

**ACADEMIC REGULATIONS
COURSE STRUCTURE & SYLLABUS**

For

B.Tech

COMPUTER SCIENCE AND ENGINEERING

(Applicable for batches admitted from 2019-20)



PRAGATI ENGINEERING COLLEGE
(AUTONOMOUS)

Permanently Affiliated to JNTUK, Kakinada, Accredited by NAAC with “A” Grade
Recognized by UGC 2(f) and 12(b) under UGC act, 1956
1-378, ADB Road, Surampalem – 533 437
Near Peddapuram, E.G. Dist, Andhra Pradesh

VISION AND MISSION OF THE INSTITUTE

VISION

To emerge as a Premier Institution for Technical Education in the Country through Academic Excellence and to be recognized as a Centre for Excellence in Research & Development, Catering to the needs of our Country.

MISSION

To realize a strong Institution by consistently maintaining State-of-art-Infrastructure and building a cohesive, World Class Team and provide need based Technical Education, Research and Development through enhanced Industry Interaction.

VISION AND MISSION OF THE DEPARTMENT

VISION

To emerge as a center of technical expertise in the field of computer science and engineering by producing globally competent professionals with technical & research capabilities, ethical values and team spirit.

MISSION

- M1:** To produce competent software professionals.
M2: To induce application oriented and research capabilities in students for the betterment of society.
M3: To inculcate ethics and human values in students to adapt to the dynamism in the field of computing technology.

PROGRAM EDUCATIONAL OBJECTIVES

- PEO1:** Graduates are prepared to be engineering practitioners in the areas of computer science and engineering to solve industry's technological problems.
PEO2: Graduates are prepared to be employed in IT industries through advanced education, research and development and entrepreneurial skills.
PEO3: Graduates are prepared to be responsible computing professionals in an ethical manner.

PROGRAM OUTCOMES (POs)

After successful completion of the program, the graduates will be able to

PO1	Engineering knowledge : Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6	Environment and sustainability: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Ethics: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Individual and team work: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

PSO-1	Analyze the problem and identify computing requirements appropriate to its solution.
PSO-2	Design and development of software based solutions to the real world problems.
PSO-3	Adapt to a rapidly changing environment by learning and employing emerging software tools and technologies.

Bloom's Taxonomy Knowledge Level	Knowledge Level Representation	Mapping/correlation levels
Remember	K1	1: Low
Understand	K2	
Apply	K3	2:Medium
Analyze	K4	
Evaluate	K5	3. High
Create	K6	

R19-ACADEMIC REGULATIONS FOR B.TECH (REGULAR)

Applicable for the students of B.Tech (Regular) Admitted from the academic year 2019-2020.

1. AWARD OF B.TECH DEGREE

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

- 1.1 A Student shall be declared eligible for the award of the B.Tech Degree, if he/she pursues a course of study for not less than four and for not more than eight academic years.
- 1.2 The candidate shall register for 160 credits and secure all the 160 credits.

2. PROGRAMMES OF STUDY

Following B.Tech Programmes are offered with English as medium of instruction.

S. No.	Name of the Programme	Code
1	Civil Engineering (CE)	01
2	Electrical and Electronics Engineering (EEE)	02
3	Mechanical Engineering (ME)	03
4	Electronics and Communications Engineering (ECE)	04
5	Computer Science and Engineering (CSE)	05
6	Information Technology (IT)	12

3. INDUCTION PROGRAMME

At the beginning of the first year in the zero semester there shall be three weeks induction programme to help new students adjust and feel comfortable in the new environment, inculcate in them the culture of the institution.

4. DISTRIBUTION AND WEIGHTAGE OF MARKS

4.1 The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory/drawing/design courses and 75 marks for laboratory courses. The project work shall be evaluated for 200 marks. The mini project/Socially relevant activity has a weightage of 50 marks and evaluated internally.

4.2 Theory Courses**a) Internal assessment : 30 marks**

For the Mid examinations there shall be two tests, one conducted in the middle and the other at the end of each semester. Each mid examination consists of an examination and assignment. The question paper contains **Part-A** and **Part-B**. The duration for the answering the question paper is 100 minutes. For First mid examination Part-A consists of three questions, one question from first unit, one question from Second unit each for 8 marks and one question from first half of third unit for 4 marks. For second mid examination Part-A consists of three questions, one question from second half of third unit for 4 marks, one question from fourth unit and one question from fifth unit each for 8 marks. Part-B consists of ten objective type questions each carries half mark totaling to 5 marks. Answering all questions is compulsory.

Students shall submit two assignments in a semester. The first assignment will be on first two units and first half of the third unit. The second assignment will be on the second half of third unit and last two units. The marks allotted for each assignment is 5.

