTER ANALYSIS: Overview ,Basics and Importance of Cluster Analysis, Clustering techniques, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bi-secting K Means, Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. **[Text Book 2]**

Text Books:

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

Reference Books:

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining: VikramPudi and P. Radha Krishna, Oxford.
3. Data Mining and Analysis - Fundamental Concepts and Algorithms; Mohammed J. Zaki, Wagner Meira, Jr, Oxford
4. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
5. http://onlinecourses.nptel.ac.in/noc18_cs14/preview
   (NPTEL course by Prof.PabitraMitra)
6. http://onlinecourses.nptel.ac.in/noc17_mg24/preview
   (NPTEL course by Dr. NandanSudarshanam& Dr. BalaramanRavindran)
7. http://www.saedsayad.com/data_mining_map.htm

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III Year B. Tech – I Semester

Computer Networks
PCC3102

Course Objectives:

- To provide insight about networks, topologies, and the key concepts.
- To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities.
- To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP.

Course Outcomes (COs): At the end of the course, student will be able to

	Course Outcomes	Knowledge Level(K)#
CO1	**Demonstrate** different network models for networking links OSI, TCP/IP get knowledge about various communication techniques, methods and protocol standards.	**K2**
CO2	**Discuss** different transmission media and different switching networks.	**K6**
CO3	**Analyze** data link layer services, functions and protocols like HDLC and PPP.	**K4**
CO4	**Compare and Classify** medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols.	**K4**
CO5	**Determine** application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.	**K5**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3	2	2		1	2		**1**	**2**	**3**	**1**
CO2		3	2	3	2			1	1		**2**	**1**	**2**	
CO3	2	3	2	3	3			1	2		**1**	**1**	**2**	
CO4	2	3	2	2	2				2		**1**	**1**	**2**	**3**
CO5	1	3	2	2	2				2		**1**	**1**	**2**	**3**

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT I: Introduction: Network Types, LAN, MAN, WAN, Network Topologies Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, OSI Vs TCP/IP, Lack of OSI models success, Internet History.

Physical Layer –Introduction to Guided Media- Twisted-pair cable, Coaxial cable and Fiber optic cable and unguided media: Wireless-Radio waves, microwaves, infrared.

UNIT II: Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction codes, CRC, Checksum: idea, one's complement internet checksum, services provided to Network Layer, **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, Data link layer in HDLC: configuration and transfer modes, frames, control field, point to point protocol (PPP): framing transition phase, multiplexing, multi link PPP.

UNIT – III: Media Access Control: Random Access: ALOHA, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, **Controlled Access:** Reservation, Polling, Token Passing, **Channelization:** frequency division multiple access(FDMA), time division multiple access(TDMA), code division multiple access(CDMA).

Wired LANs: Ethernet, Ethernet Protocol, Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.

UNIT – IV: The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path, Flooding, Distance vector, Link state, Hierarchical, Congestion Control algorithms-General principles of congestion control, Congestion prevention polices, Approaches to Congestion Control-Traffic Aware Routing- Admission Control-Traffic Throttling-Load Shedding. Traffic Control Algorithm-Leaky bucket & Token bucket.

Internet Working: How networks differ- How networks can be connected-Tunneling, internetwork routing-, Fragmentation, network layer in the internet – IP protocols-IP Version 4 protocol-IPV4 Header Format, IP addresses, Class full Addressing, CIDR, NAT-, Subnets-IP Version 6-The main IPV6 header, Transition

from IPV4 to IPV6, Comparison of IPV4 & IPV6- Internet control protocols- ICMP-ARP-DHCP

UNIT –V: The Transport Layer: Transport layer protocols: Introduction-services-port number-User data gram protocol-User datagram-UDP services-UDP applications-Transmission control protocol: TCP services- TCP features- Segment- A TCP connection- windows in TCP- flow control-Error control, Congestion control in TCP.

Application Layer –- World Wide Web: HTTP, Electronic mail-Architecture- web based mail- email security- TELENET-local versus remote Logging-Domain Name System: Name Space, DNS in Internet ,- Resolution-Caching- Resource Records-DNS messages- Registrars-security of DNS Name Servers, SNMP.

TEXT BOOKS:

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

REFERENCES BOOKS:

1. Data Communications and Networks- Achut S Godbole, Atul Kahate
2. Computer Networks, Mayank Dave, CENGAGE

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III B. Tech – I Sem-R19

COMPILER DESIGN
PCC3103

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Ability to design, implement a compiler for any language usinglex and yacc tools.	K2
CO2	Able to develop Top Down and Bottom Up Parsing and LL(1) grammars.	K3
CO3	Able to design and implement LL and LR parsers.	K3
CO4	Able to design algorithms to perform SDD's and Inter Mediate Code Generations.	K4
CO5	Ability to design algorithms to generate Storage Organization, machine Dependent and Independent Optimization	K3

 # Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3	2	2		1	2		1	2	3	1
CO2		3	2	3	2			1	1		2	1	2	
CO3	2	3	2	3	3			1	2		1	1	2	
CO4	2	3	2	2	2				2		1	1	2	3
CO5	2	3	2	3	3			1	1			2	1	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT – I: Introduction: Language Processors, the Phases of a compiler, Boot Strapping.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, the Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Lexical Analyzer.

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UNIT – II: Syntax Analysis: Introduction, Role of a Parser, Context Free Grammars, Derivations, Parse Trees, Ambiguity, Left Recursion, Left Factoring, Types of Parsers
Top-Down Parsing: Pre Processing Steps of Top-Down Parsing, Backtracking, Recursive Descent Parsing, Non-Recursive predictive parsing, LL (1) Grammars, Error recovery in predictive parsing.

UNIT – III: Bottom-Up Parsing: Types of LR Parsers, Shift Reduce Parsing, Difference between LR and LL Parsers, Construction of SLR Tables, More powerful LR parses, construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Error recovery in LR Parsing, Handling Ambiguity Grammar with LR Parsers.

UNIT – IV: Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, and Implementing L-Attributed SDD's.
Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Back patching, Switch-Control Flow statements, Intermediate Code for Procedures.

UNIT–V: Run-Time Environments: Storage organization, Run Time Storage Allocation, Activation Records, Procedure Calls.
Machine-Independent Optimizations: The Principle Sources of Optimization, Basic Blocks, Optimization of Basic Blocks, Structure Preserving Transformations, Flow Graphs, Loop Optimization, Data-Flow Analysis
Code Generation: Issues in the Design of a Code Generator, the Object Code Form, Code Generation Algorithm, Register Allocation and Assignment.
Machine-Dependent Optimizations: Peephole Optimization.

Text Books:

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson.

Reference Books:

1. Compiler Construction-Principles and Practice, Kenneth C Louden, Cengage Learning.
2. Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.
3. The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH
4. Writing compilers and interpreters, R. Mak, 3rd edition, Wiley student edition.
5. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly Learning Algorithms, Capacity, Overfitting

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III B. Tech – I Sem-R19

ARTIFICIAL INTELLIGENCE
PCC3104

Course Objectives: The student will be able to

- Know the methodology of Problem solving
- Implement basic AI algorithms
- Design and carry out an empirical evolution of different algorithms on a problem formalization

Course Outcomes (COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Discuss the fundamental concepts in Artificial Intelligence	K4
CO2	Analyze the applications of search strategies and problem reductions.	K6
CO3	Apply the mathematical logic concepts	K4
CO4	Develop the Knowledge representations in Artificial Intelligence	K4
CO5	Explain the Fuzzy logic systems	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3	2	2		1	2		1	2	3	1
CO2		3	2	3	2			1	1		2	1	2	
CO3	2	3	2	3	3			1	2		1	1	2	
CO4	2	3	2	2	2				2		1	1	2	3
CO5	1	3	2	2							1	1		

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT I: Introduction to artificial intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI

Problem solving: state-space search and control strategies: Introduction, general problem solving, characteristics of problem

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UNIT II: Search Strategies: 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 proportional logic, predicate logic

UNIT IV: Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames **advanced knowledge representation techniques:** Introduction, conceptual dependency theory, script structure.

UNIT V: Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools .

Text books:

1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

Reference books:

1. Atificial intelligence, structures and Strategies for Complex problem solving, - George F Lugar, 5th ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

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III B. Tech – I Sem-R19

PRINCIPLES OF PROGRAMMING LANGUAGE
PE3101

CO'S	Course Outcomes	Knowledge Level
CO1	**Describe** the syntax and semantics of programming languages and gain practical knowledge in lexical analysis and parsing phases of a compiler	K4
CO2	**Make use of** different constructs in programming languages with merits and demerits	K3
CO3	**Design** and implement sub programs in various programming languages	K5
CO4	**Developing** the knowledge on different programming language features like object-orientation, concurrency, exception handling and event handling	K3
CO5	**Analyzing** functional paradigm and ability to write small programs using Scheme and ML **Develop** programs logic paradigm and ability to write small programs using Prolog	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3	2	2		1	2		1	2	3	1
CO2	3	2	3	2	2			1	1		2	1	2	
CO3	2	3	2	3	3			1	2		1	1	2	
CO4	1	2	2	3	2	2		1	2		1	1	2	3
CO5	1	2	2	3	2	2		1	2		1	2	1	1

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT – I: Introduction: Role of Programming Languages: Why Programming Languages, Towards Higher-Level Languages, Programming Paradigms, and Programming Environments Language Description: Syntactic Structure, Language Translation Issues: Programming Language Syntax, Stages in Translation, Formal Translation Models

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UNIT – II: Data, Data Types, and Basic Statements : Names , Variables , Binding, Type Checking, Scope, Scope Rules , Lifetime and Garbage Collection, Primitive Data Types, Strings, Array Types, Associative Arrays ,Record 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, Dynamic Scoping.

UNIT – IV: Object-Orientation, Concurrency, and Event Handling : Grouping of Data and Operations — Constructs for Programming Structures, Abstraction Information Hiding, Program Design with Modules, Defined Types, Object Oriented Programming — Concept of Object, Inheritance, Derived Classes and Information Hiding – Templates, Semaphores, Monitors, Message Passing, Threads, Statement Level Concurrency Exception Handling

UNIT – V: Functional and Logic Programming Languages : Introduction to Lambda Calculus , Fundamentals of Functional Programming Languages, Programming with Programming with ML, Introduction to Logic and Logic Programming – Programming with Prolog.

Text Books:

1. Programming Languages: Design and Implementations" , Terrance W.Pratt, Marvin V. Zelkowitz, T.V.Gopal, Fourth ed., Prentice Hall
2. "Programming Language Design Concept", David A. Watt, Willey India

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III B. Tech – I Sem-R19

DIGITAL IMAGE PROCESSING
PE3101

Course Objectives:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain
- To learn concepts of degradation function and restoration techniques
- To study the image segmentation and representation techniques
- To become familiar with image compression and recognition methods

Course Outcomes (COs): At the end of the course, student will be able to

Course Outcomes		Knowledge Level (K)#
CO1	Demonstrate the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms	**K4**
CO2	Analyze & Operate on images using the techniques of smoothing, sharpening and enhancement.	**K6**
CO3	Apply Image restoration concepts and filtering techniques	**K4**
CO4	Illustrate the basics of Image segmentation	**K4**
CO5	Apply Image Compression and Recognition techniques	**K3**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3		2		1	2		1	2	3	1
CO2	3	2	3	2							2	1	2	
CO3	2	3	2	3				1	2		1	1	2	
CO4	2	2	3		2		1	2			1	1	2	3
CO5	1	2	2	3	2	2		1	2		1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

UNIT I: Digital Image Fundamentals: Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II: Image Enhancement: Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III: Image Restoration: Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering.

UNIT IV: Image Segmentation: Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V: Image Compression and Recognition: Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

Text Books:

1) Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson, Third Edition, 2010.
2) Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2002.

Reference Books:

1) Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
2) D,E. Dudgeon and RM. Mersereau, Multidimensional Digital Signal Processing, Prentice Hall Professional Technical Reference, 1990.
3) William K. Pratt, Digital Image Processing, John Wiley, New York, 2002.

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III B. Tech – I Sem-R19

ADVANCED UNIX PROGRAMMING
PE3101

OBJECTIVES: Understating the shell commands, shell programming, system calls of files and processes, signals, inter-process communication concepts and programming.

Course Outcomes (COs): At the end of the course, student will be able to

Course Outcomes		Knowledge Level (K)#
CO1	Know about the Unix commands	**K1**
CO2	Analyze of shell programming	**K6**
CO3	Apply Know about different system calls for files and directories	**K4**
CO4	Illustrate the basics working of processes and signals	**K4**
CO5	Apply the Application of client server program for IPC	**K4**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2	2		1	2	3	1
CO2	1	2	2	3					1		2	1	2	
CO3	1	3	2	2					1		1	1	2	
CO4	1	2	2	3					1		1	1	2	3
CO5	2	2	3		2		1	2	2		1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT-I: Introduction, History of unix, Architecture of unix, Responsibilities of shell, unix file system, vi editor. **Unix commands**: Some Basic Commands, file utilities, process utilities, text processing utilities, network utilities,

UNIT-II: Unix Commands: disk utilities, backup utilities , Security by file permissions. **Filters:** The grep family, The stream editor, the awk. **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,

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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(<<), The Sleep Command, Debugging Scripts, The Script command, The Eval command, The Exec Command

UNIT-III: Files - Introduction, file descriptors, open, creat, read, write, close, lseek, dup2, file status information-stat family, file and record locking- fcntl function, file permissions - chmod, fchmod, file ownership-chown, lchown, links-soft and hard links- symlink, link, unlink. **Directories-**Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning Directories-opendir, readdir, closedir, rewinddir functions waitpid functions, exec functions, user identify Process Control: process identifiers, fork function, vfork function, exit function, wait and exec functions, user identification

UNIT-IV: IPC: introduction, pipes, FIFO's, client –server examples for pipes and FIFO's **message queues:** message queue structure in kernel, system calls of message queue, client-server example for message queue. **Semaphores:** definition, system calls of semaphores, semaphores structure in kernel, file locking using semaphores.

UNIT-V: Shared memory-system calls of shared memory, semaphore structure in kernel, client server example. **Sockets:** Introduction, overview, elementary socket system calls, TCP Echo program, UDP Echo program

Text Books:

1. Unix the ultimate guide, 3rd edition, sumitabha Das, TMH.
2. Advanced programming in the unix environment by W. Richard Stevens.
3. Unix network programming by W. Richard Stevens.

Reference Books:

1. Introduction to Unix and shell programming, Venkateshmurhty
2. Unix and shell programming by B.M. Harwani, OXFORD university press.

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III B. Tech – I Sem-R19

ADVANCED COMPUTER ARCHITECTURE
PE3101

Course Objectives: The main objective of the course is to provide a deep understanding on advanced computer architectures and low-level system software such as pipelined and Multiprocessor systems

Course Outcomes(COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understand the advanced concepts of computer architecture. (Knowledge and understanding)	K2
CO2	Compare and contrast the parallel architectures	K2, K4,K5
CO3	Illustrate parallel programming concepts	K2, K3
CO4	Investigate modern design structures of Pipelined and Multiprocessors systems.	K4
CO5	Acquainted with recent computer architectures and I/O devices, as well as the low-level language required to drive/manage these types of advanced hardware.	K6
CO6	Identify the limitations of ILP.	K2

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2	2	2	1	2	3	1
CO2	1	2	2	3					1	2	2	1	2	
CO3	1	3	2	2					1	3	1	1	2	
CO4	1	2	2	3					1	2	1	1	2	3
CO5	2	2	3		2		1	2	2	2	1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT–I: Theory of Parallelism: Parallel Computer Models, The State of Computing, Multiprocessors and Multicomputer, Multivector and SIMD Computers, PRAM and VLSI Models, Program and Network Properties, Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms, System Interconnect Architectures, Principles of Scalable Performance, Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance Laws, Scalability Analysis and Approaches.

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UNIT-II: Hardware Technologies: Processors and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

UNIT-III: Bus, Cache, and Shared Memory, Bus Systems, Cache Memory Organizations, Shared Memory Organizations, Sequential and Weak Consistency Models, Pipelining and Superscalar Techniques, Linear Pipeline Processors, Nonlinear Pipeline Processors, Instruction Pipeline Design, Arithmetic Pipeline Design (Upto 6.4)

UNIT-IV: Parallel and Scalable Architectures: Multiprocessors and Multicomputers, Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Three Generations of Multicomputers, Message-Passing Mechanisms, Multivector and SIMD Computers, Vector Processing Principles, Multivector Multiprocessors, Compound Vector Processing, SIMD Computer Organizations(Upto 8.4), Scalable, Multithreaded and Dataflow Architectures, Latency-Hiding Techniques, Principles of Multithreading, Fine-Grain Multicomputers, Scalable and Multithreaded Architectures, Dataflow and Hybrid Architectures.

UNIT–V: Software for parallel programming: Parallel Models, Languages, and Compilers, Parallel Programming Models, Parallel Languages and Compilers, Dependence Analysis of Data Arrays, Parallel Program Development and Environments, Synchronization and Multiprocessing Modes. Instruction and System Level Parallelism, Instruction Level Parallelism, Computer Architecture, Contents, Basic Design Issues, Problem Definition, Model of a Typical Processor, Compiler-detected Instruction Level Parallelism, Operand Forwarding, Reorder Buffer, Register Renaming, Tomasulo's Algorithm, Branch Prediction, Limitations in Exploiting Instruction Level Parallelism, Thread Level Parallelism.

Text Books:

1. "Advanced Computer Architecture (SIE): Parallelism, Scalability, Programmability", Kai Hwang and Naresh Jotwani, McGraw Hill Education 3rd Edition. 2015
2. "Computer Architecture and Parallel Processing", Kai Hwang and Faye Briggs, Mc Graw-Hill International Edition, 2000

Reference Books:

1. John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach, 5th edition, Morgan Kaufmann Elseveir, 2013
2. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G. Wellein, CRC Press, Taylor & Francis Group.
3. Sima D, Fountain T and Kacsuk P, "Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 2000.

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III B. Tech – I Sem-R19

OBJECT ORIENTED ANALYSIS AND DESIGN
PE3101

OBJECTIVE:

- To understand how to solve complex problems
- Analyze and design solutions to problems using object oriented approach
- Study the notations of Unified Modeling Language

Course Outcomes(COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the Inherent Complexity of Software	K2
CO2	Identify classes and responsibilities of the problem domain	K2, K4,K5
CO3	Represent classes, responsibilities and states using UML notation	K2, K3
CO4	Ability to find solutions to the complex problems using object oriented approach	K4

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			1	2	3	1
CO2	1	2	2	3							2	1	2	
CO3	1	3	2	2							1	1	2	
CO4	1	2	2	3							1	1	2	3
CO5	2	2	3		2		1	2			1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT-I: Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model.

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UNIT-II: Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT-III: Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT-IV: Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams. Implementation Diagrams, UML package diagram, when to use package diagrams, Component and Deployment Diagrams, When to use Component and Deployment diagrams

UNIT-V: Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Software Quality Assurance, Impact of object orientation on Testing , Develop Test Cases and Test Plans Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

Case Study: The Unified Library application.

Text Books:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON.
2. "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.

Reference Books:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O"Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning
4. "The Unified modeling language Reference manual", James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley

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COMPUTER NETWORKS & COMPILER DESIGN LAB
PCC3105

Objectives:

- To understand the working principle of various communication protocols.
- To analyze the various routing algorithms.
- To know the concept of data transfer between nodes.
- To analyze various parsing techniques, code optimization.
- To learn how the parse trees are generated, errors are handled and code is optimized.

Course Outcomes (COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level(K#)
CO1	Analyze performance of various communication protocols.	**K4**
CO2	Practice packet /file transmission between nodes.	**K3**
CO3	Construct error detecting and correcting codes.	**K5**
CO4	Develop programs for data transfer between nodes using Routing algorithms.	**K6**
CO5	Develop Top Down and Bottom Up Parsing and LL grammars.	**K5**
CO6	Design and implement LL and LR parsers.	**K6**

#Based on suggested Revised BTL

Computer Networks Lab

List of Experiments:

1. Study of Network devices in detail and connect the computers in Local Area Network.
2. Write a Program to implement the data link layer farming methods such as i) character stuffing ii) bit stuffing.
3. Write a Program to implement data link layer farming method checksum.
4. Write a program for Hamming Code generation for error detection and correction.
5. Write a Program to implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
6. Write a Program to implement Sliding window protocol for Goback N.
7. Write a Program to implement Sliding window protocol for Selective repeat.
8. Write a Program to implement Stop and Wait Protocol.
9. Write a program for congestion control using leaky bucket algorithm

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10. Write a Program to implement Dijkstra's algorithm to compute the Shortest path through a graph.
11. Write a Program to implement Distance vector routing algorithm by obtaining routing table at each node (Take an example subnet graph with weights indicating delay between nodes).
12. Write a Program to implement Broadcast tree by taking subnet of hosts.

Compiler Design Lab

List of Experiments:

1. Write a C program to identify different types of Tokens in a given Program.
2. Implementation of Lexical Analyzer using Lex tool
3. Write a C program to Simulate Lexical Analyzer to validating input String.
4. Write a program to implement Brute force technique of Top down parsing.
5. Implementation of Recursive Descent Parser
6. Write program to calculate First and Follow Functions Sets for the given grammar
7. Write a program to check the validity of input string using Predictive Parser.
8. Implement a Shift Reduce Parser using Stack Data Structure for a given grammar.
9. Implementation of calculator using LEX and YACC tool
10. Generate YACC specification for a few syntactic categories.
11. Write a program for generating various intermediate code forms
    i) Three address code ii) Polish notation
12. Write a program to perform loop unrolling and constant propagation.

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AI TOOLS & TECHNIQUES LAB
PCC3106

1. Write a program to implement A* Search Algorithm
2. Write a program to implement K-means and KNN algorithms and explain the difference between them
3. Write a program to implement Naïve Bias Algorithm for a classification problem
4. Write a program to implement Suduko solver
5. Turbo Prolog features and format.
6. Write a program using variables in Prolog.
   a. Write a Prolog program containing facts related to following predicates
      1. Location (city, state)
      2. Stays (person, city)
   b. Display: (i) list of person, state and city
      (ii) Given person staying in which state.
7. (1) Write a program for using Input, Output and fail predicates in Prolog.
   Display: (i) list of married & unmarried employees
   (ii) List of male & female employees
   (iii) List of employees for given job location
   (2)Create a small set of facts and rules on who is the ancestor of whom.
8. Study of PROLOG. Write the following programs using PROLOG
9. Program to read address of a person using compound variable .
10. Write a program to solve 8 queens problem
11. Write any problem using depth first search.
12. Implement any problem using best first search.
13. Write 8-puzzle problem using best first search.
14. Experiment Robot (traversal) problem using means End Analysis
15. Implement traveling salesman problem.
16. Program to demonstrate family relationship
17. Program to read address of a person using compound variable .

18. i) Program to count number of elements in a list .

    ii) Program to reverse the list .

19. Using RapidMiner Community implement the following
    Perform EDA (Exploratory Analysis on the following datasets)

References:

1. https://www.kaggle.com/sootersaalu/amazon-top-50-bestselling-books-2009-2019?select=bestsellers+with+categories.csv
2. https://www.kaggle.com/unsdsn/world-happiness

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DATA WAREHOUSING AND DATA MINING LAB
PCC3107

COURSE OUTCOMES:

CO	Course Outcomes	Knowledge Level(K#)
CO1	Design a data mart or data warehouse for any organization	K6
CO2	Extract knowledge using data mining techniques	K2
CO3	Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification, clustering.	K2
CO4	Analyze on knowledge flow application on data sets	K3

Software Requirements: WEKA Tool/Python

LIST OF EXPERIMENTS:

Sl. No **Exercise Name**

1 Creation of a Data Warehouse.

- Build Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration Tool, Pentaho Business Analytics; or other data warehouse tools like Microsoft-SSIS,Informatica,Business Objects,etc.,)
- Design multi-dimensional data models namely Star, Snowflake and Fact Constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, manufacturing, Automobiles, salesetc).
- Write ETL scripts and implement using data warehouse tools.
- Perform Various OLAP operations such slice, dice, roll up, drill up and pivot.

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2 Explore machine learning tool "WEKA"

- Explore WEKA Data Mining/Machine Learning Toolkit.
- Downloading and/or installation of WEKA data mining toolkit.
- Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.
- Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)
- Study the arff file format Explore the available data sets in WEKA. Load a data set (ex. Weather dataset, Iris dataset, etc.)
- Load each dataset and observe the following:
  1. List the attribute names and they types
  2. Number of records in each dataset
  3. Identify the class attribute (if any)
  4. Plot Histogram
  5. Determine the number of records for each class.
  6. Visualize the data in various dimensions

3 Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

- Explore various options available in Weka for preprocessing data and apply
  unsupervised filters like Discretization, Resample filter, etc. on each dataset
- Load weather. nominal, Iris, Glass datasets into Weka and run Apriori
  algorithm with different support and confidence values.
- Study the rules generated. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated.
- Derive interesting insights and observe the effect of discretization in the rule generation process.

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4 Demonstrate performing classification on data sets

- Load each dataset into Weka and run 1d3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
- Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix.
- Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
- Plot RoC Curves
- Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

5 Demonstrate performing clustering of data sets

- Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters).
- Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
- Explore other clustering techniques available in Weka.
- Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

6 Demonstrate knowledge flow application on data sets

- Develop a knowledge flow layout for finding strong association rules by using Apriori, FP Growth algorithms
- Set up the knowledge flow to load an ARFF (batch mode) and perform a cross validation using J48 algorithm
- Demonstrate plotting multiple ROC curves in the same plot window by using j48 and Random forest tree

7 Write a program of Apriori algorithm using python programming language.

8 Write a program of Naive Bayesian classification using python programming language.

9 Write a program of cluster analysis using simple k-means algorithm python programming language.

10 A case study of Business Intelligence in Government sector/Social Networking/Business.

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SOCIALLY RELEVANT PROJECTS
(15 HRS)
Code: PR3101

1. Water Conservation Related Works
2. Swatch Bharath (Internal External)
3. Helping police
4. Traffic monitoring
5. Teaching Rural Kids (Sarva siksha Abhiyan)
6. Street light monitoring
7. Electricity Conservation
8. Solar panel utilization
9. E- policing & cyber solution
10. Pollution
11. Any social related

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Employability skills-II
Code: MC3101

Course Outcomes: After completion of this course

CO	Course Outcomes	Knowledge Level (K)#
CO1	Solve various Basic Mathematics problems by following different methods	**K3**
CO2	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems	**K2**
CO3	Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.	**K3**
CO4	Analyze, summarize and present information in quantitative forms including table, graphs and formulas	**K4**

SYLLABUS:
UNIT I:
Numerical ability l: Number system, HCF & LCM, Average, Simplification, Problems on numbers
Numerical ability II: Ratio & Proportion, Partnership, Percentages, Profit & Loss
UNIT II:
Arithmetical ability l: Problems on ages, Time & Work, Pipes & Cistern, Chain Rule.
Arithmetical ability ll: Time & Distance, Problems on boats &Steams, Problems on Trains
UNIT III:
Arithmetical ability lll: Allegation, Simple interest and compound interest, Races & Games of skills, Calendar and Clock, **Logical ability:** Permutations and Combination and Probability.
UNIT IV: Mensuration: Geometry, Areas, Volumes, **Data interpretation:** Tabulation, Bar graphs, Pie charts, line graphs

TEXT BOOKS AND REFERENCE BOOKS:

1. R. S. Aggarwal "Quantitative Aptitude", Revised ed., S Chand publication, 2017 ISBN:8121924987

E- resources:

1. https://blog.feedspot.com/aptitude_youtube_channels/
2. https://www.tutorialspoint.com/quantitative_aptitude/
3. https://www.careerbless.com/aptitude/qa/home.php

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MACHINE LEARNING USING PYTHON
PCC3201

Course Objectives:

- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the definition and usage of the term 'the internet of things' in different contexts.	K2
CO2	Demonstrate on various network protocols used in IoT.	K2
CO3	Analyze on various key wireless technologies used in IoT systems, such as WiFi, 6LoWPAN, Bluetooth and ZigBee.	K4
CO4	Illustrate on the role of big data, cloud computing and data analytics in IoT system.	K5
CO5	Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software.	K6

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			1	2	3	1
CO2	1	2	2	3							2	1	2	
CO3	1	3	2	2							1	1	2	
CO4	1	2	2	3							1	1	2	3
CO5	2	2	3		2		1	2			1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

UNIT I: Introduction: Well-posed Learning Problems, Designing a Learning System, Perspectives and Issues in Machine Learning.
Concept Learning and the General-to-specific Ordering: Introduction, A Concept Learning Task, Concept Learning as Search, Find-S: Finding a Maximally Specific Hypothesis, Version Spaces and the CANDIDATE-ELIMINATON Algorithm, Remarks on Version Spaces and Candidate Elimination, Inductive Bias.
Decision Tree Learning: Decision Tree Representation, Appropriate Problems, The Basic Decision Tree Learning Algorithm, Hypothesis Space Search, Issues in Decision Tree Learning

UNIT II: Linear Regression & Logistic Regression:
Predicting Numeric Values: Regression - Finding the Best Fit Lines with Linear Regression, Locally Weighted Linear Regression, Shrinking Coefficients, The Bias / Variance Tradeoff.
Logistic Regression: Classification with Logistic Regression and the Sigmoid Function, Using Optimization to find the Best Regression Coefficients.

UNIT III: Artificial Neural Networks: Introduction, Neural Network Representation, Appropriate Problems for Neural Network Learning, Perceptions, Multilayer Networks and the Backpropagation Algorithm, Remarks on the Backpropagation Algorithm, An Illustrative Example of Face Recognition, Advanced Topics in Artificial Neural Networks

UNIT IV: Evaluation Hypotheses: Motivation, Estimation Hypothesis Accuracy, Basics of Sampling Theory, A General Approach for Deriving Confidence Intervals, Difference in Error of Two Hypotheses, Comparing Learning Algorithms.

UNIT V: Support Vector Machines: Separating Data with the Maximum Margin, Finding the Maximum Margin, Efficient Optimization with SMO Algorithm, Speeding up Optimization with Full Platt SMO, Using Kernels for More Complex Data. **Dimensionality Reduction techniques:** Principal Component Analysis with Example. **Instance-Based Learning**- Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning. **Python Libraries suitable for Machine Learning:** Anaconda, Jupyter Notebook, Numpy, Pandas, Matplotlib

Text Books:

1. Machine Learning ,Tom M. Mitchell, MGH
2. Machine Learning in Action, Peter Harington, 2012, Manning Publications Co.

Reference Books:

1. Introduction to Machine Learning, Ethem Alpaydin, PHI, 2004

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DESIGN AND ANALYSIS OF ALGORITHMS
PCC3202

Course Objectives:

- To provide an introduction to formalisms to understand, analyze and denote time complexities of algorithms
- To introduce the different algorithmic approaches for problem solving through numerous example problems
- To provide some theoretical grounding in terms of finding the lower bounds of algorithms and the NP-completeness

Course Outcomes(COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms and apply graph search algorithms to real world problems	K1
CO2	List and describe various algorithmic approaches and Solve problems using divide and conquer & greedy Method	K3
CO3	Apply dynamic pogramming to real world problem	K2
CO4	Organize backtracking, branch and bound algorithmic approaches	K6
CO5	Demonstrate NP- Completeness theory ,lower bound theory and String Matching	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			1	2	3	1
CO2	1	2	2	3							2	1	2	
CO3	1	3	2	2		1		3			1	1	2	
CO4	1	2	2	3							1	1	2	3
CO5	2	2	3		2		1	2			1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

Syllabus:

UNIT I: Introduction: Algorithm Definition, Algorithm Specification, performance Analysis, Performance measurement, Asymptotic notation, Randomized Algorithms. Sets & Disjoint set union: introduction, union and find operations.

Basic Traversal & Search Techniques: Techniques for Graphs, connected components and Spanning Trees, Bi-connected components and DFS.

UNIT II: Divide and Conquer: General Method, Defective chessboard, Binary Search, finding the maximum and minimum, Merge sort, Quick sort. **The Greedy Method:** The general Method, container loading, knapsack problem, Job sequencing with deadlines, minimum-cost spanning Trees.

UNIT III: Dynamic Programming: The general method, multistage graphs, All pairs-shortest paths, single- source shortest paths: general weights, optimal Binary search trees, 0/1 knapsack, reliability Design, The traveling salesperson problem, matrix chain multiplication.

UNIT IV: Backtracking: The General Method, The 8-Queens problem, sum of subsets, Graph coloring, Hamiltonian cycles, knapsack problem.
Branch and Bound: FIFO Branch-and-Bound, LC Branch-and-Bound, 0/1 Knapsack problem, Traveling salesperson problem.

UNIT V: NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP-Complete classes, Cook's theorem.
String Matching: Introduction, String Matching-Meaning and Application, Naïve String Matching Algorithm, Rabin-Karp Algorithm, Knuth-Morris-Pratt Automata, Tries, Suffix Tree.

Text Books:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition, Universities Press.
2. Harsh Bhasin, "Algorithms Design & Analysis", Oxford University Press.

Reference Books:

1. Horowitz E. Sahani S: "Fundamentals of Computer Algorithms", 2nd Edition, Galgotia Publications,2008.
2. S. Sridhar, "Design and Analysis of Algorithms", Oxford University Press.

Resources:
http://nptel.ac.in/courses/106101060/

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III B. Tech – II Sem-R19

Universal Human Values 2: Understanding Harmony
HSS3201

Human Values Courses

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: Understanding Harmony"is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

Universal Human Values 2: Understanding Harmony

Course code: HSMC (H-102)
Credits: L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits
Pre-requisites: None. Universal Human Values 1 (desirable)

1. OBJECTIVE:

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being),family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

2. COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than asarbitrariness in choice based on liking-disliking

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

2. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
3. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
4. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
5. Understanding the characteristics and activities of 'I' and harmony in 'I'
6. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
7. Programs to ensureSanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

8. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
9. Understanding the meaning of Trust; Difference between intention and competence
10. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
11. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
12. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family**.**

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self-regulation in nature

20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space

21. Holistic perception of harmony at all levels of existence.
Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

22. Natural acceptance of human values
23. Definitiveness of Ethical Human Conduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people- friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
26. Case studies of typical holistic technologies, management models and production systems
27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
28. Sum up.
Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

3. READINGS:

3.1 Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books,New Delhi, 2010

3.2 Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

4. MODE OF CONDUCT (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.
Tutorial hours are to be used for practice sessions.
While analysing and discussing the topic, the faculty mentor's role is in pointing to essentialelements to help in sorting them out from the surface elements. In other words, help the studentsexplore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up" ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials)
would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working basedon basic humanvalues.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department, including HSS faculty. Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

5. ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of thestudent, so participation in classroom discussions, self-assessment, peer assessment etc. will be used in evaluation.
Example:

Assessment by faculty mentor: 10 marks
Self-assessment: 10 marks
Assessment by peers: 10 marks
Socially relevant project/Group Activities/Assignments: 20 marks
Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course**.**

6. OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

This is only an introductory foundational input. It would be desirable to follow it up by

a) faculty-student or mentor-mentee programs throughout their time with the institution

b) Higher level courses on human values in every aspect of living. E.g. as a professional

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OPERATION RESEARCH
PE3201

Course Objectives:

- To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.
- To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.
- To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

Course Outcomes(COs): At the end of the course, student will be able to

Course Outcomes		Knowledge Level (K)#
CO1	Describe clearly a problem, identify its parts and analyze the individual functions	**K1**
CO2	Perform Feasibility study for solving an optimization problem	**K3**
CO3	Become a mathematical translation of the verbal formulation of an optimization problem	**K2**
CO4	Design algorithms, the repetitive use of which will lead reliably to finding an approximate solution	**K6**
CO5	Discover, study and solve optimization problems	**K6**
CO6	Investigate, study, develop, organize and promote innovative solutions for various applications	**K3**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			**1**	**2**	**3**	**1**
CO2	1	2	2	3							**2**	**1**	**2**	
CO3	2	2	3	2							**1**	**1**	**2**	
CO4	1	1	2	2	1						**1**	**1**	**2**	**3**
CO5	2	2	3		2		1	2			**1**	**1**	**2**	

(Please fill the above levels with Correlation i.e. L-1, M-2, H-3)

Syllabus:

UNIT–I: Development: Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes,
Allocation: Introduction linear programming formulation, graphical solution, simplex methods, artificial variable technique, duality principle

UNIT-II: Transportation problem: Formulation, optimal solution, unbalanced transportation, **Assignment problem:** formulation, optimal solution, variations

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problem, degeneracy i.e. non square MXN) matrix, restrictions, **Sequencing:** Introduction, optimal solution for processing each of n jobs through three machines, travelling salesman problem (i.e.) shortest acyclic route models.

UNIT-III: Replacement: Introduction, replacement of items that deteriorate when money value is not counted and counted, and replacement of items that fail completely (i.e.) group replacements, **Waiting lines:** Introduction, single channel, Poisson arrivals, exponential service time infinite population and unrestricted queue.

UNIT-IV: Inventory: Introduction, single item, deterministic models, production is instantaneous or at a constant rate , shortages are allowed or not allowed and with drawls from stock is continuous, purchase inventory model with one price break, shortages are not allowed, instantaneous production demand production or purchase cost is relevant, stochastic models, simple problems.

UNIT–V: Theory of Games: Introduction, minmax (maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle points. **Dynamic programming:** Introduction, Bellman's Principle of optimality, solutions for simple problems, **Project Management:** PERT and CPM, difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities

Text Books:

1. Operations Research, 2nd Edition, S.D.Sharma, Ramnath&Kedarnath Co, Meerut,2009
2. Operations Research, An introduction, 8th Edition, Taha, Pearson, 2008

Reference Books:

1. Operations Research, Revised edition, P.K.Gupta, D.S. Hira, S.Chand, 2014
2. Operations Research, Problems &Solutions, 2nd Edition, JKSharma, Macmillan,2003
3. Operations Research, 2nd Edition, Panneerselvam, PHI, 2004

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III B. Tech – II Sem-R19

ADVANCED COMPUTER NETWORKS
PE3201

Course Objectives: This course is aimed at enabling the students to

- The course is aimed at providing basic understanding of Computer networks starting with OSI Reference Model, Protocols at different layers with special emphasis on IP, TCP & UDP and Routing algorithms.
- Some of the major topics which are included in this course are CSMA/CD, TCP/IP implementation, LANs/WANs, internetworking technologies, Routing and Addressing.
- Provide the mathematical background of routing protocols.
- Aim of this course is to develop some familiarity with current research problemsand research methods in advance computer networks.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Student learns routing algorithms and different congestion control methods in networking.	K2
CO2	Students Learns IPV4 and IPV6 protocol Formats and how these protocols used to deliver data packets from source to destination.	K4
CO3	Students Learns different Transport Layer protocol formats of TCP, UDP and SCTP for packet delivery at Transport Layer..	K3
CO4	Students Learns the concepts Wireless LANS, IEEE 802.11, and Satellite networks.	K6
CO5	Students Learn the emerging trends of networks-MANETS, WSN and their applications.	K2

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			1	2	3	1
CO2	1	2	2	3							2	1	2	
CO3	2	2	3	2							1	1	2	
CO4	1	1	2	2	1						1	1	2	3
CO5	2	2	3		2		1	2			1	1	2	

(Please fill the above levels with Correlation i.e. L-1, M-2, H-3)

Syllabus:

UNIT- I: Network Device, Routing algorithms, BGP, Advanced routing concepts, Router architectures, internetworking: Inter domain Routing, BGP, IPv6, Multicast Routing Protocols, Multi Protocol Label Switching, and Virtual Networks. Transport layer Transport protocols, TCP mechanics, congestion control, resource allocation UDP mechanics. Socket Programming.

UNIT- II: High speed transport protocols, Quality of Service Mechanisms, Improving QoS in Internet, DiffServ and IntServ Architectures, RSVP. Distributed Systems: Naming, DNS, DDNS, Paradigms for Communication in Internet, Caching, Issues of Scaling in Internet and Distributed Systems, Caching Techniques for Web, Protocols to Support Streaming Media, Multimedia Transport Protocols, Content Delivery Networks, Overlay and P2P Networks.

UNIT – III: Applications: architectures and examples. Network virtualization, software defined networking Applications and Other Networking Technologies: RTP, RTSP, SIP, VoIP, Security Systems, SSH, PGP, TLS, IPSEC, DoS Attack, Mitigation in Internet, Security in MPLS.

UNIT- IV: Wireless LANS: Introduction, Architectural comparison, Access control, The IEEE 802.11 Project: Architecture, MAC sub layer, Addressing Mechanism, Physical Layer, Bluetooth: Architecture, Bluetooth Layers,Satellite Networks: Operation, GEO Satellites, MEO satellites, LEO satellites.

UNIT–V: Emerging trends in Computer networks: Mobile computing: Motivation for mobile computing, Protocol stack issues in mobile computing environment, mobility issues in mobile computing, security issues in mobile networks, MOBILE Ad Hoc Networks: Applications of Ad Hoc Networks, Challenges and Issues in MANETS, MAC Layer Issues Routing Protocols in MANET, Transport Layer Issues, Ad hoc Network Security

Wireless Sensor Networks: WSN functioning, Operating system support in sensor devices, WSN characteristics, sensor network operation, Sensor Architecture: Cluster management, Wireless Mesh Networks: WMN design , Issues in WMNs, Computational Grids, Grid Features, Issues in Grid construction design, Grid design features.

Text Books:

1. Internetworking with TCP/IP:Principles, Protocols, and Architecture by Douglas E. Commer-Prentice Hall-6th Edition, 2013
2. Data Communications and Networking,4th Edition Behrouz A Fourzan,TMH-2007
3. Computer Networks, Mayank Dave, CENGAGE, 1st Edition.2012

Reference Books:

1. Computer Networks by Andrew S. Tanenbaum, David J.Wetherall-Prentice-Hall-5th Edition, 2010
2. Data Communications and Networks nh Achyut S Godbole and Atul Kahate, TMH
3. Computer Networks, A System Approach, 5th Edition, Larry L Peterson and Bruce S Davie, Elsevier-2012

4. SDN: Software Defined Networks,Thomas D. Nadeau, Ken Gray,Kindle Ed., O'Reilly,2013
5. Data Communication and Network,Behrouz A. Forouzan,McGraw Hill,5th Edition 2012

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MOBILE APPLICATION DEVELOPMENT
PE3201

Course Outcomes: At the end of this course, students will be able to:

- Install and configure Android application development tools.
- Design and develop user Interfaces for the Android platform.
- Save state information across important operating system events.
- Apply Java programming concepts to Android application development.