Internal Marks based on mid examinations including assignments (30 Marks) are calculated with 80% weightage for best of the two mid examinations and 20% weightage for other mid examination.

The formula for finding the total marks of internal assessment (30 marks) = [0.80 x higher marks scored between the two internal tests + 0.20 x marks scored in the other test]

b) External assessment: 70 Marks

The end semester examination is of 3 hours duration and it covers the topics in 5 units and weightage is 70 marks.

End examination consists of 5 questions and each question for 14 marks. Two Questions from each unit with internal choice i.e, either or choice (total 10 questions with 2 questions from each unit)

4.3 Laboratory Courses

a) Internal assessment : 25 marks

There shall be continuous evaluation during the semester for 25 marks as shown below:

Day-to-Day work	-	10 marks
Laboratory record	-	5 marks
One internal test at the end of the semester	-	10 marks

Total	-	25 Marks

b) External Assessment : 50 marks

At the end of the semester an examination for 3 hours duration shall be conducted for 50 marks by the concerned teacher and an external examiner.

4.4 Drawing/Similar Course

i) For Engineering Drawing course,

a) Internal assessment : 30 marks

There shall be continuous evaluation with a weightage of 30 marks as shown below :

Day-to-Day work	-	15 marks
Internal tests :		
There shall be two internal tests One in the middle of the semester and the other at the end. Marks for Internal Tests = 0.8 x higher marks scored between the two tests + 0.2 x marks scored in the other test.	-	15 marks

Total	-	30 Marks

b) External assessment : 70 Marks

Same as for theory courses given in 4.2 (b)

ii) For Machine Drawing course,**a) Internal assessment : 30 marks**

There shall be continuous evaluation with a weightage of 30 marks as shown below :

Day-to-Day work - 15 marks

Internal tests :

There shall be two internal tests One in the middle of the semester and the other at the end. Marks for Internal Tests = 0.8 x higher marks scored between the two tests + 0.2 x marks scored in the other test.

- 15 marks

Total

- **30 Marks**

b) External assessment : 70 Marks

The end semester examination is of 3 hours duration and it covers the topics in two parts and weightage is 70 marks.

End examination consists of two parts i.e PART-A and PART-B. PART-A consists of 3 questions and out of which two questions are to be answered and each carries 14 marks. PART-B contains one compulsory question for 42 marks.

iii) Courses such as Building Planning and Drawing, Design and Detailing of Reinforced Concrete Structures, Design and Detailing of Steel Structures, Estimation, Specifications and Contracts.**a) Internal assessment : 30 marks**

There shall be continuous evaluation with a weightage of 30 marks as shown below :

Assignments - 10 marks

Internal tests :

There shall be two internal tests One in the middle of the semester and the other at the end. Marks for Internal Tests = 0.8 x higher marks scored between the two tests + 0.2 x marks scored in the other test.

- 20 marks

Total

- **30 Marks**

b) External assessment : 70 Marks

The end semester examination is of 3 hours duration and it covers the topics in 5 units and weightage is 70 marks.

End examination consists of two parts i.e PART-A and PART-B. PART-A consists of 2 questions and out of which one question has to be answered and carries 28 marks. PART-B contains 5 Questions out of which three questions has to be answered and each carries 14 marks.

4.5 Socially Relevant Activity

To enhance social responsibility among students a Socially relevant Activity is introduced in the II year I / II semester. Each student has to participate in various social awareness programmes viz. Swachh Bharat, Water Harvesting, Health and Hygiene. Each student has to work 15 hours continuously in the semester for this work. It has a weightage of 50 marks and evaluated internally at the end of the semester.

4.6 Mini Project

There shall be a Mini Project in the III year I / II semester. It has a weightage of 50 marks and evaluated internally at the end of the semester.

4.7 Project Work

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.

4.8 Mandatory Audit/Non Credit Courses

Following are the mandatory audit courses offered to all the programmes.

- i. Environmental Science
- ii. Constitution of India
- iii. Essence of Indian Traditional Knowledge
- iv. Professional Ethics and Human Values
- v. IPR and Patents
- vi. MOOCs/Industry course approved by the department.

4.8.1 Evaluation Procedure:

4.8.1.1 Mandatory Audit/Non Credit Courses (i - v):

For the Mandatory Audit/Non credit courses i-v listed above an internal test shall be conducted at the end of the semester. A student is required to score minimum 40 marks out of 100 marks in each of the mandatory audit/non credit courses.