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			1	2	3	1
CO2	1	2	2	3							2	1	2	
CO3	2	2	3	2							1	1	2	
CO4	1	1	2	2	1						1	1	2	3

(Please fill the above levels with Correlation i.e. L-1, M-2, H-3)

Syllabus:

UNIT I: Introduction to Mobile Computing- Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development, Android User

UNIT II: Intents on UIs VUIs and Mobile Apps: Text-to-Speech Techniques Designing the Right UI Multichannel and Multimodial UIs and Services-Android Intents and Services, Characteristics of Mobile Applications, Successful Mobile Development- Storing and Retrieving Data-Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider

UNIT III: Communications Via Network and the Web- State Machine, Correct Communications Model, Android Networking and Web, Telephony- Deciding Scope of an App, Wireless Connectivity and Mobile Apps, Android Telephony, **Notifications and Alarms-** Performance, Performance and Memory Management, Android Notifications and Alarms

UNIT IV: Graphics-Performance and Multithreading, Graphics and UI Performance, Android Graphics and Multimedia, Mobile Agents and Peer-to-Peer Architecture, Android Multimedia Location, Mobility and Location Based Services, Android,

UNIT V: Packaging and Deploying, Performance Best Practices, Android Field Service App, Security and Hacking - Active Transactions, More on Security, Hacking Android,

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Platforms and Additional Issues - Development Process, Architecture, Design, Technology Selection, Mobile App Development Hurdles, Testing

Text Books:

1. Professional Mobile Application Development 11 October 2012 by Jeff Mcherter and Scott Gowell

Reference Book:

1. Android Programming: The Big Nerd Ranch Guide (3rd Edition)
2. iOS Programming: The Big Nerd Ranch Guide (6th Edition)
3. Mastering Xamarin UI Development 1st
4. Xamarin Mobile Application Development: Cross-Platform C# and Xamarin.Forms Fundamentals 1st
5. Professional Android 4 Application Development

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DISTRIBUTED SYSTEMS
PE3201

Course Objectives: At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of System models and Concurrency Control in Distributed Transactions

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Discuss about System Models	K6
CO2	How to know External Data Representation and Marshalling	K1
CO3	Explain the Operating System Architecture	K3
CO4	Demonstrate Service Architecture	K6
CO5	Identify the Concurrency Control in Distributed Transactions	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	3	1				1		1	2	3	1
CO2	3	2	3	3	2	1		2	1		2	1	2	
CO3	2	2			3	2		1	2		1	1	2	
CO4	1			2	3	2		3	2		1	1	2	3
CO5	2	2			3						1	1	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-I: Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Challenges. **System Models:** Introduction, Physical Models, Architectural Models, Fundamental Models

UNIT-II: Inter-process Communication: Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Multicast Communication, Network Virtualization: Overlay Networks **Remote Invocation:** Introduction, Request- reply Protocols, Remote Procedure Call, Remote Method Invocation

UNIT-III: Indirect Communication: Introduction, Group Communication, Message Queues, Shared Memory Approaches **Operating System Support:** Introduction, The Operating System Layer, Protection, Processes and Threads, Communication and Invocation, Operating System architecture, Virtualization at the Operating System Level.

UNIT-IV: Distributed File Systems: Introduction, File Service Architecture, Case Study: Sun Network File System, Enhancements and Further Developments **Co-ordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Coordination and Agreement in Group Communication

UNIT-V: Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, **Distributed Transactions:** Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery

Text Books:

1. George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair "Distributed Systems- Concepts and Design", Fifth Edition, Pearson Publications

Reference Books

1. Ajay D Kshemkalyani, MukeshSinghal, "Distributed Computing-Principles,Algorithms and Systems", Cambridge
2. Andrew S Tanenbaum, Maarten Van Steen, "Distributed Systems-Principles andParadigms-PHI

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III Year B. Tech – II Semester

Software Project Management
PE3202

Course Objectives: At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	**Apply** the process to be followed in the software development life-cycle models.	K3
CO2	**Apply** the concepts of project management• & planning. Implement the project plans through managing people, communications and change.	K3
CO3	**Conduct** activities necessary to successfully complete and close the Software projects.	K2
CO4	**Implement** communication, modeling, and construction & deployment practices in software development.	K6
CO5	**Illustrate** Life Cycle Expectations Pragmatic Software	K6

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2	2		1	2	3	1
CO2	1	2	2	3					1		2	1	2	
CO3	2	2	3	2					2		1	1	2	
CO4	1	1	2	2	1				1		1	1	2	3
CO5	2	2	3		2		1	2	2		1	1	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-I: Conventional Software Management: The waterfall Model, Conventional Software Management Performance, Evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. **Improving Software Economics:** Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II: Conventional and Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, and Transitioning to an interactive Process. **Life Cycle Phases:** Engineering and Production Stages Inception, Elaboration, Construction, Transition phases.

UNIT-III: Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. **Model Based Software Architectures:** A Management Perspective and Technical Perspective.

UNIT-IV: Flows of the Process: Software Process Workflows. Inter Trans Workflows. **Checkpoints of the Process:** Major Mile Stones, Minor Milestones, Periodic Status Assessments. **Interactive Process Planning:** Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V: Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations and Evolution of Organizations. **Process Automation:** Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software.

Text Books:

1. Software Project Management, Walker Royce, Pearson Education, 2005.
2. Software Project Management, Bob Hughes, 4th edition, Mike Cotterell, TMH.

Reference Books:

1. Software Project Management, Joel Henry, Pearson Education.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005.
3. Effective Software Project Management, Robert K.Wysocki, Wiley,2006.

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NETWORK PROGRAMMING
PE3202

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	**Explain** OSI Reference Model	K3
CO2	**Demonstrate** the I/O Multiplexing & IPV6 Socket option	K5
CO3	**Describe** the TCP Echo server functions	K4
CO4	**Analyze** the UDP Echo server function	K5
CO5	**Identify** the Server Binding, Authentication	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3		2		1	2			1	2	3	1
CO2	1	2	2	3					1		2	1	2	
CO3	2	2	3	2					2		1	1	2	
CO4	1	1	2	2	1				1		1	1	2	3
CO5	2	2	3		2		1	2	2		1	1	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-I: Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

UNIT-II: Sockets: Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.
I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, get socket and set socket functions. Socket states, Generic socket option, IPV6 socket option, ICMPV6 socket option IPV6 socket option and TCP socket options.

UNIT-III: TCP client server: Introduction, TCP Echo server functions, Normal start-up, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

UNIT-IV: Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, get host by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

Unit-V: Remote Procedure Calls: Sun RPC, Introduction, Multithreading, Server Binding, Authentication, Timeout and Retransmission, Call semantics, Premature Termination of Client or server, RPC packet formats.

TEXTBOOKS:

1. UNIX Network Programming, Vol. I, SocketsAPI, 2nd Edition. - W.Richard Stevens, Pearson Education. Asia.
2. UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

REFERENCES BOOKS:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

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DESIGN PATTERNS
PE3202

Course Objectives:

- The aim of the course is to appreciate the idea behind Design Patterns in handling common problems faced during building an application
- This course covers all pattern types from creational to structural, behavioral to concurrency and highlights the scenarios when one pattern must be chosen over others

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	**Create** software designs that are scalable and easily maintainable	**K1**
CO2	**Develop** creational design patterns in software design for class instantiation	**K4**
CO3	**Illustrate** structural design patterns for better class and object composition	**K5**
CO4	**Describe** behavioral patterns for better organization and communication	**K4**
CO5	**Make Use of** behavioral patterns for better organization and communication between the objects	**K2**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	1	2		1	2			1	2	3	1
CO2	3	2	2	3	2						2	1	2	
CO3	2	3	3	2							1	1	2	
CO4	2	1	2	2	1						1	1	2	3
CO5	2	2	3		2		1	2			1	1	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-1: Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern. What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought

UNIT-II: A Case Study: Designing a Document Editor : Design Problems, Document

Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

UNIT-III: Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, And Discussion of Creational Patterns.

UNIT-IV: Structural Patterns: Adapter, Bridge, Composite, Decorator, açade, Flyweight, Proxy.

UNIT-V: Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method , Visitor, Discussion of Behavioral Patterns , Anti patterns.

TEXT BOOKS:

1. Design Patterns By Erich Gamma, Pearson Education
2. Head First Design Patterns By Eric Freeman-Oreilly-SPD.

REFERENCE BOOKS:

1. Pattern's in JAVA Vol-I By Mark Grand ,Wiley DreamTech
2. Design Patterns Explained By Alan Shalloway,Pearson Education.
3. Pattern Oriented Software Architecture,F.Buschrnann&others,Jo1tn Wiley 8: Sons

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III B. Tech – II Sem-R19

MACHINE LEARNING USING PYTHON LAB
PCC3203

Course Objectives: This course will enable students to

- To learn and understand different Data sets in implementing the machine learningalgorithms.
- Implement the machine learning concepts and algorithms in any suitablelanguage of choice.

Course Outcomes (COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Implement procedures for the machine learning algorithms	**K4**
CO2	Design Python programs for various Learning algorithms	**K6**
CO3	Apply appropriate data sets to the Machine Learning algorithms	**K3**
CO4	Identify and apply Machine Learning algorithms to solve real world problems	**K2**

#Based on suggested Revised BTL

Experiment-1:
Exercises to solve the real-world problems using the following machine learningmethods:
a) Linear Regression
b) Logistic Regression.

Experiment-2:
Write a program to Implement Support Vector Machines.

Experiment-3:
Exploratory Data Analysis for Classification using Pandas and Matplotlib.

Experiment-4:
Implement a program for Bias, Variance, and Cross Validation.

Experiment-5:
Write a program to simulate a perception network for pattern classification andfunction approximation.

Experiment-6:
Write a program to demonstrate the working of the decision tree based ID3 algorithm.Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

Experiment-7:
Build an Artificial Neural Network by implementing the Back propagation algorithmand test the same using appropriate data sets.

Experiment-8:
Write a program to implement the naïve Bayesian classifier for Iris data set. Computethe accuracy of the classifier, considering few test data sets.

Experiment-9:
Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

Experiment-10:
Apply EM algorithm to cluster a Heart Disease Data Set. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Experiment-11:
Write a program to implement k-Nearest Neighbor algorithm to classify the iris dataset. Print both correct and wrong predictions.

Experiment-12:
Implement the non-parametric Locally Weighted Regression algorithm in order to fitdata points. Select appropriate data set for your experiment and draw graphs.

Experiment-13:
For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

Experiment-14:
Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

Experiment-15:
Solve optimal relay coordination as a linear programming problem using GeneticAlgorithm.

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DATA ANALYTICS USING R LAB
PCC3204

Course Objectives:
In this course student will learn about the fundamentals of R programming, standard R libraries, solid understanding of R functions, write programs using the R and gain skills in R programming Language, get acquaintances with Arrays, Files, Strings, Packages, and distributions using R.

Course Outcomes (COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Familiarity with the R programming language and the RStudio development environment Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File programming	K2, K6
CO2	Hands-on experience using various basic data formats and file types in R	K2, K6
CO3	Experience using basic statistical analysis tools in R to analyze data sets	K3, K4
CO4	Extend the functionality of R by using add-on packages	K2
CO5	Use R Graphics and Tables to visualize results of various statistical operations on data	K3

#Based on suggested Revised BTL

List of Lab Experiments:

Week 1:
Installing R and RStudio
Basic functionality of R, variable, data types in R

Week 2:
a) Implement R script to show the usage of various operators available in R language.
b) Implement R script to read person‘s age from keyboard and display whether he is eligible for voting or not.
c) Implement R script to find biggest number between two numbers.
d) Implement R script to check the given year is leap year or not.

Week 3:
a) Implement R Script to generate first N natural numbers.
b) Implement R Script to check given number is palindrome or not.
c) Implement R script to print factorial of a number.

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d) Implement R Script to check given number is Armstrong or not.

Week 4:

a) Implement R Script to perform various operations on string using string libraries.
b) Implement R Script to check given string is palindrome or not.
c) Implement R script to accept line of text and find the number of characters, number of vowels and number of blank spaces init.
d) Implement R script for Call-by-value and Call-by-reference

Week 5:

a) Implement R Script to create a list.
b) Implement R Script to access elements in the list.
c) Implement R Script to merge two or more lists.
d) Implement R Script to perform matrix operation.

Week 6:

Implement R script to perform following operations:
a) various operations on vectors
b) Finding the sum and average of given numbers using arrays.
c) To display elements of list in reverse order.
d) Finding the minimum and maximum elements in the array

Week 7:

a) Implement R Script to perform various operations on matrices
b) Implement R Script to extract the data from dataframes.
c) Write R script to display file contents.
d) Write R script to copy file contents from one file to another.

Week 8:

a) Implement R Script to create a Pie chart, Bar Chart, scatter plot and Histogram.
b) Implement R Script to perform mean, median, mode, range, summary, variance, standard deviation operations.
c) Introduction to ggplot2 graphics

Week 9:

a) Implement R Script to perform Normal, Binomial distributions.
b) Implement R Script to perform correlation, Linear and multiple regression

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Week 10:

Introduction to Non-Tabular Data Types: Time series, spatial data, Network data.
Data Transformations: Converting Numeric Variables into Factors, Date Operations, String Parsing.

Week 11:

Introduction Dirty data problems: Missing values, data manipulation, duplicates, forms of data dates, outliers, spelling.

Week 12:

a) Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location.
b) Reading Excel data sheet in R.

References:

1. R Cookbook Paperback – 2011 by Teetor Paul O Reilly Publications
2. Beginning R: The Statistical Programming Language by Dr. Mark Gardener, Wiley Publications
3. R Programming For Dummies by Joris Meys Andrie de Vries, Wiley Publications
4. Hands-On Programming with R by Grolemund, O Reilly Publications
5. Statistical Programming in R by KG Srinivas G.M. Siddesh, Chetan Shetty & Sowmya B.J. - 2017 edition
6. R Fundamentals and Programming Techniques, Thomas Lumely.
7. R for Everyone Advanced Analytics and Graphics, Jared P. Lander- Addison Wesley Series
8. The Art of R Programming, Norman Matloff, Cengage Learning
9. Maria Dolores Ugarte, Ana F.Militino, Alan T.Arnholt- Probability and Statistics withR, 2nd Edition, CRC Press,2016.
10. R-programming for Data science, Roger D.Peng.
11. An Introduction to statistical learning-with applications in R, Trevor Hastie and Rob Tibshirani.

Web Links

1. URL: https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf
2. http://nptel.ac.in/courses/106104135/48
3. http://nptel.ac.in/courses/110106064/

Software requirements:

1. The R statistical software program. Available from: https://www.r-project.org/
   RStudio an Integrated Development Environment (IDE) for R. Available from: https://www.rstudio.com/

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IV B .Tech I Sem-R19
CRYPTOGRAPHY AND NETWORK SECURITY
PCC4101

COURSE OBJECTIVES:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand the basic categories of threats to computers and networks
- Discusses the Mathematics of Cryptography
- Discuss the fundamental ideas of Symmetric and Asymmetric cryptographic Algorithms
- Discusses the Network layer, Transport Layer and Application layer Protocols Enhanced security mechanisms

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Student will be able to understand security issues related to computer networks and learn different symmetric key techniques	**K2**
CO2	Students will be able learn mathematic of cryptography for symmetric and Asymmetric algorithms and apply this knowledge to understand the Cryptographic algorithms	**K3**
CO3	Students will be able learn different types of symmetric and Asymmetric algorithms	**K3**
CO4	Students will be able learn different algorithms of Hash functions, message authentication and digital signature and their importance to the security	**K4**
CO5	Students will be able learn different Enhanced security protocols of Application Layer, Transport Layer and Network layer	**K4**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2	1	1	1	1		1	1	2	3	1
CO2	3	1	1	2	2	2	1	2		3	2	1	2	
CO3	2	2	2	1	2	1	1	1		2	1	1	2	
CO4	3	2	3	2	3	2	1	1		2	1	1	2	3
CO5	3	2	3	1	2	2	1	1		2	1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

SYLLABUS:

UNIT – I: Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography. Classical Encryption Techniques-symmetric cipher model, Substitution techniques, Transposition techniques, Rotor Machines, Stegnography.

Introduction to Mathematics of Cryptography: Integer Arithmetic, Euclidean Algorithm, The Extended Euclidean Algorithm, Linear Diophantine Equations, Modular Arithmetic, Inverses, Matrices, Linear Congruence.

UNIT – II: Mathematics of Symmetric Cryptography: Algebraic Structures-Groups, Rings, Fields, GF(2^n) fields, Polynomials. **Mathematics of Asymmetric cryptography:** Primes, Checking For Primness, Eulers phi-functions, Fermat's Little Theorem, Euler's Theorem, Generating Primes, Primality Testing, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Exponentiation And Logarithm.

UNIT – III: Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, IDEA, Block cipher operation, Stream ciphers: RC4, RC5

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange, Elgamal Cryptographic system, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT – IV: Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Requirements and Security, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithms (SHA)

Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MAC'S,MAC'S Based On Hash Functions: HMAC, MAC'S Based On Block Ciphers: DAA And CMAC

Digital Signatures: Digital Signatures, Elgamal Digital Signature Scheme, Elliptic Curve Digital Signature Algorithm, RSA-PSS Digital Signature Algorithm.

UNIT – V: Network and Internet Security: Transport-Level Security: Web Security Considerations, Transport Level Security, HTTPS, SSH.

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IP Security: IP Security Overview, IP Security Policy, Encapsulating Security Payload, Authentication Header Protocol.
Electronic-Mail Security: Internet-mail Security, Email Format, Email Threats and Comprehensive Email Security, S/MIME, PGP.

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 7th Edition, 2017
2. Cryptography and Network Security: Behrouz A. Forouzan Debdeep, Mc Graw Hill, 3rd Edition, 2015

REFERENCE BOOKS:

1. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition
2. Introduction to Cryptography with Coding Theory: Wade Trappe, Lawrence C. Washington, Pearson.
3. Modern Cryptography: Theory and Practice By Wenbo Mao. Pearson

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BIG DATA ANALYTICS
PCC4102

Objectives:

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

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

CO	COURSE OUTCOMES	Knowledge Level (K)#
CO1	Preparing for data summarization, query, and analysis.	K2
CO2	Applying data modelling techniques to large data sets	K3
CO3	Creating applications for Big Data analytics.	K3
CO4	Building a complete business data analytic solution	K4

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2	1	1		1		1	1	2	3	1
CO2	3	1	1	2	2	2		2		3	2	1	2	
CO3	2	2	2	1	2	1		1		2	1	1	2	
CO4	3	2	3	2	3	2		1		2	1	1	2	3
CO5	3	2	3	1	2	2		1		2	1	1	2	

(Please fill the above with Levels of Correlation, viz., L-1, M-2, H-3)

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Syllabus:

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

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

UNIT-III: Writing Map Reduce Programs: A Weather Dataset, Understanding Hadoop API for Map Reduce Framework (Old and New), Basic programs of Hadoop Map Reduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Practitioner

UNIT-IV: StreamMemory and Spark: Introduction to Streams Concepts– Stream Data ModelandArchitecture , Stream computing, Sampling Data in a Stream , Filtering Streams ,Counting Distinct Elements in a Stream , Introduction to Spark Concept , Spark Architecture and components , Spark installation , Spark RDD(Resilient Distributed Dataset) – Spark RDD operations.

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.

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 Analyzingdata

TEXT BOOKS:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd.Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

REFERENCE BOOKS:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Big Data Analytics by Dr. A.Krishna Mohan and Dr.E.Laxmi Lydia
3. Hadoop Map Reduce Cookbook, SrinathPerera, ThilinaGunarathne

SOFTWARE LINKS:

1. Hadoop:http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html

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IV B. Tech I Sem-R19

MOBILE COMPUTING
PE4101

Course Objectives:

- To study the emerging technologies in the context of wireless networks
- To understand the mobile computing environment
- To learn about pervasive computing environment

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Interpret Wireless local area networks (WLAN): MAC design principles, 802.11 WIFI	K2
CO2	Discuss fundamental challenges in mobile communications and potential Techniques in GSM	K6
CO3	Demonstrate Mobile IP in Network layer	K5
CO4	Elaborate TCP/IP Protocols and database issues	K4
CO5	Illustrate different data delivery methods and synchronization protocols	K5

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2	1	1		1		1	1	2	3	1
CO2	3	1	1	2	2	2		2		3	3	1	2	
CO3	2	2	2	1	2	1		1		2	2	2	2	
CO4	3	2	3	2	3	2		1		2	3	2	2	3
CO5	3	2	3	1	2	2		1		2	3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT I : Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks.

Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, handheld pocket computers, Hand held devices, Smart systems, Limitations of mobile devices.

UNIT II: GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture.