4.8.1.2 MOOCs Course/ industry course approved by the department::

A student shall register either MOOCs or industry course approved by the department.

i. MOOCs:

There shall be a Discipline Centric mandatory Course through Massive Open Online Course (MOOC). The student shall register for the course (Minimum of 8 weeks) offered by authorized Institutions/Agencies through online with the approval of Head of the Department which is not covered in the curriculum,. For those students who have not cleared the online MOOCs course, respective Head of the Department shall appoint one mentor for each of the MOOC subjects offered and the mentor appointed shall conduct an internal test. A student is required to score 40 marks out of 100 marks.

ii. Industry course approved by the department:

For the industry course an industry trained faculty member nominated by the Head of the department shall conduct a course during the semester. At the end of the semester an internal test shall be conducted. A student is required to score 40 marks out of 100 marks.

The B.Tech degree shall only be awarded if a student gets satisfactory grade (CS-Completed Successfully) in each of the mandatory audit/non credit courses besides acquiring 160 (120 for lateral entry) credits.

5. ATTENDANCE REQUIREMENTS :

- 5.1 A student shall be eligible to appear for semester end examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.
- 5.2 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.
- 5.3 Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.
- 5.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the College.
- 5.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester and their registration shall stand cancelled.
- 5.6 A student will not be promoted to the next semester unless he/she satisfies the attendance requirements of the present semester. They may seek readmission for that semester when offered next.

6. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned under rule 5.0.

6.1 A Student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/laboratory, design/drawing subject/project by securing 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.

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

7. PROGRAMME PATTERN

- 7.1 The entire programme of study is for four academic years, all the years are on semester pattern.
- 7.2 A student eligible to appear for the end semester examination in a subject, but absent or failed in the end semester examination, may write the examination in that subject when conducted next.
- 7.3 When a student is detained due to 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.

8. PROMOTION TO NEXT HIGHER CLASS

- 8.1 A Student shall be promoted from I year to II year if he fulfills the minimum attendance requirement under rule 5.
- 8.2 A Student shall be **promoted from II year to III year**, if he fulfills the academic requirement of **50% of the credits up to II year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.**
- 8.3 A student shall be **promoted from III year to IV year** if he fulfills the academic requirements of **50% of the credits up to III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.**

9. CUMULATIVE GRADE POINT AVERAGE (CGPA)

Theory/Laboratory Design/Drawing/Project work/mini project/socially relevant activity (%)	Letter Grade	Level	Grade Point
≥ 90	O	Outstanding	10
≥ 80 to < 90	S	Excellent	9
≥ 70 to < 80	A	Very Good	8
≥ 60 to < 70	B	Good	7
≥ 50 to < 60	C	Fair	6
≥ 40 to < 50	D	Satisfactory	5
<40	F	Fail	0
--	--	Absent	0

Computation of Semester Grade Point Average (SGPA)

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

The **SGPA** is the ratio of sum of product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student i.e.

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

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

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.,

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

- Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.
- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- Equivalent Percentage = $(\text{CGPA} - 0.75) \times 10$

10. 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 shall be placed in one of the following four classes.

Class Awarded	CGPA to be secured	From the CGPA secured from 160 credits
First Class with Distinction	≥ 7.75	
First Class	≥ 6.75 to < 7.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

11. MINIMUM INSTRUCTIONS DAYS.

The minimum instruction days for each semester shall be 90 working days

12. STUDENT TRANSFERS

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

12.2 Pragati Engineering College (Autonomous) follows the practice of JNTUK/ State Government guidelines for transfer of students.

13. TRANSITORY REGULATIONS

13.1 Discontinued or Detained Students are eligible for readmission as and when next offered. The readmitted students will be governed by the regulations under which the student has been admitted.

13.2 a) In case of transferred students from other universities/colleges, the credits shall be transferred to Pragati Engineering College (Autonomous) R19 Academic Regulations and course structure of the respective discipline.

b) The students seeking transfer to Pragati Engineering College (Autonomous) from other universities/institutions have to obtain the credits of equivalent courses as prescribed by the college. In addition the transferred students have to pass the courses in which they failed at the earlier institute.

14. GENERAL :

14.1 Whenever the words “he”, “him”, “his” secure in the regulations, they include “she”, “her”, “hers”.

14.2 The academic rules and regulations should be read as a whole for the purpose of interpretation.

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

14.4 The college may change or amend the academic rules and regulations or syllabi at any time and the changed rules come into effect from the date of issue of such orders.

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

Applicable for the students admitted into II year B.Tech I semester from the Academic year 2020-21.

1. AWARD OF B.TECH DEGREE

A Student will be declared eligible for the award of B.Tech Degree if he fulfills the following academic regulations.

- 1.1. A Student shall be declared eligible for the award of the B.Tech Degree, if he pursues a course of study for not less than three academic years and not more than six academic years.
- 1.2 The candidate shall register for 120 credits and secure all the 120 credits.

2. The attendance regulations of B.Tech (Regular) shall be applicable to B.Tech (LES) students as well.

3. PROMOTION RULES

- 3.1 A student shall be **promoted from III year to IV year** if he fulfills the academic requirements of **50% of the credits up to III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.**

4. 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 shall be placed in one of the following four classes.

Class Awarded	CGPA to be secured	From the CGPA secured from 120 credits
First Class with Distinction	≥ 7.75	
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)** also.

MALPRACTICE RULES**DISCIPLINARY ACTION FOR MALPRACTICE/ IMPROPER CONDUCT IN EXAMINATIONS**

	Nature of Malpractices/Improper conduct	Punishment
	<i>If the candidate:</i>	
1(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3	Impersonates any other candidate in connection with the examination	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 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 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 examiner requesting him to award pass marks	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Chief 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 amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that 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 will be registered against them.
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 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 college: 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 Principal for further action to award suitable punishment	

Ragging






Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features



Ragging within or outside any educational institution is prohibited.

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

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

LET US MAKE PRAGATI RAGGING FREE COLLEGE

Ragging



ABSOLUTELY NO TO RAGGING

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

LET US MAKE PRAGATI RAGGING FREE COLLEGE

COURSE STRUCTURE

Zero Semester	
Induction program (mandatory)	3 weeks duration
Induction program for students to be offered right at the start of the first year.	<ul style="list-style-type: none"> • Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch and Innovations

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days. We propose a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.² The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it. The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

I Year – I Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Humanities, Social Sciences including Management	19HE1T01	Professional Communicative English	3	-	-	3
2	Basic Sciences	19BM1T01	Linear Algebra and Differential Equations	3	-	-	3
3	Basic Sciences	19BP1T02	Applied Physics	3	-	-	3
4	Engineering Sciences	19CS1T01	Programming for Problem Solving using C	3	-	-	3
5	Engineering Sciences	19ME1T01	Engineering Drawing	1	-	3	2.5
6	Humanities, Social Sciences including Management	19HE1L01	Professional Communicative English Laboratory- I	-	-	3	1.5
7	Basic Sciences	19BP1L02	Applied Physics Laboratory	-	-	3	1.5
8	Engineering Sciences	19CS1L01	Programming for Problem Solving using C Laboratory	-	-	3	1.5
9	Mandatory Courses	19HM1T07	Professional Ethics and Human Values	2	-	-	0
Total Credits							19

I Year – II Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Basic Sciences	19BM2T02	Numerical Methods and Multivariable Calculus	3	-	-	3
2	Basic Sciences	19BM2T03	Integral Transforms and Vector Calculus	3	-	-	3
3	Basic Sciences	19BC2T02	Applied Chemistry	3	-	-	3
4	Professional Core	19IT2T01	Data Structures	3	-	-	3
5	Engineering Sciences	19EE2T02	Basic Electrical and Electronics Engineering	3	-	-	3
6	Basic Sciences	19BC2L02	Applied Chemistry Laboratory	-	-	3	1.5
7	Professional Core	19IT2L01	Data Structures Laboratory	-	-	3	1.5
8	Engineering Sciences	19EE2L02	Basic Electrical and Electronics Engineering Laboratory	-	-	3	1.5
9	Humanities, Social Sciences including Management	19HE2L02	Professional Communicative English Laboratory-II	-	-	3	1.5
10	Mandatory Courses	19BE2T01	Environmental Science	2	-	-	0
Total Credits							21

II Year – I Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Basic Sciences	19BM3T04	Probability and Statistics	3	-	-	3
2	Engineering Sciences	19CS3T03	Python Programming	3	-	-	3
3	Professional Core	19CS3T04	Digital Marketing	3	-	-	3
4	Engineering Sciences	19EC3T06	Digital Logic Design	3	-	-	3
5	Professional Core	19IT3T04	Mathematical Foundations of Computer Science	3	-	-	3
6	Humanities, Social Sciences including Management	19HM3T01	Managerial Economics and Financial Analysis	3	-	-	3
7	Engineering Sciences	19CS3L02	Python Programming Laboratory	-	-	3	1.5
8	Professional Core	19CS3L03	Digital Marketing Laboratory	-	-	3	1.5
9	Mandatory Courses	19HM3T06	Essence of Indian Traditional Knowledge	2	-	-	0
Total Credits							21