Wireless medium access control, CDMA, 3G, 4G and 5G Communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-20003G wireless communication standards, WCDMA 3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks, 5G Networks.

UNIT III: Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP

Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

UNIT IV: Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server.

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UNIT V: Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

TEXT BOOKS:

1. Mobile Computing, 2nd edition, Raj kamal, Oxford,2011
2. Mobile Computing, Technology Applications and Service Creation, 2nd Edition, Asoke K Talukder, Hasanahmed, Roopa R Yavagal, McGraw Hill,2017

REFERENCE BOOKS:

1. "Principles of Mobile Computing," 2nd Edition, UWE Hansmann, Lother Merk, Martin S. Nocklous, Thomas Stober, Springer.2003

E-Resources:

1. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs13/

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MEAN STACK DEVELOPMENT
PE4101

Course Objectives:

From the course the student will learn

- Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
- Writing optimized front end code HTML and JavaScript.
- Monitor the performance of web applications & infrastructure and Troubleshooting web application with a fast and accurate a resolution
- Design and implementation of Robust and Scalable Front End Applications.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Identify the Basic Concepts of Web & Markup Languages.	K3
CO2	Develop web Applications using Scripting Languages & Frameworks.	K3
CO3	Make use of Express JS and Node JS frameworks	K3
CO4	Illustrate the uses of web services concepts like restful, react js.	K2
CO5	Adapt to Deployment Techniques & Working with cloud platform.	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2		1		1		1	1	2	3	1
CO2	3	1	1	2		2		2		3	3	1	2	
CO3	2	2	2	1		1		1		2	2	2	2	
CO4	1	2	1	2		2		1		2	3	2	2	3
CO5	3	2	3	1		2		1		2	3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT I: Introduction to Web: Internet and World Wide Web, Domain name service, Protocols: HTTP, FTP, SMTP. **Html5** concepts, **CSS3**, Anatomy of a web page.

XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches.

UNIT II: JavaScript: The Basic of JavaScript: Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions.

Angular Java Script- AngularJS Expressions: ARRAY, Objects, $eval, Strings, AngularJS Form Validation & Form Submission.

UNIT III: Node.js: Introduction, Advantages, Node.js Process Model, Node JS Modules. **Express.js:** Introduction to Express Framework, Getting Started with Express, Your first Express App, Express Routing, Implementing MVC in Express, Middleware, Using Template Engines, Error Handling , API Handling , Debugging, Developing Template Engines

UNIT IV: REST ful Web Services: Using the Uniform Interface, Designing URIs, Web Linking, Conditional Requests.
React Js: Welcome to React, Keeping Up with the Changes, Working with the Files, Pure React, Page Setup, The Virtual DOM, React Elements, ReactDOM, Children, Constructing Elements with Data, React Components, DOM Rendering.

UNIT V: Mongo DB: Introduction, Architecture, Features, Examples, Database Creation & Collection in Mongo DB. Deploying Applications: Web hosting & Domains, Deployment Using Cloud Platforms.

TEXT BOOKS:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. Pro Mean Stack Development, ELadElrom, Apress
4. Restful Web Services Cookbook, Subbu Allamraju, O'Reilly
5. JavaScript & jQuery the missing manual, David sawyer mcfarland, O'Reilly
6. Web Hosting for Dummies, Peter Pollock, John Wiley Brand

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REFERENCE BOOKS:

1. Ruby on Rails up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
5. Express.JS Guide, The Comprehensive Book on Express.js, Azat Mardan, Lean Publishing.

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INTERNET OF THINGS
PE4101

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.	K1
CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.	K2
CO3	Appraise the role of IoT protocols for efficient network communication.	K3
CO4	Elaborate the need for Data Analytics and Security in IoT.	K4
CO5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.	K5

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3		3	2		2		2	1		1	2	3	1
CO2		2		2	3		2	3			3	1	2	
CO3	1		3			3		2		2	2	2	2	
CO4		2	1				2		2		3	2	2	3
CO5			2		2			3	1		3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT – I: Introduction to Internet of Things: Definition and Characteristics of IoT, Physical Design of IoT – IoTProtocols, IoT communication models, Iot Communication APIs IoT enabled Technologies – WirelessSensor Networks, Cloud Computing, Big data analytics, Communication protocols, EmbeddedSystems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail,Logistics, Agriculture, Industry, health and Lifestyle

UNIT – II: IoT and M2M: Software defined networks, network function virtualization, difference between SDN andNFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMPNETOPEER

UNIT – III: Introduction to Python: Language features of Python, Data types, data structures, Control of flow,functions, modules, packaging, file handling, data/time operations, classes, Exception handling Pythonpackages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT – IV: IoT Physical Devices and Endpoints: Introduction to Raspberry PI- Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT – V: IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage models and communication APIs Web server – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, UniversitiesPress, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014,ISBN: 9789350239759

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IV B .Tech I Sem-R19

PARALLEL COMPUTING
PE4101

Course Objectives

- To design the parallel algorithms for real world problems.
- To understand a wide variety of parallel architectures.
- To implement the parallel algorithms on available parallel systems
- To design algorithms suited for multiprocessor systems using MPI and Open MP
- To analyze the parallel algorithms

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	How to design the parallel algorithms for real world problems	K1
CO2	Explain wide variety of parallel architectures.	K3
CO3	Describe and implement the parallel algorithms on available parallel Systems	K4
CO4	Develop and design algorithms suited for multiprocessor systems using MPI And OpenMP.	K5
CO5	Analyze the parallel algorithms.	K5

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2		1		1			1	2	3	1
CO2	3	1	1	2		2		2			3	1	2	
CO3	2	2	2	1		1		1			2	2	2	
CO4	1	2	1	2		2		1			3	2	2	3
CO5	3	2	3	1		2		1			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT- I : Introduction, Modern Scientific Method, Evolution of Supercomputing, Modern Parallel Computers, Seeking Concurrency, Data Clustering, Programming Parallel computers, Parallel Architectures-Introduction, Interconnection Networks, Processor Arrays, Multiprocessors, Multi computers, Flynn's Taxonomy.

UNIT- II: Parallel Algorithm Design- Introduction, The Task/Channel model, Foster's Design methodology, Boundary value problem, Finding the maximum, The n-Body problem, Adding data input, Message-Passing Programming-Introduction, The Message-Passing Model, The Message-Passing Interface, Circuit Satisfiability, Introducing Collective Communication, Benchmarking Parallel performance.

UNIT- III: Floyd's Algorithm- Introduction , The All-Pairs Shortest –Path Problem, Creating arrays at run time, Designing the parallel algorithm, Point-to-Point Communication, Documenting the Parallel program, Analysis and Benchmarking, Performance Analysis - Introduction, Speedup and efficiency, Amdahl's law, Gustafson- Barsis's law, The Karp-Flatt metric, The iso-efficiency metric.

UNIT- IV Document Classification- Introduction, Parallel algorithm design, Non-blocking Communication, Documenting the Parallel program, Enhancements, Matrix multiplication- Introduction, Sequential Matrix multiplication, Row-wise block-striped parallel algorithm, Canon's algorithm.

Solving Linear systems- Introduction, terminology, Back substitution, Gaussian elimination, Iterative methods, The Conjugate gradient method, Sorting- Introduction, Quick sort, Parallel Quick sort Algorithm , Hyper Quick sort, Parallel sorting by regular sampling.

UNIT- V Shared-memory programming- Introduction, The Shared-memory model, Parallel for loops, Declaring private variables, Critical sections, Reductions, Performance improvements, more general data parallelism, Functional parallelism, Combining MPI and OpenMP- Introduction, Conjugate gradient method, Jacobi method.

Text Book:

1. Parallel Programming in C with MPI and OpenMP, Michael J. Quinn, McGraw Hill Education (India) Pvt. Ltd, 2003, sixteenth reprint 2016.

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Reference Books:

1. Parallel computing ,Theory and Practice,2nd edition,M.J.Quinn, McGraw Hill Education(India) Pvt Ltd
2. Introduction to Parallel computing , W.P. Petersen and P.Arbenz, Oxford Univ. Press
3. Introduction to Parallel computing ,Ananth Grama, Anshul Gupta,G .Karypis, and V.Kumar, Pearson Education.
4. Algorithms ,Sequential and Parallel, 3rd edition, Russ Miller,L Boxer, Cengage Learning.
5. Computer Architecture, 4th edition, John L. Hennessy and David A. Patterson, ELSEVIER.

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IV B .Tech I Sem-R19

CLOUD COMPUTING
PE4102

Course Objectives:

- Ability to understand various service delivery models of a cloud computing architecture.
- Ability to understand the ways in which the cloud can be programmed and deployed.
- Understanding cloud service providers.
- Understand and learn the Characteristics of IaaS and Characteristics of PaaS
- Learn and gain knowledge about the Cloud Service providers.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain different types of Computing	K3
CO2	Illustrate Four types of Cloud Deployment Models	K4
CO3	Demonstrate different Phases of Cloud Migration Approaches for Cloud Migration	K5
CO4	Analyze and Develop Cloud Service Models	K3
CO5	Describe Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud	K4

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2		1		1			1	2	3	1
CO2	3	1	1	2		2		2			3	1	2	
CO3	2	2	2	1		1		1			2	2	2	
CO4	1	2	1	2		2		1			3	2	2	3
CO5	3	2	3	1		2		1			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT-I: Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-2: Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT-3: Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-4: Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-5: **Cloud Service Providers:** EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform

Text Books:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

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Reference Books:

1. Cloud Computing: Principles and Paradigms by RajkumarBuyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, SubraKumaraswamy, ShahedLatif, O'Reilly, SPD, rp 2011.

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IV B .Tech I Sem-R19

SOCIAL NETWORKS & SEMANTIC WEB
PE4102

Course Objectives:

- The learning objective of the course Social Network Analysis is to provide students with essential knowledge of network analysis applicable to real world data, with examples from today's most popular social networks.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate social network analysis and measures.	K2
CO2	Analyze random graph models and navigate social networks data	K4
CO3	Apply the network topology and Visualization tools.	K3
CO4	Analyze the experiment with small world models and clustering models.	K4
CO5	Compare the application driven virtual communities from social network Structure.	K5

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	2		1		1			1	2	3	1
CO2	3	1	1	2		2		2			3	1	2	
CO3	2	2	2	1		1		1			2	2	2	
CO4	1	2	1	2		2		1			3	2	2	3
CO5	3	2	3	1		2		1			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT I: Social Network Analysis: Preliminaries and definitions, Erdos Number Project, Centrality measures, Balance and Homophily.

UNIT II: Random graph models: Random graphs and alternative models, Models of network growth, Navigation in social Networks, Cohesive subgroups, Multidimensional Scaling, Structural equivalence, roles and positions.

UNIT III: Network topology and diffusion, Contagion in Networks, Complex contagion, Percolation and information, Navigation in Networks Revisited.

UNIT IV: Introduction to the Web Science and Semantic Web, Introduction to Ontologies, Ontology Languages for the Semantic Web – Resource Description Framework (RDF) – Lightweight ontologies: RDF Schema – Web Ontology Language (OWL) – A query language for RDF: SPARQL, Ontology Engineering Semantic web and Web 2.0 Applications of Semantic Web, Infrastructure Social Networks, Web 3.0 - Linked Data RDFa and the Open Graph Protocol schema.org and search enhancement Semantic

UNIT V: Network structure -Important vertices and page rank algorithm, towards rational dynamics in networks, basics of game theory, Coloring and consensus, biased voting, network formation games, network structure and equilibrium, behavioural experiments, Spatial and agent-based models.

Text Books:

1. S. Wasserman and K. Faust. Social Network Analysis: Methods and Applications (Cambridge, Cambridge University Press, 1994)
2. D. Easley and J. Kleinberg, Networks, Crowds and Markets: Reasoning about a highly connected world
3. Michael C. Daconta, Leo J. Obrst, and Kevin T. Smith, "The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management", Fourth Edition, Wiley Publishing, 2003.
4. John Davies, Rudi Studer, and Paul Warren John, "Semantic Web Technologies: Trends and Research in Ontology-based Systems", Wiley and Son's, 2006.
5. John Davies, Dieter Fensel and Frank Van Harmelen, "Towards the Semantic Web: Ontology- Driven Knowledge Management", John Wiley and Sons, 2003.

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AD-HOC & SENSOR NETWORKS
PE4102

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the Concepts, Network Architecture and Applications of Ad-hoc and Wireless Sensor Networks	K5
CO2	Analyze the protocol design issues of Ad-hoc Networks	K4
CO3	Make use of the the design of routing protocols for ad-hoc and wireless networks.	K2
CO4	Develop the Concepts, Architecture of ad-hoc and sensor networks and MAC layer protocols.	K4
CO5	Evaluate the QOS related performance measurements of ad-hoc and sensor networks	K5

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3		2	3	2	3		2	3	3	1	2	3	1
CO2	2	1			3		3	3			3	1	2	
CO3	3		2		2			2	2		2	2	2	
CO4	3		1	2	2			2	2	1	3	2	2	3
CO5	2	1			2	1	2	3	2	2	3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-1:Wireless System & Random-Access Protocols: Introduction, First and Second-Generation Cellular Systems, Cellular Communications from 1G to 3G, Wireless 4G systems, The Wireless Spectrum; Random Access Methods: Pure ALOHA, Slotted ALOHA, Carrier Sense Multiple Access (CSMA),Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA).

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UNIT-II: Wireless LANs: Introduction, importance of Wireless LANs, WLAN Topologies, And Transmission Techniques: Wired Networks, Wireless Networks, comparison of wired and Wireless LANs; WLAN Technologies: Infrared technology, UHF narrowband technology, Spread Spectrum technology

UNIT-III:The IEEE 802.11 Standard for Wireless LANs: Network Architecture, Physical layer, The Medium Access Control Layer; MAC Layer issues: Hidden Terminal Problem, Reliability, Collision avoidance, Congestion avoidance, Congestion control, Security, The IEEE 802.11e MAC protocol

UNIT-IV: Wireless PANs: Introduction, importance of Wireless PANs, The Bluetooth technology: history and applications, technical overview, the Bluetooth specifications, piconet synchronization and Bluetooth clocks, Master-Slave Switch; Bluetooth security; Enhancements to Bluetooth: Bluetooth interference issues, Intra and Inter Piconet scheduling, Bridge selection, Traffic Engineering, QoS and Dynamics Slot Assignment, Scatternet formation

UNIT-V:The IEEE 802.15 working Group for WPANs: The IEEE 802.15.3, The IEEE 802.15.4, ZigBee Technology, ZigBee components and network topologies, The IEEE 802.15.4 LR-WPAN Device architecture: Physical Layer, Data Link Layer,The Network Layer, Applications; IEEE 802.15.3a Ultrawide band.

Text Books:

1. Ad Hoc and Sensor Networks - Carlos de MoraisCordeiro and Dharma Prakash Agrawal,World Scientific, 2011.
2. Wireless Communications and Networking - Vijay K.Garg, Morgan Kaufmann Publishers,2009.

Reference Books:

1. Kaveh Pahlaram, Prashant Krishnamurthy, “Wireless Networks”, PHI, 2002.
2. Marks Ciampor, Jeorge Olenewa, “Wireless Communication”, Cengage Learning, 2007.

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IV B .Tech I Sem-R19

CYBER SECURITY & FORENSICS
PE4102

Course Objectives:

- Able to identify security risks and take preventive steps
- To understand the forensics fundamentals
- To understand the evidence capturing process
- To understand the preservation of digital evidence

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Enumerate the computer forensics fundamentals	K2
CO2	Describe the types of computer forensics technology	K4
CO3	Analyze various computer forensics systems	K4
CO4	Illustrate the methods for data recovery, evidence collection and data seizure	K5
CO5	Identify the Role of CERT-In Security	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2		3	1							1	2	3	1
CO2	2	3	3	1							3	1	2	
CO3	2	2	1	3		1		1			2	2	2	
CO4		3	2					1			3	2	2	3
CO5	1	2	3			2					3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT I: **Introduction to Cybercrime:** Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Cybercriminals, Classifications of Cybercrime, Cyber stalking, Cyber cafe and Cybercrimes, Botnets. Attack Vector, Proliferation of Mobile and Wireless Devices, Security Challenges Posed by Mobile Devices.

UNIT II : **Tools and Methods :** Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, Sniffers, Spoofing, Session Hijacking Buffer over flow, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Identity Theft (ID Theft).

UNIT III : **Cyber Crime Investigation:** Introduction, Investigation Tools, e-Discovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Hands on Case Studies. Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT IV: **Computer Forensics and Investigations:** Understanding Computer Forensics, Preparing for Computer Investigations. Current Computer Forensics Tools: Evaluating Computer Forensics Tools, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics.

UNIT V: **Cyber Crime Legal Perspectives:** Introduction, Cybercrime and the Legal Landscape around the World, 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, Cyber law, Technology and Students: Indian Scenario.

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Text Books:

1. Sunit Belapure Nina Godbole "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", WILEY, 2011.
2. Nelson Phillips and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.

Reference Books:

1. Michael T. Simpson, Kent Backman and James E. Corley, "Hands on Ethical Hacking and Network Defence", Cengage, 2019.
2. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
3. Alfred Basta, Nadine Basta,Mary Brown and Ravinder Kumar "Cyber Security and Cyber Laws" , Cengage,2018.

E-Resources:

1. CERT-In Guidelines- http://www.cert-in.org.in/
2. https://www.coursera.org/learn/introduction-cybersecurity-cyber-attacks [Online Course]
3. https://computersecurity.stanford.edu/free-online-videos [Free Online Videos]

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IV B .Tech I Sem-R19

BIG DATA ANALYTICS LAB
PCC4103

Week 1, 2:

1. (i)Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed
   (ii)Use web based tools to monitor your Hadoop setup.

Week 3:

2. Implement the following file management tasks in Hadoop:
   - Adding files and directories
   - Retrieving files
   - Deleting files

   Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 4:

3. Run a basic Word Count MapReduce program to understand MapReduce Paradigm**.**

Week 5:

4. Write a map reduce program that mines weather data.
   Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with Map Reduce, since it is semi structured and record-oriented.

Week 6:

5. Use MapReduce to find the shortest path between two people in a social graph.

   Hint: Use an adjacency list to model a graph, and for each node store the distance from the original node, as well as a back pointer to the original node. Use the mappers to propagate the distance to the original node, and the reducer to restore the state of the graph. Iterate until the target node has been reached.

Week 7:

6. Implement Friends-of-friends algorithm in MapReduce.

   Hint: Two MapReduce jobs are required to calculate the FoFs for each user in a social network .The first job calculates the common friends for each user, and the second job sorts the common friends by the number of connections to your friends.

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Week 8:

7. Implement an iterative PageRank graph algorithm in MapReduce.
Hint: PageRank can be implemented by iterating a MapReduce job until the graph has converged. The mappers are responsible for propagating node PageRank values to their adjacent nodes, and the reducers are responsible for calculating new PageRank values for each node, and for re-creating the original graph with the updated PageRank values.

Week 9:

8. Create a Bloom filter in MapReduce.
Hint: Write a MapReduce job to create and output a Bloom filter using the Hadoop built-in BloomFilter class. The mappers are responsible for creating intermediary Bloom filters, and the single reducer combines them together to output a combined Bloom filter.

Week 10:

9. Perform an efficient semi-join in MapReduce.
Hint: Perform a semi-join by having the mappers load a Bloom filter from the Distributed Cache, and then filter results from the actual MapReduce data source by performing membership queries against the Bloom filter to determine which data source records should be emitted to the reducers.

Week 11:

10. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 12:

11. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

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CRYPTOGRAPHY & NETWORK SECURITY LAB
PCC4104

Exercise 1: Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string With 0 and displays the result.

Exercise 2: Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.

Exercise 3: Write a Java program to perform encryption and decryption using the following algorithms a) Ceaser cipher b) Substitution cipher c) Hill Cipher

Exercise 4: Write a C/JAVA program to implement the DES algorithm logic.

Exercise 5: Write a C/JAVA program to implement the Blowfish algorithm logic.

Exercise 6: Write a C/JAVA program to implement the Rijndael algorithm logic.

Exercise 7: Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.

Exercise 8: Write a Java program to implement RSA algorithm.

Exercise 9: Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.

Exercise 10: Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

Exercise 11: Calculate the message digest of a text using the MD5 algorithm in JAVA.

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IV B. Tech - II sem-R19

NATURAL LANGUAGE PROCESSING
PE4201

Objectives:

- This course introduces the fundamental concepts and techniques of natural language processing (NLP).
- Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
- The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.
- Enable students to be capable to describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate a given text with basic Language features.	K2
CO2	Explain a rule based system to tackle morphology/syntax of a language.	K5
CO3	To design an innovative application using NLP components.	K6
CO4	To design a tag set to be used for statistical processing for real-time applications.	K6
CO5	To compare and contrast the use of different statistical approaches for different types of NLP applications.	K2

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2		3	1							1	2	3	1
CO2	2	3	3	1							3	1	2	
CO3	2	2	1	3		1		1			2	2	2	
CO4		3	2					1			3	2	2	3
CO5	1	2	3			2					3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT-I: Introduction: What is Natural Language Processing (NLP), Origins of NLP, Language and Knowledge, The challenges of NLP, Language and Grammar, Processing Indian Languages, NLP Applications, Some successful Early NLP Systems, Information Retrieval, **Language Modelling:** Introduction, Various Grammar-based Language Models, Statistical Language Model.

UNIT-II: Word Level Analysis: Introduction, Regular Expressions, Finite State Automata, Morphological Parsing, Spelling Error Detection and Correction, Words and Word Classes, Part-of-Speech Tagging, **Syntactic Analysis:** Introduction, Context-Free Grammar, Constituency, Parsing, Probabilistic Parsing, Indian Languages.

UNIT-III: Semantic Analysis and Pragmatics: Introduction, Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation, **Discourse Processing:** Introduction, Cohesion, Reference Resolution, Discourse Coherence and Structure.

UNIT-IV: Natural Language Generation: Introduction, Architectures of NLG Systems, Generation task and Representations, Applications of NLG,
Machine Translation: Introduction, Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Direct Machine Translation, Rule-based Machine Translation, Corpus-based Machine Translation, Semantic or Knowledge-based MT Systems, Translation involving Indian Languages.

UNIT-V: NLP Applications: Introduction, Information Extraction, Automatic Text Summarization, Question-Answering System, **Lexical Resources:** Introduction, Word Net, Frame Net, Stemmers, Part-of-Speech Tagger, Research Corpora, Journals and Conferences in the Area.

Text Books:

1. Tanveer Siddiqui, U.S. Tiwary, —Natural Language Processing and Information Retrieval, Oxford University Press, 2008.
2. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.

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Reference Books:

1. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python, First Edition, OReilly Media, 2009.
2. Breck Baldwin, —Language processing with Java and Ling Pipe Cookbook, Atlantic Publisher, 2015.
3. Richard M Reese, —Natural Language Processing with Java, OReilly Media, 2015.

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IV B. Tech-II sem-R19

DEEP LEARNING TECHNIQUES
PE4201

Course Objectives: At the end of the course, the students will be expected to:

- Learn deep learning methods for working with sequential data,
- Learn deep recurrent and memory networks,
- Learn deep Turing machines,
- Apply such deep learning mechanisms to various learning problems.
- Know the open issues in deep learning, and have a grasp of the current research directions.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the basic concepts fundamental learning techniques and layers.	K2
CO2	Discuss the Neural Network training, various random models.	K6
CO3	Explain different types of deep learning network models.	K5
CO4	Classify the Probabilistic Neural Networks.	K2
CO5	Implement tools on Deep Learning techniques.	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2		3	1							1	2	3	1
CO2	2	3	3	1							3	1	2	
CO3	2	2	1	3		1		1			2	2	2	
CO4		3	2					1			3	2	2	3
CO5	1	2	3			2					3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT 1: Foundations of Neural Networks and Deep Learning : Neural Networks: Biological Neuron, Perceptron, Multi Layer Perceptron. Training Neural Networks: Back-propagation, Activation Functions, Loss Function, Hyper-parameters.

UNIT-2: Fundamentals of Deep Learning- Definition of Deep Learning, Common Architecture Principles of Deep Networks, Building Blocks of Deep Learning. Architectures of Deep Learning: Unsupervised Pre trained Networks, Convolution Neural Networks (CNN's), Recurrent Neural Networks, Recursive Neural Networks,

UNIT-3: Deep Learning Research: Linear factor models: Probabilistic PCA And Factor Analysis, Independent Component Analysis, Sparse Coding, Manifold Interpretation of PCA, Auto Encoders: Regularized Autoencoders, Representational Power, Layer Size and Depth, Denoising Autoencoders, Applications of Autoencoders.

UNIT-4: Deep Generating Models: Boltzmann Machines, Restricted Boltzmann Machines, Deep Belief Networks, Deep Boltzmann Machines, Convolution Boltzmann Machines, Backpropagation through Random Operations, Directed Generative Nets, Generating Static Networks.

UNIT-5: Applications: Large Scale Deep Learning, Image Recognition, Speech Recognition, Natural Language Processing, Other Applications. Building Deep Networks: DL4J suite of Tools, Basic Concepts of DL4J API, Modeling CSV Data with Multilayer Perceptron Networks, Modeling Handwritten Images Using CNN's

TEXT BOOKS:

1. Deep Learning A practitioner's approach- josh Patterson and Adam Gibson, OREILLY.
2. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.

REFERENCE BOOKS:

1. Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009.
2. Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013.
3. Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-Hill Education, 2004.
4. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

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IV B. Tech-II sem-R19

NEURAL NETWORKS & SOFT COMPUTING
PE4201

Course Objectives:

- To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
- To implement soft computing based solutions for real-world problems.
- To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.
- To provide student a hand-on experience on MATLAB to implement various strategies.

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

CO	Description	Knowledge Level (K)#
CO1	Elaborate fuzzy logic and reasoning to handle uncertainty in engineering problems.	K6
CO2	Make use of genetic algorithms to combinatorial optimization problems	K3
CO3	Distinguish artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning.	K4
CO4	Formulate and apply the principles of self-adopting and self organizing neuro fuzzy inference systems.	K6
CO5	Evaluate and compare solutions by various soft computing approaches for a given problem	K5

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2								1	2	3	1
CO2	2		3					3			3	1	2	
CO3	1	2	3		3						2	2	2	
CO4				2	3	1		3			3	2	2	3
CO5	2							2			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT I: Fuzzy Set Theory: Introduction to Neuro, Fuzzy and Soft Computing, Fuzzy Sets, Basic function and Terminology, Set-theoretic Operations, Member Function Formulation and Parameterization, Fuzzy Rules and Fuzzy Reasoning, Extension Principle and Fuzzy Relations, Fuzzy If-Then Rules, Fuzzy Reasoning, Fuzzy Inference Systems, Mamdani Fuzzy Models, Sugeno Fuzzy Models, Tsukamoto Fuzzy Models, Input Space Partitioning and Fuzzy Modeling.

UNIT II: Optimization: Derivative based Optimization, Descent Methods, and The Method of Steepest Descent, Classical Newton's Method, Step Size Determination, Derivative-free Optimization, Genetic Algorithms, Simulated Annealing, and Random Search, Downhill Simplex Search.

UNIT III: Artificial Intelligence: Introduction, Knowledge Representation, Reasoning, Issues and Acquisition: Prepositional and Predicate Calculus Rule Based knowledge Representation Symbolic Reasoning Under Uncertainty Basic knowledge Representation Issues Knowledge acquisition, Heuristic Search: Techniques for Heuristic search Heuristic Classification State Space Search: Strategies Implementation of Graph Search based on Recursion Patent-directed Search Production System and Learning.

UNIT IV: Neuro Fuzzy Modeling: Adaptive Neuro-Fuzzy Inference Systems, Architecture Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN Coactive Neuro Fuzzy Modeling, Framework Neuron Functions for Adaptive Networks Neuro Fuzzy Spectrum.

UNIT V: Applications Of Computational Intelligence: Printed Character Recognition, Inverse Kinematics Problems, Automobile Fuel Efficiency Prediction, Soft Computing for Coloripe Prediction.

Text Books:

1. "Neuro-Fuzzy and Soft Computing", J.S.R.Jang, C.T.Sun and E.Mizutani, PHI, 2004, Pearson Education 2004
2. Artificial Intelligence by Saroj Koushik, Cengage Learning
3. "Artificial Intelligence and Intelligent Systems", N.P.Padhy, Oxford University Press, 2006

Reference Books:

1. Artificial Intelligence, Second Edition, Elaine Rich & Kevin Knight, Tata McGraw Hill Publishing Comp., New Delhi, , 2006
2. "Fuzzy Logic with Engineering Applications", Timothy J.Ross, McGraw-Hill, 1997

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IV B. Tech-II sem-R19

WIRELESS NETWORK SECURITY
PE4202

Course Objective:

- The objective of this course is to understand the importance of Wireless networks security and its application

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	**Explain** the Threats in networks and provide Authentication to real time problems.	K2
CO2	**identify** and investigate in-depth both early and contemporary threats to wireless networks security	K3
CO3	**Ability to analyze** and determine for any organization the database security requirements and appropriate solutions	K4
CO4	**Explain** IP Security Issues and solve real time problems.	K2
CO5	**List** the Basic specifications in Bluetooth Security.	K1

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2								1	2	3	1
CO2	2		3					3			3	1	2	
CO3	1	2	3		3						2	2	2	
CO4				2	3	1		3			3	2	2	3
CO5	2							2			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

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Syllabus:

UNIT-I: Introduction to Wireless: History of Wireless Technologies, History of Wireless Security, State of the Wireless Security Industry, 2001

Wireless Threats: Uncontrolled Terrain, Communications Jamming, DoS Jamming, Injections and Modifications of Data, Man-in-the-Middle (MITM) Attack, Rogue Client, Rogue Network Access Points, Attacker Equipment, Covert Wireless Channels, Roaming Issues, Cryptographic Threats

UNIT-II: Introduction to Wireless Security Protocols and Cryptography: Recovery the FUD, OSI Model, OSI Simplified, Internet Model, Wireless LAN Security Protocols, Cryptography, SSL/TLS, Secure Shell Protocols, Terminal Access and File Transfer, Port Forwarding a Word of Caution, Man-in-the-Middle of SSL/TLS and SSH, WTLS, WEP,802.1x, IP Security

Security Considerations to Wireless Devices: Wireless Device Security Issues, Physical Security, Information Leakage, Device Security Features, Application Security, Detailed Device Analysis, Laptops, Personal Digital Assistants (PDAS), Wireless Infrastructure

UNIT-III: Wireless Technologies and Applications: Introduction to Cellular Networks- FDMA, TDMA, CDMA, Spread Spectrum Primer, Analogy, TDMA Vs CDMA, PDC, Security Threats, GSM Security, GSM Algorithm Analysis

Introduction to Wireless Data Networks: Cellular Digital Packet Data (CDPD), CDPD Architecture, CDPD Security, Mobitex- Mobitex Architecture, Mobitex Security Architecture, General Packet Radio Service (GPRS)- GPRS Architecture, Security Issues, Introduction to the Wireless Application Protocol (WAP)- WAP Device, Gateway, Security Model

UNIT-IV: Wireless Standards and Technologies: Current and Future Technologies- Infrared, Radio, Spread Spectrum, OFDM, Current and Future Standards- IEEE 802, 802.11, The ABC's of 802.11, 802.11b, 802.11a, 802.11g, 802.11j, 802.11h and 5GPP, 802.11e, 802.11i, 802.11f, IEEE 802.15, IEEE 802.16, IEEE 802.1x, ETSI, HomeRF, Ultrawideband Radio (UWB)

Wireless Deployment Strategies: Implementing Wireless LAN's- Security Considerations Common Wireless Network Applications, Enterprise Campus Designs, Wireless IST Design, Retail and Manufacturing Design, Small Office/Home Office Design (SOHO)

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UNIT-V: Bluetooth Security: Basic Specifications, Pico-nets, Bluetooth Security Architecture, Scatter-nets, Security at the Baseband Layer and Link Layer, Frequency Hopping, Security Manager, Authentication, Encryption, Threats to Bluetooth Security

Text Books:

1. Wireless Security, Merritt Maxim and David Pollino, Osborne/McGraw Hill, New Delhi, 2005
2. Wireless Security Models: Threats and Solutions, Nichols and Lekka, Tata McGraw Hill, New Delhi 2006

Reference Books:

1. Behrouz A.Forouzan, —Cryptography & Network Security‖, Tata McGraw Hill, India, New Delhi, 2009
2. William Stallings, —Cryptography and Network Security, Prentice Hall, New Delhi, 2006
3. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons, New York, 2004

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IV B. Tech-II sem-R19

ETHICAL HACKING
PE4202

Course Objectives:

- The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
- The course includes-Impacts of Hacking; Types of Hackers; Information Security Models, Information Security Program, Business Perspective, Planning a Controlled Attack
- Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Ability to understand the concepts of Ethical Hacking and Penetration Testing	K5
CO2	Analyze the information gathering techniques like Footprinting, social Engineering attacks and it's countermeasures.	K4
CO3	Analyze the concepts of Scanning and Enumeration	K4
CO4	Demonstrate the Web Hacking techniques and protecting the system from being attacked	K2
CO5	Elaborate the concepts of password cracking techniques and Steganography	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2								1	2	3	1
CO2	2		3					3			3	1	2	
CO3	1	2	3		3						2	2	2	
CO4				2	3	1		3			3	2	2	3
CO5	2							2			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-I: Introduction to Ethical Hacking, Ethics and Legality: Defining Ethical Hacking: Important Terminologies, Purpose of Ethical Hacking, Phases of Ethical Hacking, types of hacking technologies, types of ethical hacks, penetration test, vulnerability assessment vs penetration test, categories and types of penetration test, performing a penetration test

UNIT- II : Gathering Target Information: Reconnaissance, Footprinting and Social Engineering Reconnaissance, Information-Gathering Methodology: Footprinting, Using Google to Gather Information, Understanding DNS Enumeration, Understanding Whois and ARIN Lookups, Identifying Types of DNS Records, Using Traceroute in Footprinting, Understanding Email Tracking, Understanding Web Spiders, Social Engineering: The Art of Manipulation, Types of Social Engineering-Attacks, Social-Engineering Countermeasures

UNIT- III: Gathering Network and Host Information: Scanning and Enumeration: Scanning, Types of Port Scanning, Ping Sweep Techniques, nmap Command Switches, Scan Types, TCP Communication Flag Types, War-Dialing Techniques, Banner Grabbing and OS Fingerprinting Techniques, Scanning Anonymously, Enumeration, Null Sessions, SNMP Enumeration, Windows 2000 DNS Zone Transfer

UNIT- IV: Web Hacking: Google, Web Servers, Web Application Vulnerabilities, and Web-Based Password Cracking Techniques, How Web Servers Work, Types of Web Server Vulnerabilities, Attacking a Web Server, Patch-Management Techniques, Web Server Hardening Methods, Web Application Vulnerabilities, Web Application Threats and Countermeasures, Google Hacking, Web-Based Password-Cracking Techniques, Authentication Types, Password Attacks and Password Cracking

UNIT- V: System Hacking: Password Cracking, Escalating Privileges, and Hiding Files, The Simplest Way to Get a Password, Types of Passwords, Passive Online Attacks, Active Online Attacks, Offline Attacks, Nonelectronic Attacks, Cracking a Password, Understanding the LAN Manager Hash, Cracking Windows 2000 Passwords, Redirecting the SMB Logon to the Attacker, SMB Relay MITM Attacks and Countermeasures, NetBIOS DoS Attacks, Password-Cracking Countermeasures, Understanding Keyloggers and Other Spyware Technologies, Escalating Privileges, Executing Applications, Buffer Overflows, Hiding Files, NTFS File Streaming, NTFS Stream Countermeasures, Understanding Steganography Technologies, Covering Your Tracks and Erasing Evidence

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Text Books:

1. Kimberly Graves, "Certified Ethical Hacker", Wiley India Pvt. Ltd, 2010.
2. Rafay Baloch, “Ethical Hacking and Penetration Testing Guide”, 2014.

Reference Books:

1. Hacking: Be a Hacker with Ethics, Harsh Bothra, Khanna Publications, 2019
2. Mastering Modern Web Penetration Testing, Prakhar Prasad, Packt Publishing, October 2016

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IV B. Tech-II sem-R19

DIGITAL MARKETING
PE4202

Course Objective: The objective of this course is to understand the importance of digital marketing and its applications.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the applications of digital marketing in the globalized market	**K6**
CO2	Apply Channels of Digital Marketing	**K3**
CO3	Organize digital marketing plan	**K5**
CO4	Analyze Search engine marketing	**K4**
CO5	Make use of Online Advertising	**K2**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2								1	2	3	1
CO2	2		3					3			3	1	2	
CO3	1	2	3		3						2	2	2	
CO4				2	3	1		3			3	2	2	3
CO5	2							2			3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT - I: Understanding Digital Marketing: Concept, Components of Digital Marketing, Need and Scope of Digital Marketing, Benefits of Digital Marketing, Digital Marketing Platforms and Strategies, Comparison of Marketing and Digital Marketing, Digital Marketing Trends.

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UNIT - II: Channels of Digital Marketing: Digital Marketing, Website Marketing, Search Engine Marketing, Online Advertising, Email Marketing, Blog Marketing, Social Media Marketing, Audio, Video and Interactive Marketing, Online Public Relations, Mobile Marketing, Migrating from Traditional Channels to Digital Channels. **Marketing in the Digital Era:** Segmentation – Importance of Audience Segmentation, How different segments use Digital Media – Organisational Characteristics, Purchasing Characteristics, Using Digital Media to Reach, Acquisition and Retentionof new customers, Digital Media for Customer Loyalty.

UNIT - III: Digital Marketing Plan: Need of a Digital Marketing Plan, Elements of a Digital Marketing Plan – Marketing Plan, Executive Summary, Mission, Situational Analysis, Opportunities and Issues, Goals and Objectives, Marketing Strategy, Action Plan, Budget, Writing the Marketing Plan and Implementing the Plan.

UNIT - IV: Search Engine Marketing and Online Advertising: Importance of SEM, understanding Web Search – keywords, HTML tags, Inbound Links, Online Advertising vs. Traditional Advertising, Payment Methods of Online Advertising – CPM (Cost-per-Thousand) and CPC (Cost-per-click), Display Ads - choosing a Display Ad Format, Landing Page and its importance.

UNIT - V: Social Media Marketing: Understanding Social Media, Social Networking with Face book, LinkedIn, Blogging as a social medium, Microblogging with Twitter, Social Sharing with YouTube, Social Media for Customer Reach, Acquisition and Retention. Measurement of Digital Media: Analyzing Digital Media Performance, Analyzing Website Performance, Analyzing Advertising Performance.

TEXT BOOKS:

1. Michael Miller, B2B Digital Marketing, 1e, Pearson, 2014.
2. Vandana Ahuja, Digital marketing, Oxford University Press 2015
3. Michael R Solomon, Tracy Tuten, Social Media Marketing, Pearson, 1e, 2015.
4. Judy Strauss & Raymond Frost, E-Marketing, Pearson, 2016
5. Richard Gay, Alan Charles worth and Rita Esen, Online marketing – A customerled approach Oxford University Press 2007.
6. Chuck Hemann & Ken Burbary, Digital Marketing Analytics, Pearson, 2019.

OPEN ELECTIVES TO BE OFFERED BY CSE FOR OTHER BRANCHES

Department of Computer Science & Engineering
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Open Elective-I:

DATA STRUCTURES

Course Objectives:

- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVL Trees, and B Trees.

Course Outcomes: By the end of the course student will be able to understand

CO	Course Outcomes	Knowledge Level (K)#
CO1	Select appropriate data structures as applied to specified problem definition	**K5**
CO2	Summarize and understand the practical applications of several advanced techniques like Hashing and Analyzing and Implement appropriate sorting/searching technique for given problems	**K2**
CO3	Demonstrate the operations such as Insertion, Deletion and Search on Data structures like Binary Search Tree and solve the problems	**K3**
CO4	Demonstrate the operations such as Insertion, Deletion and Search on Advanced Data structures like Heaps, AVL trees and B Trees.	**K3**
CO5	Comparisons of trees like Red Black trees and B-Trees etc. and priority queue operations.	**K4**

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2								1	2	3	1
CO2	2		3					3			3	1	2	
CO3	1	2	3		3						2	2	2	
CO4				2	3	1		3			3	2	2	3
CO5	2							2			3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT- I: Introduction to Data Structures: Abstract Data Types (ADTs), The List ADT: Simple Array Implementation of Lists, Simple Linked Lists, Doubly Linked Lists, Circularly Linked Lists. The Stack ADT: The Stack Model, Implementation of Stacks, Applications of Stack. The Queue ADT: Queue Model, Array Implementation of Queues, Application of Queues.Stacks and Queue implementation using linked

list.

UNIT-II: Searching: List Searches, Linear and Binary Search Methods.
Sorting: Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort.
Hashing: Hash Function, Separate Chaining, Collision Resolution-Separate Chaining.
UNIT- III: Trees: Binary Trees- Implementation, Expression Trees. Binary Search Trees- find, findMin and findMax, insert, delete operations.

UNIT- IV: Trees: AVL Trees- Single and Double Rotation, Operations.
B-Tree: searching, insertion, deletion

UNIT –V:
Trees: Introduction to Red-Black, splay trees and Comparison of Search Trees
Priority Queues: Priority Queue Models, Simple Implementations.

TEXT BOOKS:

1. Data Structures and Algorithm Analysis, 4th Edition, Mark Allen Weiss,Pearson.
2. Data Structures: A PseudoCode Approach with C, 2nd Edition, Richard F.Gilberg, &Behrouz A. Forouzon, Cengage.