II Year – II Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Professional Core	19CS4T05	Object Oriented Programming through Java	3	-	-	3
2	Professional Core	19IT4T06	Operating Systems	3	-	-	3
3	Professional Core	19IT4T02	Data Base Management Systems	3	-	-	3
4	Professional Core	19CS4T06	Computer Organization	3	-	-	3
5	Professional Core	19CS4T07	Formal Languages and Automata Theory	3	-	-	3
6	Professional Core	19CS4L04	Object Oriented Programming through Java Laboratory	-	-	3	1.5
7	Professional Core	19IT4L05	Operating Systems Laboratory	-	-	3	1.5
8	Professional Core	19IT4L02	Data Base Management Systems Laboratory	-	-	3	1.5
9	Project	19CS4P01	Socially Relevant Activity*	-	-	-	0.5
10	Mandatory Courses	19HM4T05	Constitution of India	2	-	-	0
Total Credits							20

*15 Hours in Semester

III Year – I Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Professional Core	19CS5T08	Computer Networks	3	-	-	3
2	Professional Core	19CS5T09	Web Application Development using J2EE	3	-	-	3
3	Professional Core	19CS5T10	Software Engineering	3	-	-	3
4	Professional Core	19CS5T11	Compiler Design	3	-	-	3
5	Professional Core	19CS5T12	Data Warehousing and Data Mining	3	-	-	3
6	Professional Elective		Professional Elective-I	3	-	-	3
7	Professional Core	19CS5L05	Web Application Development using J2EE Laboratory	-	-	3	1.5
8	Professional Core	19CS5L06	Data Mining Laboratory	-	-	3	1.5
9	Project	19CS5P02	Mini Project	-	-	2	1
10	Mandatory Courses	19HM5T08	IPR and Patents	2	-	-	0
Total Credits							22

III Year – II Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Professional Core	19CS6T18	AI Tools and Techniques	3	-	-	3
2	Professional Core	19CS6T19	Mobile Computing	3	-	-	3
3	Engineering Sciences	19EC6T10	Internet of Things	3	-	-	3
4	Professional Core	19CS6T20	Design and Analysis of Algorithms	3	-	-	3
5	Open Elective		Open Elective-I	3	-	-	3
6	Professional Elective		Professional Elective-II	3	-	-	3
7	Professional Core	19CS6L07	AI Tools and Techniques Laboratory	-	-	3	1.5
8	Engineering Sciences	19EC6L11	Internet of Things Laboratory	-	-	3	1.5
9	Mandatory Courses	19CS6T38	MOOCs/Industry Courses approved by Department**	-	-	-	0
Total Credits							21

** - Student can select the course of any discipline under MOOCs. However agency will be decided by the respective BOS.

IV Year – I Semester

IV-I							
S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Professional Core	19IT7T08	Cryptography and Network Security	3	-	-	3
2	Professional Core	19CS7T25	Object Oriented Analysis and Design using UML	3	-	-	3
3	Open Elective		Open Elective-II	3	-	-	3
4	Professional Elective		Professional Elective-III	3	-	-	3
5	Professional Elective		Professional Elective-IV	3	-	-	3
6	Professional Core	19IT7L06	Cryptography and Network Security Laboratory	-	-	3	1.5
7	Professional Core	19CS7L08	Object Oriented Analysis and Design using UML Laboratory	-	-	3	1.5
Total Credits							18

IV Year – II Semester

S. No.	Course Category	Course Code	Course Title	L	T	P	C
1	Humanities, Social Sciences including Management	19HMBT02	Management Science	3	-	-	3
2	Open Elective		Open Elective-III	3	-	-	3
3	Professional Elective		Professional Elective-V	3	-	-	3
4	Project	19CS5P03	Project	-	-	18	9
Total Credits							18

Professional Elective-I

S. No.	Course Category	Course Code	Course Title
1	Professional Elective	19CS5T13	Advanced Data Structures and Algorithms
2	Professional Elective	19CS5T14	NO SQL databases
3	Professional Elective	19CS5T15	Ethical Hacking
4	Professional Elective	19CS5T16	Functional Programming
5	Professional Elective	19CS5T17	Computer Graphics

Professional Elective-II

S. No.	Course Category	Course Code	Course Title
1	Professional Elective	19IT6T07	Software Testing
2	Professional Elective	19CS6T21	Data Science
3	Professional Elective	19CS6T22	Ad-hoc and Sensor Networks
4	Professional Elective	19CS6T23	Mobile Application Development
5	Professional Elective	19CS6T24	Information Retrieval Systems

Professional Elective-III

S. No.	Course Category	Course Code	Course Title
1	Professional Elective	19CS7T26	Software Project Management
2	Professional Elective	19CS7T27	Big Data Analytics
3	Professional Elective	19CS7T28	Cyber Security
4	Professional Elective	19CS7T29	Client side Scripting Languages
5	Professional Elective	19CS7T30	Computer Vision

Professional Elective-IV

S. No.	Course Category	Course Code	Course Title
1	Professional Elective	19CS7T31	Design Patterns
2	Professional Elective	19CS7T32	Social Network Analysis
3	Professional Elective	19IT7T13	Block chain Technology
4	Professional Elective	19IT7T14	High Performance Computing
5	Professional Elective	19CS7T33	Cloud Computing

Professional Elective-V

S. No.	Course Category	Course Code	Course Title
1	Professional Elective	19CS8T34	Agile Methodologies and DevOps
2	Professional Elective	19IT8T12	Machine Learning
3	Professional Elective	19CS8T35	Digital Forensics
4	Professional Elective	19CS8T36	Server side Scripting Languages
5	Professional Elective	19CS8T37	Human Computer Interaction

Open Elective-I

S. No.	Course Category	Course Code	Course Title
1	Open Elective	19CE6T18	Environmental Impact Assessment and Management
2	Open Elective	19EE6T24	Energy Audit, Conservation and Management
3	Open Elective	19EC6T35	RFID Sensors and Data Acquisition
4	Open Elective	19ME6T28	Industrial Robotics
5	Open Elective	19HE6T02	Soft Skills and Interpersonal Communication

Open Elective-II

S. No.	Course Category	Course Code	Course Title
1	Open Elective	19CE7T24	Wastewater Management
2	Open Elective	19EE7T36	Power Safety and Management
3	Open Elective	19EC7T31	Embedded Systems
4	Open Elective	19ME7T27	Mechatronics
5	Open Elective	19HM7T03	Entrepreneurship

Open Elective-III

S. No.	Course Category	Course Code	Course Title
1	Open Elective	19CE8T38	Remote Sensing and GIS
2	Open Elective	19EE8T12	Power Electronics
3	Open Elective	19EC8T33	Biomedical Instrumentation
4	Open Elective	19ME8T29	Supply Chain Management
5	Open Elective	19HM8T04	Marketing Management

I Year I Semester
Professional Communicative English
(Common to CE, EEE, MECH, ECE, CSE & IT)

Course Category	Basic Sciences	Course Code	19HE1T01
Course Type	Theory	L-T-P-C	3 – 0 – 0 – 3
Prerequisites	LSRW + Vocabulary Synonyms, antonyms, Grammar.	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES		
1	Schumacher describes the education system by saying that it was mere training, something more than mere knowledge of facts. To develop extensive reading skill and comprehension for pleasure and profit.	
2	The lesson centers on the pros and cons of the development of science and technology. To develop extensive reading skill and comprehension for pleasure and profit.	
3	Depicts of the symptoms of Cultural Shock and the aftermath consequences. To develop extensive reading skill and comprehension for pleasure and profit.	
4	Portrays the ways of living life in its true sense. To develop extensive reading skill and comprehension for pleasure and profit.	
5	Supports the developments of technology for the betterment of human life. To develop extensive reading skill and comprehension for pleasure and profit.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Emphasizes that the ultimate aim of education is to enhance wisdom and inspires the readers to serve their nation with their self-enrichment.	K2
CO2	Enables the learners to promote peaceful co-existence and universal harmony in the society and empowers the learners to have initiation in innovation.	K2
CO3	Imparts the students to manage different cultural shock due to globalization and to develop multiculturalism to appreciate diverse cultures and also motivates the learners to contribute to their nation.	K3
CO4	Arouse the thought of life to lead in a well path by recognizing the importance of work besides enhancing their LSRW skills.	K2
CO5	Inspires the learners at the advancement of software by the eminent personalities and motivates the readers to think and tap their innate talents.	K2

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	2	1	-	-	1	-	3	-	-
CO2	2	1	-	-	-	1	3	1	-	1	-	1	-	-
CO3	-	-	-	-	-	1	2	-	-	1	-	-	-	-
CO4	-	-	-	-	-	1	-	1	2	-	-	-	-	-
CO5	-	-	1	2	1	-	-	-	-	1	-	-	-	-

COURSE CONTENT**UNIT I**

1. 'The Greatest Resource- Education' from Professional Communicative English.
2. 'War' from 'Panorama: A Course on Reading'

UNIT II

1. 'A Dilemma' from Professional Communicative English.
2. 'The Verger' from 'Panorama: A Course on Reading'

UNIT III

1. 'Cultural Shock': Adjustments to new Cultural Environments from Professional Communicative English.
2. 'The Scarecrow' from Panorama: A Course on Reading

UNIT IV

1. 'The Secret of Work' from Professional Communicative English.
2. 'A Village Lost to the Nation' from Panorama: A Course on Reading