REFERENCES BOOKS:

1. Data Structures, Algorithms and Applications in java, 2/e, Sartaj Sahni,University Press.
2. Data Structures using C, 2/e, Reema Thareja

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JAVA PROGRAMMING

Course Objective: Implementing programs for user interface and application development using core java principles

Course Outcomes: By the end of the course student will be able to understand

CO	Course Outcomes	Knowledge Level (K)#
CO1	Discuss and understand java programming constructs, Control structures	K2
CO2	Illustrate and experiment Object Oriented Concepts like classes, objects	K3
CO3	Apply Object Oriented Constructs such as Inheritance, interfaces, and exception handling	K3
CO4	Construct applications using multithreading and I/O	K3
CO5	Develop Dynamic User Interfaces using applets and Event Handling in java	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1		1	2	1	3					1	1	2	3	1
CO2	1	2	3	1	2				1	2	3	1	2	
CO3	1	2	2	3	1	2			1	2	2	2	2	
CO4	1		3		1	1			2	2	3	2	2	3
CO5		2	2	3	1				1		3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I: Objective: Focus on object oriented concepts and java program structure and its installation, Introduction to OOP Introduction, Need of Object Oriented Programming, Principles of Object Oriented Languages, Procedural languages Vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features.

UNIT II: Objective: Comprehension of java programming constructs, control structures in Java Programming Constructs Variables , Primitive Datatypes, Identifiers- Naming Conventions, Keywords, Literals, Operators-Binary, Unary and ternary, Expressions, Precedence rules and Associativity, Primitive Type Conversion and Casting, Flow of control Branching, Conditional, loops.,

UNIT III: Classes and Objects- classes, Objects, Creating Objects, Methods, constructors, Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments **Interfaces and exception handling Inheritance:** Types

of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class Interfaces,

UNIT IV: Objective: Understanding of Thread concepts and I/O in Java MultiThreading: java.lang.Thread, The main Thread, Creation of new threads, Thread priority, Multithreading- Using isAlive() and join(), Syncronization, suspending and Resuming threads, Communication between Threads.

UNIT V: Objective: Being able to build dynamic user interfaces using applets and Event handling in java Swing: Introduction , javax.swing package , JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScroll Pane, Split Pane, JTabbedPane, Dialog Box.

TEXT BOOKS:

1. The Complete Refernce Java, 8ed, Herbert Schildt, TMH
2. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.

REFERENCE BOOKS:

1. JAVA Programming, K.Rajkumar.Pearson
2. Core JAVA, Black Book, Nageswara Rao, Wiley, Dream Tech
3. JAVA for Beginners, 4e, Joyce Farrell, Ankit R. Bhavsar, Cengage Learning.
4. Object oriented programming with JAVA, Essentials and Applications, Raj Kumar Bhuyya, Selvi, Chu TMH
5. Introduction to Java programming, 7th ed, Y Daniel Liang, Pearson
   Core JAVA for Beginners, Rashmi Kanta Das, Vikas.
6. Object Oriented Programming through JAVA , P Radha Krishna , University Press

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DATA BASE MANAGEMENT SYSTEMS

Pre-requisite: Basic Knowledge on Data Structures
Course Outcomes: At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	**Illustrate** the concept of databases, database management systems, database languages, database structures and their work	**K2**
CO2	**Apply** ER modeling and Relational modeling for designing simple databases.	**K3**
CO3	**Summarize** the concepts related to relational model and SQL and **Write** database queries using relational algebra and structured query language.	**K2**
CO4	**Design and develop** databases from the real world by applying the concepts of Normalization.	**K6**
CO5	**Outline** the issues associated with Transaction Management and Recovery, Tree Structured Indexing	**K2**

#Based on suggested Revised BTL
Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	3	1				2	1	1	2	3	1
CO2	1	2	2		2				3	2	3	1	2	
CO3	1	2	2	3	2	1				2	2	2	2	
CO4			3	2	1					1	3	2	2	3
CO5	1	3	2	1	1	1			2	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT – I: Overview of Database System: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Informational Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems**. [Text Book -2]**

UNIT –II: Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model, Extended ER features **[Text Book -1]**

UNIT –III: Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views,

Destroying/Altering Tables and Views **[Text Book -1]]**

UNIT –IV: SQL: Queries, Constraints, Triggers: The Form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers, Exceptions, Procedures, Functions **[Text Book -1]**

UNIT –V: Normal Forms: Introduction to Schema Refinement, Functional Dependencies, Reasoning about FDs, Normal Forms, Properties of Decompositions, Normalization. **[Text Book -1]**

TEXT BOOKS:

1. Data base Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, Mc Graw-Hill
2. Data base System Concepts, 6/e, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Mc Graw-Hill

REFERENCE BOOKS:

1. Database Systems, 6/e Ramez Elmasri, Shamkant B. Navathe, Pearson
2. Introduction to Database Systems, 8/e, C J Date, Pearson
3. Database Systems, 9/e, Carlos Coronel, Steven Morris, Peter Rob, Cengage

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COMPUTER GRAPHICS

Course Objectives:

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Acquire the basics of computer graphics, different graphics systems and applications of computer graphics with various algorithms for line, circle and ellipse drawing objects for 2D transformations	K3
CO2	Explain projections and visible surface detection techniques for display of 3D scene on 2D screen	K5
CO3	Develop scene with basic graphic primitive algorithms using OPENGL programming.	K3
CO4	Know and be able to Explain selected among models for lighting/shading: Color, ambient light; distant and light with sources; Phong reflection model; and shading (flat, smooth, Gourand, Phong)..	K5
CO5	Illustrate able to create the general software architecture of programs that use 3D object sets with computer graphics	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1							1	1	2	3	1
CO2		3			1	2				2	3	1	2	
CO3			3	3				1	1	2	2	2	2	
CO4	3		2	2		1				1	3	2	2	3
CO5				3	1	2				3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT-I: 2D Primitives : Output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformations - Two dimensional viewing – Line, Polygon, Curve clipping algorithms

UNIT-II: 3D Concepts: Parallel and Perspective projections - Three dimensional object representation – Polygons, Curved lines, Splines, Quadric Surfaces, - Visualization of data sets - 3D transformations – Viewing -Visible surface identification.

UNIT-III: Graphics Programming : Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects.

UNIT- IV: Rendering : Introduction to Shading models – Flat and Smooth shading – Adding texture to faces – Adding shadows of objects – Building a camera in a program – Creating shaded objects– Rendering texture – Drawing Shadows.

UNIT- V: Fractals: Fractals and Self similarity – Peano curves – Creating image by iterated functions – Mandelbrot sets – Julia Sets – Random Fractals

TEXT BOOKS:

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education,2004.
2. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.

REFERENCE BOOKS:

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007.

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C++ PROGRAMMING

Course Objectives:

- This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and portable code. The nature of C language is emphasized in the wide variety of examples and applications.
- To learn and acquire art of computer programming.
- Programming language for solving a problem.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate basics of object oriented mode, differences between conventional and oops programming, the top-down and bottom-up approach I/O streams in C++	K2
CO2	Explain Write, compile and debug programs and Use different data types, classes, objects and member functions in C++ language.	K5
CO3	Make use of Basic concept in C++ programming, Operators, control structures, functions, overloading, and recursion.	K5
CO4	Build dynamic memory management techniques using pointers, constructors, destructors, virtual functions.	K5
CO5	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	1	2	3	1				2	1	1	2	3	1
CO2	1		3		2				3	2	3	1	2	
CO3	1	2	2	3	2	1				2	2	2	2	
CO4	2		3	2						1	3	2	2	3
CO5	1	3	2			1			2	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

Syllabus:

UNIT-I: Introduction to C++ Difference between C and C++- Evolution of C++- The Object Oriented Technology Disadvantage of Conventional Programming- Key Concepts of Object Oriented Programming- Advantage of OOP- Object Oriented Language.

UNIT-II: Classes and Objects &Constructors and Destructor Classes in C++- Declaring Objects-Defining Member Function-Overloading Member Function-

Nested class, Constructors and Destructors, Introduction- Constructors and Destructor- Characteristics of Constructor and Destructor-Application with Constructor- Constructor with Arguments.

UNIT-III: Operator Overloading and Type Conversion & Inheritance The Keyword Operator- Overloading Unary Operator- Operator Return Type Overloading Assignment Operator (=)- Rules for Overloading Operators, Inheritance, Reusability- Types of Inheritance- Advantages of Inheritance-Disadvantages of Inheritance,

UNIT-IV: Pointers & Binding Polymorphisms and Virtual Functions Pointer, Features of Pointers- Pointer Declaration- Pointer to Class- Pointer Object The this Pointer- Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions.

UNIT-V: Generic Programming with Templates & Exception, Need for Templates- Definition of class Templates- Normal Function Templates- Over Loading of Template Function-Bubble Sort Using Function Templates- Difference Between Templates and Macros-, Exception Handling- Principles of Exception Handling- The Keywords try throw and catch- Multiple Catch Statements.

TEXT BOOKS:

1. A First Book of C++, Gary Bronson, Cengage Learning.
2. The Complete Reference C++, Herbert Schildt, TMH. 3. Programming in C++, Ashok N Kamthane, Pearson 2nd Edition

REFERENCE BOOKS:

1. Object Oriented Programming C++, Joyce Farrell, Cengage.
2. C++ Programming: from problem analysis to program design, DS Malik, Cengage Learning

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STIMULATION & MODELING

Course Objectives:

Introduce computer simulation technologies and techniques, provides the foundations for the student to libraries and programs. This course focusses what is needed to build simulation software environments, and not just building simulations using preexisting packages. Introduce.

Course Outcomes:

After finishing this course student will be able to:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Analyze Computer simulation needs, and to implement and test a variety of simulation and data analysis	K2
CO2	Build tools to view and control simulations and their results	K6
CO3	Provide a strong foundation on concept of simulation, and modeling.	K3
CO4	Design simulation models for various case studies like inventory, traffic flow networks, etc.	K4
CO5	Practice on simulation tools and impart knowledge on building simulation systems.	K3,K5

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1		1	2	3	3				3		1	2	3	1
CO2	1		2		3	2				2	3	1	2	
CO3		2		3		1			3	2	2	2	2	
CO4	2		3	2						1	3	2	2	3
CO5	2	3	2	1		1			2	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT-I: System models: Concepts, continuous and discrete systems, System modeling, types of models, subsystems, system study.

UNIT-II: System Simulation: Techniques, comparison of simulation and analytical methods, types of simulation, Distributed log models, cobweb models.

UNIT-III: Continuous system Simulation: Numerical solution of differential equations, Analog Computers, Hybrid Computers, continuous system simulation languages CSMP, system dynamic growth models, logistic curves.

UNIT-IV: Probability concepts in simulation: Monte Carlo techniques, stochastic variables, probability functions, Random Number generation algorithms. **Queuing Theory:** Arrival pattern distributions, servicing times, queuing disciplines, measure of queues, mathematical solutions to queuing problems.

UNIT-V: Discrete System Simulation: Events, generation of arrival patterns, simulation programming tasks, analysis of simulation output. GPSS & SIMSCRIPT: general description of GPSS and SIMSCRIPT, programming in GPSS & SIMSCRIPT, Data structures, Implementation of activities, events and queues, Event scanning, simulation algorithms in GPSS and SIMSCRIPT.

TEXT BOOKS

1. Geoffrey Gordon, “System Simulation”, 2nd Edition, Prentice Hall, India, 2002.
2. Narsingh Deo, “System Simulation with Digital Computer, “Prentice Hall, India, 2001.

REFERENCES

1. Jerry Banks and John S.Carson, Barry L. Nelson, David M.Nicol, “Discrete Event System Simulation”, 3rd Edition, Prentice Hall, India, 2002.
2. Shannon, R.E. Systems simulation, The art and science, Prentice Hall, 1975.
3. Thomas J. Schriber, Simulation using GPSS, John Wiley, 1991

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Open Elective-II:

OPERATING SYSTEMS

Course Objectives:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Describe Computer Operating System Functions, Structures and System Calls.	K1
CO2	Demonstrate various Process Management Concepts and CPU Scheduling Algorithms and Process Synchronization Techniques.	K3
CO3	Illustrate Memory Management Techniques and Page Replacement Algorithms.	K2
CO4	Apply Deadlock Prevention and Avoidance Techniques	K3
CO5	Demonstrate File System Concepts and Mass Storage Structures	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	2	2				2		1	2	3	1
CO2		1	3		1	2			1	1	3	1	2	
CO3	1	2		1	2	1			3	2	2	2	2	
CO4			3	2	3				2		3	2	2	3
CO5	2	3	2	2	1	1			2	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT-I: Introduction to Operating System Concept: Types of operating systems, operating systems concepts, Evaluation of operating systems, operating systems services, structure of OS, Introduction to System call, System call types.

UNIT-II: Process Management – Process concept, The process, Process State Diagram , Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Interprocess Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

UNIT-III: Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, **Virtual Memory Management:** Virtual Memory, Demand Paging, Page-Replacement Algorithms.

UNIT-IV: Concurrency: Process Synchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples **Principles of deadlock**: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-V: File System Interface: Concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection. **File System Implementation:** File system structure, allocation methods, Disk scheduling, **Case studies: Android, UNIX, Windows**

TEXT BOOK:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata McGraw Hill Education, 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata McGraw-Hill Education, 2007.
4. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016

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PYTHON PROGRAMMING

Course Objectives:

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

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Describe comprehend the basics of python programming..	K1
CO2	Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology..	K3
CO3	Explain the use of the built-in data structures list, sets, tuples and dictionary.	K2
CO4	Make use of functions and its applications	K3
CO5	Identify real-world applications using oops, files and exception handling provided by python.	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	2	3	3			2		1	2	3	1
CO2		1	2	2	1	1			1		3	1	2	
CO3	1	2		1	2				3	2	2	2	2	
CO4			3	2	3	2			2		3	2	2	3
CO5	2	3	1	2		1			3		3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT – I: Introduction: History of Python, Python Language, Features of Python, Applications of Python, Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT – II: Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity

Operators, Expressions and order of evaluations, Control Flow- if, if-elif-else, for, while, break, continue.

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

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

UNIT – V: Modules: Creating modules, import statement, from.import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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WEB TECHNOLOGIES

Course Objectives:

- To Learn the basics of Web Designing using HTML, DHTML, and CSS
- To learn the basics about Client side scripts and Server side scripts

Course Outcomes (COs):

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Describe basics of Web Designing using HTML, DHTML, and CSS	K2
CO2	Build real world applications using client side and server side scripting languages	K3
CO3	Design and develop applications using web servers	K5
CO4	Analyze the basics of PHP programming	K4
CO5	Apply Database connectivity with case study for student Information System and Health Management system	K3

#***Based on suggested Revised BTL***

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	2	1	3			3		1	2	3	1
CO2	2	2	3		2	1					3	1	2	
CO3	1		2	1	2				3	2	2	2	2	
CO4	1	1			3	2	1		1		3	2	2	3
CO5	2	2		3	3	1			2		3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I HTML :- Introduction - HTML Formatting - Hyper-Links - Lists - Tables - Images - Forms - Frames - Cascading Style sheets - Types - XML - Document type definition - XML Schemas - Document Object model.

UNIT II Introduction to Client Side scripting - JavaScript - Control statements - Functions - Arrays - Objects - Events - Dynamic HTML with Java Script - AJAX: Ajax Client Server Architecture - XML Http Request Object - Call Back Methods.

UNIT III Web Application- Web servers – IIS (XAMPP) and Tomcat Servers - Server Side Scripting - Java Servlets - Java Server Pages - JSF Components - Cookies.

UNIT IV PHP Programming - Basic Syntax - Defining variable and constant - PHP Data types - Operator and Expression - Operator Precedence - Decisions and Loop - Functions & Recursion - String Processing and Regular Expressions

UNIT V JDBC: Database Connectivity with MySQL - Servlets - JSP - PHP – Case Studies - Student information system - Health Management System

TEXT BOOKS:

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, “Internet & World Wide Web How to Program”, Fifth Edition, Deitel Series, 2012.
2. Jason Gilmore, “Beginning PHP and MySQL from Novice to Professional”, Fourth Edition, Apress Publications, 2010.
3. Brown, Ethan, “Web Development with Node and Express: Leveraging the JavaScript Stack”, O'Reilly Media, 2019. CSE Dept. Flexible Curriculum NITTUGCSE19 95
4. Anthony, Accomazzo, Murray Nathaniel, Lerner Ari, “Fullstack React: The Complete Guide to React JS and Friends”, Fullstack.io, 2017.
5. Kozlowski, Pawel, “Mastering Web Application Development with Angular JS”, Packt Publishing Ltd., 2013.

REFERENCE BOOKS:

1. Robert W. Sebesta, “Programming with World Wide Web”, Fourth Edition, Pearson, 2008.
2. David William Barron, “The World of Scripting Languages”, Wiley Publications, 2000.
3. Dayley B., “Node.js, MongoDB, and AngularJS Web Development”, Addison-Wesley Professional, 2014.
4. Vainikka J., “Full-Stack Web Development using Django REST Framework and React”, 2018

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SOFT COMPUTING

Course Objectives: In the course the student will Learn soft computing concepts and techniques and foster their abilities in designing and implementing soft computing based solutions for real-world problems.

Course Outcomes (COs): At the end of the course, student will be able to

CO	Course Outcomes	Knowledge Level (K)#
CO1	Able to apply fuzzy logic and reasoning to handle uncertainty in engineering problems.	K2
CO2	Make use of genetic algorithms to combinatorial optimization problems	K3
CO3	Apply artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning.	K5
CO4	Learn and apply the principles of self adopting and self organizing neuro fuzzy inference systems	K4
CO5	Evaluate and compare solutions by various soft computing approaches for a given problem	K3

#***Based on suggested Revised BTL***

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1		3		2	1	3			2	1	1	2	3	1
CO2	1	2	3	1	2	1				2	3	1	2	
CO3	1	2		3			1		3		2	2	2	
CO4	1	1	2			1	1		1		3	2	2	3
CO5	1	2		3		2					3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I :FUZZY SET THEORY: Introduction to Neuro – Fuzzy and Soft Computing, Fuzzy Sets, Basic Definition and Terminology, Set-theoretic Operations, Member Function Formulation and Parameterization, Fuzzy Rules and Fuzzy Reasoning, Extension Principle and Fuzzy Relations. Fuzzy Inference Systems, Mamdani Fuzzy Models, Sugeno Fuzzy Models.

UNIT II: OPTIMIZATION: Derivative based Optimization, Descent Methods, The Method of Steepest Descent, Classical Newton's Method, Step Size Determination, Derivative-free Optimization, Genetic Algorithms.

UNIT III: ARTIFICIAL INTELLIGENCE : Introduction, Knowledge Representation, Reasoning, Issues and Acquisition: Prepositional and Predicate Calculus Rule Based knowledge Representation Symbolic Reasoning, Heuristic Search: Techniques for Heuristic search Heuristic Classification.

UNIT IV: NEURO FUZZY MODELING: Adaptive Neuro-Fuzzy Inference Systems, Architecture – Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN –Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V: APPLICATIONS OF COMPUTATIONAL INTELLIGENCE : Printed Character Recognition, Inverse Kinematics Problems, Automobile Fuel Efficiency Prediction, Soft Computing for Color Recipe Prediction.

TEXT BOOKS:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004
2. N.P.Padhy, "Artificial Intelligence and Intelligent Systems", Oxford University Press, 2006.

REFERENCES:

1. Elaine Rich & Kevin Knight, Artificial Intelligence, Second Edition, Tata Mcgraw Hill Publishing Comp., 2006, New Delhi.
2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
3. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
4. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI,
5. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP Professional, Boston, 1996.
6. Amit Konar, "Artificial Intelligence and Soft Computing Behaviour and Cognitive model of the human brain", CRC Press, 2008

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DISTRIBUTED COMPUTING

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the fundamentals of Distributed Computing	**K2**
CO2	Identify an Message communication process	**K3**
CO3	Briefly explain uses of RPC Model in a system	**K3**
CO4	Design and Implementation issues of DSM	**K6**
CO5	Compare the relationship between Clock Synchronization, Algorithms	**K2**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	3		2	1	3			2	2	1	2	3	1
CO2	2	2	3	2	2	1					3	1	2	
CO3	1		3		1	2			3		2	2	2	
CO4	2			2		2	1		1		3	2	2	3
CO5	1	3	2	3	1		1			2	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT 1: Fundamentals Evolution of Distributed Computing Systems, System models, issues in design of Distributed Systems, Distributed computing environment, web based distributed model, computer networks related to distributed systems and web based protocols.

UNIT 2: Message Passing Inter process Communication, Desirable Features of Good Message-Passing Systems, Issues in IPC by Message, Synchronization, Buffering, Multidatagram Messages, Encoding and Decoding of Message Data.

UNIT 3: Remote Procedure Calls The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs.

UNIT 4: Distributed Shared Memory Design and Implementation issues of DSM, Granularity, Structure of Shared memory Space, Consistency Models,Thrashing, Other Approaches to DSM, Advantages of DSM.

UNIT 5: Synchronization Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms.

TEXT BOOKS:

1. Distributed OS by Pradeep K. Sinha (PHI)
2. Tanenbaum S.: Distributed Operating Systems, Pearson Education

REFERENCES:

1. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms, (Pearson Education)
2. George Coulouris, Jean Dollimore. Tim Kindberg: Distributed Systems concepts and design.