UNIT V

1. 'The Chief Software Architect' from Professional Communicative English.
2. 'Martin Luther King and Africa' from Panorama: A Course on Reading

TEXT BOOKS

1. PROFESSIONAL COMMUNICATIVE ENGLISH. Published by Maruthi Publishers.
2. PANORAMA: A COURSE ON READING, Published by Oxford University Press India

REFERENCE BOOKS

1. ENGLISH GRAMMAR AND COMPOSITION – WREN & MARTIN
2. LEARNER'S ENGLISH GRAMMAR AND COMPOSITION – N.D.V. Prasada Rao

WEB RESOURCES**Online Dictionaries:**

<https://dictionary.cambridge.org/>

<https://www.oxfordlearnersdictionaries.com/>

Grammar:

<https://www.oxfordlearnersdictionaries.com/grammar/>

<https://dictionary.cambridge.org/grammar/british-grammar/>

Synonyms and Antonyms:

<https://www.thesaurus.com/browse/search>

<https://www.englishclub.com/vocabulary/synonyms-antonyms.htm>

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering.

As far as the detailed Textbooks are concerned, the focus is on the skills of listening, speaking, reading and writing. The non-detailed Textbooks are meant for extensive reading for pleasure and profit. Thus the stress in the syllabus is primarily on the development of communicative skills and fostering ideas.

Objectives:

1. To improve the language proficiency of the learners in English with emphasis on LSRW skills.
2. To enable the learners to study and comprehend the prescribed course effectively relating to their theoretical and practical components.
3. To develop the communication skills of the learners in both formal and informal situations.

LISTENING SKILLS**Objectives:**

1. To enable the learners to appreciate the role of listening skill and improve their pronunciation.
2. To enable the learners to comprehend the speech prescribe of people belonging to different backgrounds and regions.
3. To enable the learners to listen for general content, to fill up information and infer the content.

SPEAKING SKILLS**Objectives:**

1. To make the learners aware of the importance of speaking for their personal and professional communication.
2. To enable the learners to express themselves fluently and accurately in social and professional set up.
3. To help the learners describe objects, situations and people.
4. To make the learners participate in group activities like role-plays, discussions and debates.
5. To make the learners participate in Just a Minute talks.

READING SKILLS**Objectives:**

1. To enable the learners to comprehend a text through silent reading.
2. To enable the learners to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the learners to skim and scan a text.
4. To enable the learners to identify the topic sentence.
5. To enable the learners to identify discourse features.
6. To enable the learners to make intensive and extensive reading.

WRITING SKILLS**Objectives:**

1. To make the learners understand that writing is an exact formal skill.
2. To enable the learners to write sentences and paragraphs coherently and cohesively.
3. To make the learners identify and use appropriate vocabulary.
4. To enable the learners to narrate and describe.
5. To enable the learners capable of note-making.
6. To make the learners to write formal and informal letters.
7. To enable the learners to describe graphs using expressions of comparison.

8. To enable the learners to write technical reports.

Methodology:

1. The classes are to be learning-centred where the learners participate in the language learning activities with the peer group and the facilitator.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be animated with the help of learning positive activities such as pair work, Group Discussion and so on.
4. The facilitator is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The facilitator activities the learning in a particular mode.

The following text books are recommended for study in I B.Tech I Semester (Common for all branches) of Pragati Engineering College, Surampalem from the academic year 2019-20 (R-19 Regulations)

DETAILED TEXTBOOK:

- **PROFESSIONAL COMMUNICATIVE ENGLISH** *Published by Maruthi Publishers.*

NON-DETAILED TEXTBOOK:

- *-PANORAMA: A COURSE ON READING, Published by Oxford University Press India*
The course content along with the study material is divided into six units.

UNIT 1:

1. *'The Greatest Resource- Education' from Professional Communicative English.*
Objective: Schumacher describes the education system by saying that it was mere training, something more than knowledge of facts.

Outcome: Underscores that the ultimate aim of Education is to enhance wisdom.

2. *'War' from 'Panorama: A Course on Reading'*
Objective: To develop extensive reading skill and comprehension for pleasure and profit.

Outcome: Acquisition of LSRW skills

UNIT 2:

1. *'A Dilemma' from Professional Communicative English.*
Objective: The lesson centers on the pros and cons of the development of science and technology.

Outcome: Enables the students to promote peaceful co-existence and universal harmony among people in the society.

2. *'The Verger' from 'Panorama: A Course on Reading'*
Objective: To develop extensive reading skill and comprehension for pleasure and profit.

Outcome: Acquisition of LSRW skills

UNIT 3:

1. '*Cultural Shock*': *Adjustments to new Cultural Environments from Professional Communicative English.*

Objective: Depicts of the symptoms of Cultural Shock and the aftermath consequences

Outcome: Enables the students to manage different cultural shocks due to globalization.