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AI and ML for Robotics

Course Objectives :

To learn the concepts of searching for AI problems

- To learn about agents and knowledge representation
- To understand the various factors involved in inferences
- To get introduced to fundamentals of machine learning
- To learn about the possibilities of Supervised and Unsupervised learning

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the History of AI - Agents - Structure of Intelligent agents	**K5**
CO2	Design agents for any given problem	**K3**
CO3	Describe Represent real world knowledge using first order or propositional logic	**K6**
CO4	To make use of Solve problems by appropriated using the supervised or unsupervised machine learning algorithms	**K5**
CO5	Develop appropriate clustering algorithm for solving real-world problems	**K4**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	1	3	2	3			2	3	1	2	3	1
CO2	2	1	3	2	2	1			1		3	1	2	
CO3	1		3		1	2			3	2	2	2	2	
CO4	2	2		2	3	2	2		1	1	3	2	2	3
CO5	1	2		3	1		1			2	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I : AI - History of AI - Agents - Structure of Intelligent agents - Environments - Problem solving methods - Problem solving agents - Formulating problems - search strategies - Breadth-first - Uniform cost - Depth-first – Depth limited - Bidirectional - Informed Search - Best-first Heuristic Functions - Memory bounded search - A* - SMA* - Iterative Improvement algorithms - Hill Climbing - Simulated annealing - Measure of performance and analysis of search algorithms.

UNIT II: Game playing - Perfect Decisions - Imperfect Decisions - Alpha-beta pruning - Knowledge based agent - Wumpus World Environment - Propositional logic - agent for wumpus world - First order logic - syntax - semantics - extensions - Using First order logic - Representation change in the world - Goal based agents.

UNIT III: Knowledge Base - Knowledge representation - Production based system - Frame based system - Inference - Backward chaining - Forward chaining.

UNIT IV: Learning from agents - inductive learning - Types of Machine learning - Supervised learning - learning decision trees - support vector machines - Neural and Belief networks - Perceptron - Multi-layer feed forward networks - Bayesian belief networks.

UNIT V: Unsupervised learning - K-means clustering - hierarchical clustering - Agglomerative and Divisive clustering - Fuzzy clustering.

TEXT BOOKS:

1. Stuart Russel, Peter Norvig, "AI – A Modern Approach", Second Edition, Pearson Education, 2007.
2. Kevin Night, Elaine Rich, Nair B., "Artificial Intelligence (SIE)", McGraw Hill, 2008.

REFERENCE BOOKS:

1. Vinod Chandra SS, Anand Hareendran S, "Artificial and Machine Learning", First Edition, PHI Learning, 2014.
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007
3. G. Luger, W. A. Sttubblefield, "Artificial Intelligence", Third Edition, Addison-Wesley Longman, 1998.
4. N. J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing House, 1980.
5. Tom Mitchell, "Machine Learning", First Edition, Tata McGraw Hill India, 2017.

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Open Elective-III:

BIG DATA ANALYTICS

Course Objectives:

- To understand the competitive advantages of big data analytics
- To understand the big data frameworks
- To learn data analysis methods
- To learn stream computing
- To gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Understand how to leverage the insights from big data analytics	K2
CO2	Analyze data by utilizing various statistical and data mining approaches	K3
CO3	Perform analytics on real-time streaming data	K3
CO4	Understand the various NoSql alternative database models	K4

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	2	2	2			2	3	1	2	3	1
CO2		1	3	2		1			1		3	1	2	
CO3	1		3		1	2			3	2	2	2	2	
CO4	2	1		2		3	2		1	1	3	2	2	3
CO5	1	2		3	1		1			2	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I- INTRODUCTION TO BIG DATA: Big Data – Definition, Characteristic Features – Big Data Applications - Big Data vs Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability.

UNIT II- HADOOP FRAMEWORK: Distributed File Systems - Large-Scale FileSystem Organization – HDFS concepts - MapReduce Execution, Algorithms using MapReduce – Hadoop YARN.

UNIT III-DATA ANALYSIS: Statistical Methods: Regression modelling, Multivariate Analysis - Classification: SVM & Kernel Methods - Rule Mining - Cluster Analysis, Types of Data in Cluster Analysis, Partitioning Methods, Predictive Analytics – Data

analysis using R.

UNIT IV- MINING DATA STREAMS: Streams: Concepts – Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time-series data - Real Time Analytics Platform (RTAP) Applications - Case Studies – Real Time Sentiment Analysis.

UNIT V- BIG DATA FRAMEWORKS: Introduction to NoSQL – Aggregate Data Models – Hbase: Data Model and Implementations – Hbase Clients – Examples – .Cassandra: Data Model – Examples – Cassandra Clients – Hadoop Integration.

SOFTWARE LINKS:

1. Hadoop: http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. Pig latin: http://pig.apache.org/docs/r0.7.0/tutorial.html

TEXT BOOKS:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.

REFERENCE BOOKS:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne
3. Michael Berthold, David J. Hand, ―Intelligent Data Analysis‖, Springer, Second Edition, 2007.
4. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 201

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AI TOOLS & TECHNIQUES

Course Objectives:

- To learn the basic concepts and techniques of AI and machine learning
- To explore the various mechanism of Knowledge and Reasoning used for building expert system.
- To become familiar with supervised and unsupervised learning models
- To design and develop AI and machine learning solution using modern tools.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the fundamentals of AI and machine learning	**K2**
CO2	Identify an appropriate AI problem solving method and knowledge representation technique	**K3**
CO3	Identify appropriate machine learning models for problem solving	**K3**
CO4	Design and develop the AI applications in real world scenario	**K6**
CO5	Compare the relationship between AI, ML, and Deep Learning	**K2**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	3	1	3	1		2	3	1	2	3	1
CO2	2	1		2	3	1			2		3	1	2	
CO3		2	3		1	2			3	2	2	2	2	
CO4	2	2		2		2			1	2	3	2	2	3
CO5	1			3	1		1		1	2	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT– I: Introduction to AI- Definition, Problem, State space representation. Intelligent Systems: Categorization of Intelligent System, Components of AI Program, Foundations of AI, Applications of AI, Current trends in AI, Intelligent Agents: Anatomy, structure, Types.

UNIT– II: Problem solving-Solving problem by Searching: Problem Solving Agent, Formulating Problems. Uninformed Search Methods: Breadth First Search (BFS), Depth First Search (DFS), Depth Limited Search, Depth First Iterative Deepening (DFID), Informed Search Methods- Greedy best first Search, A* Search, Memory bounded heuristic Search. Local Search Algorithms and Optimization Problems- Hill climbing search Simulated annealing and local beam search.

UNIT – III: Knowledge and Reasoning-Knowledge based Agents, The Wumpus World, and Propositional logic**. First Order Logic**- Syntax and Semantic, Inference in FOL, Forward chaining, backward Chaining, Knowledge Engineering in First-Order Logic, Unification and Resolution.

UNIT – IV: Concepts of Machine learning -Supervised, unsupervised, semi-supervised, Rote learning, Reinforcement learning, Issues, steps and applications, Designing a learning System. Case study- hand written digit recognition, stock price prediction. Learning Models- Decision tree learning. Probabilistic Models, Deterministic Models, Hidden Markov Model, Reinforcement Learning-Model based learning, Temporal Difference Learning, Generalization, Partially Observable States.

UNIT – V: Artificial Neural Network: Introduction, neural network representation, Problems for neural network learning, perception, multilayer network & Back propagation Algorithm**.** Deep learning- Definition, relationship between AI, ML, and Deep Learning, Trends in Deep Learning.

TEXT BOOKS:

1. Artificial Intelligence and Machine Learning, 1st Edition, Vinod Chandra S.S., Anand Hareendran S, 2014
2. Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson Education, Stuart J. Russell, Peter Norvig, 2002

REFERENCE BOOKS:

1. PROLOG Programming for Artificial Intelligence", 3rd Edition, Pearson Education, Ivan Bratko, 2002
2. Artificial Intelligence, Third Edition, McGraw Hill Education, Elaine Rich and Kevin Knight, 2017
3. Data Mining Concepts and Techniques, Morgann Kaufmann Publishers, Han Kamber, 2011
4. Machine learning with R, 2nd Edition, Brett Lantz, 2015
5. Genetic Algorithms: Search, Optimization and Machine Learning, 1st ed, Davis E. Goldberg, Addison Wesley, N.Y., 1989

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IMAGE PROCESSING

Course Objectives:

- Describe and explain basic principles of digital image processing.
- Design and implement algorithms that perform basic image processing (e.g. noise removal and image enhancement).
- Design and implement algorithms for advanced image analysis (e.g. image compression, image segmentation).
- Assess the performance of image processing algorithms and systems.

Course Outcomes:

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the components of image processing	**K2**
CO2	Explain various filtration techniques.	**K5**
CO3	Apply image compression techniques.	**K3**
CO4	Discuss the concepts of wavelet transforms.	**K6**
CO5	Analyze the concept of morphological image processing.	**K4**

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2		3		2	1		2	3	1	2	3	1
CO2	2	1		2	3	1					3	1	2	
CO3			3		1	2			3	2	2	2	2	
CO4	1	2		1		2			2	3	3	2	2	3
CO5	1			3	1		1		1	2	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I: Introduction: Fundamental steps in Image Processing System, Components of Image Processing System, Elements of Visual Perception, Image Sensing and acquisition, Image sampling & Quantization, Basic Relationship between pixels.

UNIT II: Image Enhancement Techniques: Spatial Domain Methods: Basic grey level transformation, Histogram equalization, Image subtraction, image averaging.
Spatial filtering: Smoothing, sharpening filters, Laplacian filters.

UNIT III: Image Compression: Redundancies- Coding, Inter pixel, Psycho visual; Fidelity, Source and Channel Encoding, **Elements of Information Theory;** Loss Less and Lossy Compression; Run length coding, Differential encoding, DCT, Image Compression Standards-JPEG, JPEG 2000, MPEG; Video compression.

UNIT IV: Wavelet Based Image Compression: Expansion of functions, Multi-resolution analysis, Scaling functions, MRA refinement equation, Wavelet series expansion, Discrete Wavelet Transform (DWT), Continuous, Wavelet Transform.

UNIT V: Image Segmentation: Discontinuities, Edge Linking and boundary detection, Thresholding, Region Based Segmentation, basic gray-scale morphology operations; Feature extraction; Classification; Object recognition. **Digital Image Watermarking:** Introduction, need of Digital Image Watermarking, applications of watermarking.

TEXT BOOKS:

1. Digital Image Processing. 2nd ed. Gonzalez, R.C. and Woods, R.E. India: Person Education,2009

REFERENCE BOOKS:

1. Digital Image Processing. John Wiley, Pratt, W. K, Fourth Edition-2001
2. Digital Image Processing, Jayaraman, S., Veerakumar, T. and Esakkiranjan, S.,Tata McGraw-Hill,Edition-3,2009

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INFORMATION SECURITY

Course Objectives:

- To provide an understanding of principal concepts, major issues, technologies, and basic approaches in information security
- Master the key concepts of information security and how they "work."
- Develop a "security mindset:" learn how to critically analyze situations of computer and network usage from a security perspective, identifying the salient issues, viewpoints, and trade-offs.

Course Outcomes:

After finishing this course student will be able to:

CO	Course Outcomes	Knowledge Level#
CO1	Evaluate the OSI Security Architecture and Security Services	**K2**
CO2	Demonstrate basic principles of Block Cipher and RSA	**K5**
CO3	Evaluate the Cryptographic Hash Functions, MAC's and Digital Signature.	**K2**
CO4	Demonstrate how to IP Security more secure then Transport Level Security	**K3**
CO5	Evaluate System security policies and procedures	**K5**

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	1	2				2		1	2	3	1
CO2	2		1	3	3	1				2	3	1	2	
CO3	1	2	3		1	3			3	2	2	2	2	
CO4		2	1	2							3	2	2	3
CO5	1	2		3	1				1	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT – I: Computer Security Concepts: OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, Model for Network Security, Classical Encryption Techniques: Transposition Techniques, Substitution Techniques, Steganography.

UNIT – II: Cryptographic Ciphers: Block Cipher Principles, DES, AES.
Asymmetric Cipher: Principles of Public-Key Cryptography, RSA, Diffie– Hellman Key Exchange.

UNIT – III: Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, SHA.
Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements for MAC, HMAC,
Digital Signatures: Digital Signatures Properties, Attacks & Forgeries, Digital Signatures Requirements, Direct Digital Signature, Elgamal DSS, Digital Signature Scheme.

UNIT – IV: IP & Transport-Level Security: IP Security: IP Security Overview, Applications of IPsec, Benefits of IPsec, Routing Applications, IPsec Documents, IPsec Services, Transport & Tunnel Models, Authentication Header, ESP.
Transport-Level Security: Web Security Considerations: Web Security Threats, Web Traffic Security Approaches. **Secure Socket Layer:** SSL Architecture, Record Protocols, Change Cipher Spec protocol, Handshake Protocol. **Transport Layer Security:** Version Number, Pseudorandom Function, Cipher Suites, Cryptographic Computations, Padding.

UNIT – V: System Security: Intruders, Detection, Password Management, Malicious Software Types, Viruses, Worms, Firewalls.

TEXT BOOKS:

1. William Stallings, Cryptography and Network Security: Principles and Practice, Sixth Edition, Pearson, 2011.

REFERENCES:

1. Security in Computing, Fourth Edition, by Charles P. Pfleeger, Pearson Education
2. Modern Cryptography: Theory and Practice, by Wenbo Mao, Prentice Hall.
3. Network Security Essentials: Applications and Standards, by William Stallings. Prentice Hall.

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MOBILE APPLICATION DEVELOPMENT

Course Outcomes: After finishing this course student will be able to:

CO	Course Outcomes	Knowledge Level#
CO1	Install and configure Android application development tools.	**K2**
CO2	Design and develop user Interfaces for the Android platform.	**K5**
CO3	Save state information across important operating system events.	**K2**
CO4	Apply Java programming concepts to Android application development.	**K3**
CO5	Design and Implement Packaging and Deploying, Performance Best Practices	**K5**

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	1	2				2		1	2	3	1
CO2	2		1	3	3	1				2	3	1	2	
CO3	1	2	3		1	3			3	2	2	2	2	
CO4		2	1	2							3	2	2	3
CO5	1	2		3	1				1	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT I: Introduction to Mobile Computing- Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development, Android User.

UNIT II: Intents on UIs VUIs and Mobile Apps: Android Intents and Services, Characteristics of Mobile Applications, Successful Mobile Development- Storing and Retrieving Data-Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider

UNIT III: Communications Via Network and the Web- State Machine, Correct Communications Model, Android Networking and Web, Telephony- Deciding Scope of an App, **Notifications and Alarms-** Performance, Performance and Memory Management, Android Notifications and Alarms

UNIT IV: Graphics-Performance and Multithreading, Graphics and UI Performance, Android Graphics and Multimedia, Mobile Agents and Peer-to-Peer Architecture, Android Multimedia Location, Mobility and Location Based Services, Android,

UNIT V: Packaging and Deploying, Performance Best Practices, Android Field Service App, Security and Hacking - Active Transactions, More on Security, Hacking Android, **Platforms and Additional Issues** - Development Process, Architecture, Design, Technology Selection, Mobile App Development Hurdles, Testing

TEXT BOOKS:

1. Professional Mobile Application Development 11 October 2012 by Jeff Mcherter and Scott Gowell

REFERENCE BOOK:

1. Android Programming: The Big Nerd Ranch Guide (3rd Edition)
2. iOS Programming: The Big Nerd Ranch Guide (6th Edition)
3. Mastering Xamarin UI Development 1st
4. Xamarin Mobile Application Development: Cross-Platform C# and Xamarin.Forms Fundamentals 1st
5. Professional Android 4 Application Development
6. Android Programming for Beginners

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SENSOR NETWORKS

Course Objectives:

- Ability to understand various service delivery models of a Sensor Network architecture.
- Ability to understand the ways in which the network can be programmed and deployed.
- Understanding sencor service providers.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the concepts of sensor networks	**K3**
CO2	Illustrate the MAC and transport protocols for adhoc networks	**K4**
CO3	Demonstrate the security of sensor networks	**K5**
CO4	Analyze and Develop Sensor Service Models	**K3**
CO5	Design the applications of adhoc and sensor networks	**K4**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1		2				2		1	2	3	1
CO2	2		2	3		2				2	3	1	2	
CO3	1		3		1	3			3	2	2	2	2	
CO4		2	1	2						2	3	2	2	3
CO5	1	2			1				1	3	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT- I: Introduction to Ad Hoc Wireless Networks: Characteristics of MANETs, Applications of MANETs, Challenges,

UNIT-II: Routing in MANETs: Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

UNIT-III: Data Transmission In MANETs: The Broadcast Storm, Multicasting, Geocasting, TCP over Ad Hoc Networks: TCP Protocol overview, TOP and MANETs, Solutions for TOP over Ad Hoc

UNIT- IV: Basics of Wireless Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design issues, Energy consumption, Clustering of Sensors, Applications

UNIT V: Data Retrieval In Sensor Networks: Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

TEXT BOOKS

1. Ad Hoc and Sensor Networks — Theory and Applications, Car/os Corderlo Dharma R Aggarwal, World Scientific Publications /Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp 2009.

REFERENCE BOOKS

1. Adhoc Wireless Networks — Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks — Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks — Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, Charles E.Perkins, Pearson Education, 2001.
5. Wireless Ad hoc Networking, Shih-Liri Wu, Yu-Chee Tseng, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks — Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks — A communication-theoretic perspective, Ozan K.Tonguz, Giatuigi Ferrari, Wiley India, 2006, rp2009.

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Open Elective-IV:

CYBER SECURITY

Course Objectives:

- To learn threats and risks within context of the cyber security architecture.
- Student should learn and Identify security tools and hardening techniques.
- To learn types of incidents including categories, responses and timelines for response.

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

Course Outcomes		Knowledge Level (K)#
CO1	Apply cyber security architecture principles.	**K3**
CO2	Demonstrate the risk management processes and practices.	**K2**
CO3	Appraise cyber security incidents to apply appropriate response	**K5**
CO4	Distinguish system and application security threats and vulnerabilities.	**K4**
CO5	Identify security tools and hardening techniques	**K3**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	2	1	1	2				2	1	1	2	3	1
CO2	1	3		3	3	2				2	3	1	2	
CO3	1	2	3		1	3			2	1	2	2	2	
CO4	1	3	1		3					2	3	2	2	3
CO5	1	2		3	1				1	3	3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

SYLLABUS:

UNIT–I: Introduction to Cyber Security-Cyber security objectives, roles, differences between information security and cyber security, Cyber security principles-confidentiality, integrity, availability, authentication and non repudiation

UNIT–II: Information Security within Lifecycle Management-Lifecycle management landscape, Security architecture processes, Security architecture tools, **Risks & Vulnerabilities**-Basics of risk management, Operational threat

environments.

UNIT–III: Incident Response-Incident categories, Incident response, Incident recovery, **Operational security protection**-Digital and data assets, ports and protocols, Protection technologies, Identity and access Management.

UNIT–IV: Threat Detection and Evaluation Monitoring-Vulnerability management, Security logs and alerts, Monitoring tools and appliances, **Analysis**-Network traffic analysis, packet capture and analysis

UNIT–V: Introduction to backdoor System and security-Introduction to metasploit, backdoor, demilitarized zone (DMZ), Digital signature, Brief study on Harding of operating system.

TEXT BOOKS:

1. NASSCOM: Security Analyst Student Hand Book, Dec 2015
2. Information Security Management Principles, Updated Edition, David Alexander, Amanda Finch, David Sutton, BCS publishers, June 2013

REFERENCE BOOKS:

1. Cyber Security Fundamentals-Cyber Security, Network Security and Data Governance Security, 2nd Edition, ISACA Publishers, 2019

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DEEP LEARNING

Course Objectives:

At the end of the course, the students will be expected to:

- Learn deep learning methods for working with sequential data,
- Learn deep recurrent and memory networks,
- Learn deep Turing machines,
- Apply such deep learning mechanisms to various learning problems.
- Know the open issues in deep learning, and have a grasp of the current research directions.

Course Outcomes:

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the basic concepts fundamental learning techniques and layers.	**K2**
CO2	Discuss the Neural Network training, various random models**.**	**K6**
CO3	Explain different types of deep learning network models.	**K5**
CO4	Classify the Probabilistic Neural Networks.	**K2**
CO5	Implement tools on Deep Learning techniques.	**K3**

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	2	1	1	2				2		1	2	3	1
CO2	2	1	3	2	3	1					3	1	2	
CO3	1		3		1	3			3	2	2	2	2	
CO4		2		2	3	1					3	2	2	3
CO5	1	2		3	1				2	1	3	2	2	

(Please fill the above with Levels of Correlation, viz., L, M, H)

Syllabus:

UNIT-1: Foundations of Neural Networks Introduction- Definition, paradigms, perceptive and issues of neural networks, **neural networks –** Biological neuron, Perceptron, Multi Layer Perceptron.

UNIT-2:Fundamentals of deep learning- Definition of Deep Learning, Common Architecture Principles of Deep Networks, Building Blocks of Deep Learning.
Architectures of Deep Networks- Feed Forward Neural Networks, Convolution Neural Networks, Recurrent Neural Networks, Recursive Neural Networks, LSTM

UNIT -3: Deep Learning Research Linear factor models - Probabilistic PCA And Factor Analysis, Independent Component Analysis, Sparse Coding, Manifold Interpretation of PCA, Auto Encoders.

UNIT -4: Deep Generating Models : Boltzmann Machines, Deep Belief Networks, Deep Boltzmann Machines, Convolution Boltzmann Machines, Backpropagation through Random Operations, Directed Generative Nets, Generating Static Networks.

UNIT -5: Applications: Large Scale Deep Learning, Image Recognition, Speech Recognition, Natural Language Processing, Other Applications.
Deep Learning Frameworks: Tensor Flow, Opencv, Pytorch, Keras, DL4J.

TEXT BOOKS:

1. Deep learning A practitioner's approach- josh Patterson and Adam Gibson, OREILLY.
2. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016..

REFERENCE BOOKS:

1. Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009.
2. Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013.
3. Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-Hill Education, 2004.
4. Bishop, C.M., Pattern Recognition and Machine Learning, Springer, 2006.

Web Link:

1. Swayam NPTEL: Deep Learning: https://onlinecourses.nptel.ac.in/noc22_cs22/preview

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DATA SCIENCE

Course Objectives:

From the course the student will learn

- Provide you with the knowledge and expertise to become a proficient data scientist.
- Demonstrate an understanding of statistics and machine learning concepts that are vital for data science;
- Produce Python code to statistically analyse a dataset;
- Critically evaluate data visualisations based on their design and use for communicating stories from data

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Acquire the knowledge and expertise to become a proficient data scientist	K3
CO2	Demonstrate an understanding of statistics and machine learning concepts that are vital for data science	K3
CO3	Explain how data is collected, managed and stored for data science	K2
CO4	Interpret the key concepts in data science, including their real-world applications and the toolkit used by data scientists	K2
CO5	Illustrate data collection and management scripts using MongoDB	K3

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1		1	1	2				2	1	1	2	3	1
CO2	1	1		3		3					3	1	2	
CO3	2	2	3	1	1				3	2	2	2	2	
CO4	1			2	3	1					3	2	2	3
CO5	1	2		2	3				2	1	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT-I: Introduction to Core Concepts and Technologies- Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.

UNIT-II: Data Collection and Management- Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, using multiple data sources.

UNIT -III: Data Analysis- Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.

UNIT-IV: Data Visualisation- Introduction, Types of data visualisation, **Data for visualisation-** Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

UNIT-V: Applications of Data Science- Technologies for visualisation, Bokeh (Python), recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

TEXT BOOKS:

1. "The Art of Data Science", 1st edition, Roger D. Peng and Elizabeth matsui, Lean Publications, 2015
2. "Algorithms for Data Science", 1st edition, **Steele**, Brian, **Chandler**, John, **Reddy**, Swarna, springers Publications, 2016

REFERENCE BOOKS:

1. Doing Data Science: Straight Talk From The Frontline, 1st edition, Cathy O'Neil and Rachel Schutt, O'Reilly, 2013
2. Mining of Massive Datasets, 2nd edition, Jure Leskovek, Anand Rajaraman and Jeffrey Ullman, v2.1, Cambridge University Press, 2014

BLOCK CHAIN TECHNOLOGIES

Course Objectives:

To understand block chain technology and Cryptocurrency works

Course Outcomes:

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Demonstrate the block chain basics, Crypto currency	K2
CO2	To compare and contrast the use of different private vs. public block chain and use cases	K6
CO3	Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins	K5
CO4	Classify Permission Block chain and use cases – Hyper ledger, Corda	K2
CO5	Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems, and others	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	1	2	2			2	1	1	2	3	1
CO2	1	2	1	2	1	3				2	3	1	2	
CO3	2	2	2	2	2	1			2		2	2	2	
CO4	2	1	3	3	3	2			3		3	2	2	3
CO5	1	2		2	3				2	1	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT- I Introduction: Introduction – basic ideas behind block chain, how it is changing the landscape of digitalization, introduction to cryptographic concepts required, Block chain or distributed trust, Currency, Cryptocurrency, How a Cryptocurrency works, Financial services, Bitcoin prediction markets.

UNIT- II: Hashing, public key cryptosystems, private vs public block chain and use cases, Hash Puzzles, Extensibility of Block chain concepts, Digital Identity verification, Block chain Neutrality, Digital art, Block chain Environment

UNIT- III Introduction to Bitcoin : Bitcoin Block chain and scripts, Use cases of Bitcoin Blockchain scripting language in micropayment, escrow etc Downside of Bit coin – mining, Block chain Science: Grid coin, Folding coin, Block chain Genomics, Bit coin MOOCs.

UNIT – IV : Ethereum continued, IOTA, The real need for mining – consensus – Byzantine Generals Problem, and Consensus as a distributed coordination problem

– Coming to private or permissioned block chains –Introduction to Hyper ledger, Currency, Token,Campus coin, Coin drop as a strategy for Public adoption, Currency Multiplicity, Demurrage currency

UNIT – V : Technical challenges, Business model challenges, Scandals and Public perception, Government Regulations, Uses of Block chain in E-Governance, Land Registration, Medical Information Systems.

TEXT BOOK:

1. Blockchain Blue print for Economy by Melanie Swan

REFERENCES:

1. Blockchain Basics: A Non-Technical Introduction in 25 Steps 1st Edition, by Daniel Drescher

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GAME THEORY

Course Objectives:
To understand Games and Solutions Game Theory, Electronic Mail Game.

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Explain the game theory terminology and solutions of games.	K4
CO2	Compare with Mixed, Correlated, and Evolutionary Equilibrium.	K5
CO3	To elaborate the uses of Knowledge and Equilibrium	K3
CO4	Discuss the Extensive Games with Perfect Information.	K5
CO5	Demonstrate The Basic Idea Infinitely Repeated Games	K3

#based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1		2	1	3	1			2	1	1	2	3	1
CO2	1	2	1		3	2				2	3	1	2	
CO3	2		2	2		1			2		2	2	2	
CO4	1	1	3		3	2			3	2	3	2	2	3
CO5	2	2		2	3				2	1	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT – I: Introduction: Game Theory, Games and Solutions Game Theory and the Theory of Competitive Equilibrium, Rational Behavior, The Steady State and Deductive Interpretations, Bounded Rationality Terminology and Notation Nash Equilibrium- Strategic Games, Strictly Competitive Games.

UNIT – II: Mixed, Correlated, and Evolutionary Equilibrium-Mixed Strategy Nash Equilibrium Interpretations of Mixed Strategy Nash Equilibrium Correlated Equilibrium Evolutionary Equilibrium Rationalizability and Iterated Elimination of Dominated Actions.

UNIT – III: Knowledge and Equilibrium –A Model of Knowledge Common Knowledge, Can People Agree to Disagree? , Knowledge and Solution Concepts, The Electronic Mail Game.

UNIT – IV: Extensive Games with Perfect Information –Extensive Games with Perfect

Information Subgame Perfect Equilibrium Two Extensions of the Definition of a Game The Interpretation of a Strategy , Two Notable Finite Horizon Games ,

UNIT – V: Repeated Games –The Basic Idea Infinitely Repeated Games vs.\ Finitely Repeated Games Infinitely Repeated Games: Definitions Strategies as Machines Trigger Strategies: Nash Folk Theorems Punishing for a Limited Length of Time: A Perfect Folk Theorem for the Limit of Means Criterion Punishing the Punisher:

TEXT BOOKS:

1. M. J. Osborne and A. Rubinstein, A course in Game Theory, MIT Press
2. Roger Myerson, Game Theory, Harvard University Press
3. D. Fudenberg and J. Tirole, Game Theory, MIT Press

REFERENCES:

1. J. von Neumann and O. Morgenstern, Theory of Games and Economic Behavior, New York:n John Wiley and Sons.
2. R.D. Luce and H. Raiffa, Games and Decisions, New York: John Wiley and Sons.,
3. G. Owen, Game Theory, (Second Edition), New York: Academic Press,

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INTERNET OF THINGS

Course Objectives:

From the course the student will learn

- Able to understand the application areas of IOT
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics

Course Outcomes:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Review Internet of Things (IoT).	**K2**
CO2	Demonstrate various business models relevant to IoT.	**K3**
CO3	Construct designs for web connectivity	**K6**
CO4	Organize sources of data acquisition related to IoT, integrate to enterprise systems.	**K4**
CO5	Describe IoT with Cloud technologies.	**K2**

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	1		3		2	1			2	1	1	2	3	1
CO2	2	2	3		1	2				2	3	1	2	
CO3		1	2	2		1			2		2	2	2	
CO4	1	1	3		2	1			3	2	3	2	2	3
CO5	2	2		2		1			3	1	3	2	2	

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3-High)

SYLLABUS:

UNIT–I: The Internet of Things- An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, Examples OF IoTs, Design Principles For Connected Devices, Internet connectivity, **Application Layer Protocols-** HTTP, HTTPS, FTP

UNIT–II: Business Models for Business Processes in the Internet of Things, IoT/M2M systems LAYERS AND designs standardizations, Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities, Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability.

UNIT-III: Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

UNIT-IV: Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT-V: Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology, Sensing the World.

TEXT BOOKS:

1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
2. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERENCE BOOKS:

1. Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
2. Getting Started with the Internet of Things, CunoPfister , Oreilly

EEE Branch
R19 Regulations
CYBER SECURITY

COURSE OBJECTIVES:

- The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
- Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

COURSE OUTCOMES:

- Cyber Security architecture principles
- Identifying System and application security threats and vulnerabilities
- Identifying different classes of attacks
- Cyber Security incidents to apply appropriate response
- Describing risk management processes and practices
- Evaluation of decision making outcomes of Cyber Security scenarios

UNIT-I: INTRODUCTION TO CYBERCRIME: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, 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: Planning of Offenses by Cyber Criminals–Introduction, Planning attacks by criminals, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

UNIT-III: CYBERCRIME MOBILE AND WIRELESS DEVICES: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies 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 DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft)

UNIT-V: CYBERCRIMES AND CYBER SECURITY: Need for 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, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

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, Antiforensics

TEXT BOOKS:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley.

REFERENCES:

1. Principles of Information Security, Micheal E.Whitman and Herbert J.Mattord, Cengage Learning.
2. Information Security, Mark Rhodes, Ousley, MGH.

EEE Branch
R19 Regulations

Data Analytics using Python

Course Objectives:
The man objective of the course is to provide statistical foundations, fundamental algorithms and techniques used in Data Analytics.

Course Outcomes: Upon completion of this course, the students will be able to

- Perform exploratory analysis and Hypothesis testing on the datasets ,
- Understand the various distribution and sampling
- Apply statistical inference for Regression and Classification
- Employ efficient storage and data operations using NumPy arrays
- Apply powerful data manipulations using Pandas.
- Do data preprocessing and visualization using Pandas

Syllabus:

UNIT I:EXPLORATORY ANALYSIS : Elements of Structured, Estimates of Location - Mean, Median, Mode, Outliers, Estimates of Variability- Standard Deviation, Z-Score, Frequency Table and Histograms, Correlation
DATA SAMPLING AND DISTRIBUTION : Normalization, Sampling Data-Simple Random sampling, Stratified, Cluster Sampling, Sampling Error/Bias. Bootstraping, Central Limit Theorem, Confidence intervals, Normal distribution, Binomial distribution, Poisson distribution

UNIT II: Introduction to Python, working with data structures such as lists, tuples, dictionaries, sets. Control structures, Math and Random number functions, user defined functions, File handling, Exception handling, Essential Python libraries.

UNIT III:HYPOTHESIS : A/B Testing, Hypothesis Tests- null, one-way, two-way, P-value, Type 1 & 2 errors, t-tests, multiple testing, degrees of freedom, ANOVA, Chi-Square Tests, Power and Sample Size
REGRESSION AND PREDICTION : Simple Linear Regression, Multiple Linear Regression, Confidence and Prediction Intervals, Categorical Variables

UNIT IV: OOPs Concepts in Python, Class and Objects, Constructors, Data hiding, Data Abstraction, Inheritance, NumPy Basics, Universal Functions: Fast Element-Wise Array Functions, Mathematical and Statistical Methods-Sorting, Unique and Other Set Logic.

UNIT V: DATA MANIPULATION WITH PANDAS: Introduction to pandas Data Structure, Series, DataFrame, Essential Functionality: Dropping EntriesIndexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking. Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.

UNIT VI: CLASSIFICATION : Naive Bayes, Discriminant Analysis, Logistic Regression, Evaluating Classification Models, Strategies for Imbalanced data, using Scikit-Learn library.
DATA CLEANING, PREPARATION AND VISUALIZATION: Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- String Manipulation: Vectorized String Functions in pandas. Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

Text Books:

1. Bruce, Peter, and Andrew Bruce. Practical statistics for data scientists: 50 essential concepts. " O'Reilly Media, Inc.", 2017.
2. Y. Daniel Liang, “Introduction to Programming using Python”, Pearson,2012.
3. McKinney, W. (2012). Python for data analysis: Data wrangling with Pandas, NumPy, and IPython. " O'Reilly Media, Inc.".

Refrence Books:

1. Dodge, Yadolah, ed. Statistical data analysis and inference. Elsevier, 2014.
2. Wes McKinney, “Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython”, O’Reilly, 2nd Edition,2018
3. Wesley J. Chun, “Core Python Programming”, Prentice Hall,2006.
4. Mark Lutz, “Learning Python”, O’Reilly, 4th Edition, 2009.

Civil Branch
R19 Regulations
Data Base Management Systems

Course Objectives:
This Course will enable students to

- Explain the concept of databases, database management systems, database structures and how they work.
- Make use of Entity-Relationship Modeling and Relational Modeling for creating simple databases from the real world scenarios.
- Write relational algebra and structured query language (SQL) statements.
- Normalize a database using Normalization Rules.
- Discuss the issues associated with Transaction Management and Recovery, Tree Structured and Hash-Based Indexing

Course Outcomes:

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

CO	Course Outcomes	Knowledge Level (K)#
CO1	Illustrate the concept of databases, database management systems, database languages, database structures and their work	K2
CO2	Apply ER modeling and Relational modeling for designing simple databases.	K3
CO3	Summarize the concepts related to relational model and SQL and Write database queries using relational algebra and structured query language.	K2
CO4	Design and develop databases from the real world by applying the concepts of Normalization.	K6
CO5	Outline the issues associated with Transaction Management and Recovery, Tree Structured and Hash-Based Indexing	K2

Syllabus:
UNIT-I:Introduction to Databases: Introduction, An Example, Characteristics of the Database Approach, Actors on Scene, Workers behind the scene, Advantages of Using the DBMS Approach, A Brief History of Database Applications, When Not to Use a DBMS **[TB-2]**
Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database

Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architecture for DBMSs, Classification of Database Management Systems **[TB-2]**

UNIT-II:

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model, Conceptual Design for Large Enterprises **[TB-1]**

Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/Altering Tables and Views **[TB-1]**

UNIT-III:

SQL: Queries, Constraints, Triggers: The Form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Stored Procedures, functions,Designing Active Databases **[TB-1]**

UNIT-IV:

Introduction to Normalization Using Functional and Multivalued Dependencies: Informal Design Guidelines for Relation Schema, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies **[TB-2]**

UNIT V:

Transaction Management and Concurrency Control: What is a Transaction?, Concurrency Control, Concurrency Control with Locking Methods, Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods, Database Recovery Management, Query Optimization and indexing**[TB-3]**

Text Books:

1. Data base Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, Mc Graw-Hill
2. Database Systems, 6/e Ramez Elmasri, Shamkant B. Navathe, Pearson
3. Database Systems, 9/e, Carlos Coronel, Steven Morris, Peter Rob, Cengage

Reference Books:

1. Data base System Concepts, 6/e, Abraham Silberschatz, Henry F. Korth, S.Sudarshan, Mc Graw-Hill
2. Introduction to Database Systems, 8/e, C J Date, Pearson

Civil Branch
R19 Regulations
COMPUTER GRAPHICS

Course Objectives:

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

Course Outcomes:

After learning the course, the student will be able:

CO	Course Outcomes	Knowledge Level (K)#
CO1	Acquire the basics of computer graphics, different graphics systems and applications of computer graphics with various algorithms for line, circle and ellipse drawing objects for 2D transformations	K3
CO2	Explain projections and visible surface detection techniques for display of 3D scene on 2D screen	K5
CO3	Develop scene with basic graphic primitive algorithms using OPENGL programming.	K3
CO4	Explain selected among models for lighting/shading: Color, ambient light; distant and light with sources; Phong reflection model; and shading (flat, smooth, Gourand, Phong).	K5
CO5	Illustrate able to create the general software architecture of programs that use 3D object sets with computer graphics.	K3

Syllabus:

UNIT-I: Introduction to Graphics: Application areas of Computer Graphics, overview of graphics systems, video-display devices, graphics monitors and work stations and input devices

2D Primitives: Output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformations - Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms.

UNIT-II: 3D Concepts: Parallel and Perspective projections - Three dimensional object representation– Polygons, Curved lines, Splines, Quadric Surfaces, - Visualization of data sets - 3D transformations – Viewing -Visible surface identification.

UNIT-III: Graphics Programming : Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects - Drawing three dimensional scenes

UNIT- IV:
Rendering: Introduction to shading models – Flat and Smooth shading – Adding texture to faces – Adding shadows of objects – Building a camera in a program – Creating shaded objects

UNIT- V:
Overview of Ray Tracing: Intersecting rays with other primitives – Adding Surface texture – Reflections and Transparency – Boolean operations on Objects.

Text Books:
1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education,2004.
2. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.
3. Schaum's Outline of Computer Graphics Second Edition, Zhigang Xiang, Roy A. Plastock.

Reference Books:
1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007.

R19 Regulations
Common to Petroleum engineering and Chemical Engineering

Introduction to Python Programming

Course objectives:

1. Describe the core syntax and semantics of Python programming language.
2. Discover the need for working with the strings and functions.
3. Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
4. Indicate the use of regular expressions and built-in functions to navigate the file system.
5. Infer the Object-oriented Programming concepts in Python.

Course Outcomes:

COs	Course Outcomes	Bloom's Level
CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	**L2**
CO2	Express proficiency in the handling of strings and functions.	**L2**
CO3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	**L3**
CO4	Identify the commonly used operations involving file systems and regular expressions.	**L2**
CO5	Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.	**L3**

UNIT-1:Introduction: History of python, Applications of python, running python scripts, Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, Control Flow- if, if-elif-else, for, while, break, continue, pass.

UNIT-2: Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods,

Formatting Strings, Lists, Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, The del Statement.

UNIT-3: Dictionaries: Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, The del Statement, Tuples and Sets, Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Traversing of Sets, Frozen set.

UNIT-4: Functions: Defining functions, calling functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length Arguments, anonymous functions, Scope of the variable in a function-Global and Local Variables. Modules: Creating modules, import statement, from import statement, name spacing.

UNIT-5: Object Oriented Programming in Python: Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism. Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions.

Text Books:

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

Reference Books:

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

R19 Regulations
Common to Petroleum engineering and Chemical Engineering
Data Science

Course Objectives: The main objectives of this course is to

- describe the life cycle of Data Science and computational environments for data scientists using Python
- describe the fundamentals for exploring and managing data with Python
- examine the various data analytics techniques for labeled/columnar data using Python
- demonstrate a flexible range of data visualizations techniques in Python

Course Outcomes: Upon completion of this course, the students will be able to

- Identify the need for data analytics and solve basic problems using Python built-in data types and their methods.
- Design an application with user-defined modules and packages using OOP concept
- Employ efficient storage and data operations using NumPy arrays
- Apply powerful data manipulations using Pandas.
- Do data preprocessing and visualization using Pandas

Syllabus:

UNIT I: INTRODUCTION TO DATA SCIENCE AND PYTHON:
Introduction to Data Science and its importance, Data Science and Big data, The life cycle of Data Science, The Art of Data Science, Work with data, data Cleaning, data Munging, data manipulation. Establishing computational environments for data scientists using Python with IPython and Jupyter.
Introduction to Python - Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments. Built-in Data types and their Methods: Strings, List, Tuple, Dictionary, Set. Type Conversion, Operators, Decision Making, Looping, Loop Control statements, Math and Random number functions. User defined functions - function arguments & its types, Essential Python libraries.

UNIT II: FILE, EXCEPTION HANDLING AND OOP:
User defined Modules and Packages in Python- Files: File manipulations, File and Directory related methods - Python Exception Handling. OOPs Concepts -Class and Objects, Constructors – Data hiding- Data Abstraction- Inheritance

UNIT III: INTRODUCTION TO NUMPY
NumPy Basics: Arrays and Vectorized Computation- The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes. Universal Functions: Fast Element-Wise Array Functions- Mathematical and Statistical Methods-SortingUnique and Other Set Logic.

UNIT IV: DATA MANIPULATION WITH PANDAS
Introduction to pandas Data Structures: Series, DataFrame, Essential Functionality: Dropping Entries Indexing, Selection, and Filtering- Function Application and Mapping-

Sorting and Ranking. Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.

UNIT V: DATA CLEANING, PREPARATION AND VISUALIZATION

Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- String Manipulation: Vectorized String Functions in pandas. Using Matplotlib, Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

Text Books:

1. Y. Daniel Liang, "Introduction to Programming using Python", Pearson,2012.
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition,2018
3. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017

Reference Books:

1. Wesley J. Chun, "Core Python Programming", Prentice Hall,2006.
2. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009.