2. '*The Scarecrow*' from *Panorama: A Course on Reading*

Objective: To develop extensive reading skill and comprehension for pleasure and profit.

Outcome: Acquisition of LSRW skills

UNIT 4:

1. '*The Secret of Work*' from *Professional Communicative English.*

Objective: Portrays the ways of living life in its true sense.

Outcome: Arouses the thought to lead life in a good path by recognizing the importance of work.

2. '*A Village Lost to the Nation*' from *Panorama: A Course on Reading*

Objective: To develop extensive reading skill and comprehension for pleasure and profit.

Outcome: Acquisition of LSRW skills

UNIT 5:

1. '*The Chief Software Architect*' from *Professional Communicative English.*

Objective: Supports the developments of technology for the betterment of human life.

Outcome: Pupil gets inspired by eminent personalities who toiled for the present day advancement of software development.

2. '*Martin Luther King and Africa*' from *Panorama: A Course on Reading*

Objective: To develop extensive reading skill and comprehension for pleasure and profit.

Outcome: Acquisition of LSRW skills

I Year I Semester
Linear Algebra and Differential Equations
 (Common to CE, EEE, ME, ECE, CSE & IT)

Course Category	Basic Sciences	Course Code	19BM1T01
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Exposure to Basics of matrices, Differentiation, Integration	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2	The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Solve systems of linear equations, determine the rank, find the eigenvalues and eigenvectors, diagonalization of a matrix.	K3
CO2	Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics.	K2
CO3	Solve first order differential equations and its applications	K3
CO4	Solve the linear differential equations with constant coefficients by appropriate method	K3
CO5	Find partial derivatives of multivariable functions and apply them to find extreme values of a function.	K3

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT**UNIT I****Solving system of linear equations, Eigen Values and Eigen vectors**

Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non-homogeneous linear equations – Gauss elimination method for solving system of equations – Eigenvalues and Eigen vectors and their properties.

UNIT II**Cayley-Hamilton Theorem and Quadratic forms**

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

UNIT III**Differential equations of first order and first degree**

Linear – Bernoulli – Exact – Reducible to exact.

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

UNIT IV**Linear differential equations of higher order**

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x^n , $e^{ax}V(x)$, $x^mV(x)$ - Method of Variation of parameters.

UNIT V**Partial differentiation**

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Generalized Mean value theorem for single variable (without proof) – Taylor's and

Maclaurin's series expansion of functions of two variables – Jacobian – Functional dependence.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

TEXT BOOKS

B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.

Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India

REFERENCE BOOKS

Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edition.

Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.

Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.

Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.

T.K.V. Iyengar et. al., Engineering Mathematics Volume I & III S Chand Publications.

WEB RESOURCES**UNIT I: Solving system of linear equations, Eigen Values and Eigen vectors**

https://en.wikipedia.org/wiki/System_of_linear_equations

https://en.wikipedia.org/wiki/Eigenvalues_and_eigenvectors

UNIT II: Cayley-Hamilton Theorem and Quadratic forms

<https://www.math.hmc.edu/calculus/tutorials/eigenstuff/>

https://en.wikipedia.org/wiki/Quadratic_form

UNIT III: Differential equations of first order and first degree

https://en.wikipedia.org/wiki/Differential_equation

<http://um.mendelu.cz/maw-html/index.php?lang=en&form=ode>

<https://www.khanacademy.org/math/differential-equations/first-order-differential-equations>

UNIT IV: Linear differential equations of higher order

https://en.wikipedia.org/wiki/Differential_equation

<http://um.mendelu.cz/maw-html/index.php?lang=en&form=ode>

<https://nptel.ac.in/courses/122107037/20>

UNIT V: Partial Differentiation

https://en.wikipedia.org/wiki/Partial_derivative

https://www.whitman.edu/mathematics/calculus_online/section14.03.html

**I Year I Semester
APPLIED PHYSICS
(ECE, CSE & IT)**

Course Category	BASIC SCIENCES	Course Code	19BP1T02
Course Type	Theory	L-T-P-C	3 - 0 - 0-3
Prerequisites	Exposure to Intermediate Physics	Internal Assessment	30
		Semester End Examination	70
		Total Marks	100

COURSE OBJECTIVES

1	Impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
2	Understand the physics of Semiconductors and their working mechanism for their utility in Engineering applications.
3	Impart the knowledge of Dielectric and Magnetic materials with characteristic utility in appliances.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Analyze the optical applications using the concepts of Interference and diffraction.	K4
CO2	Apply the concepts of quantum mechanics for calculation of free quantum particle energies.	K3
CO3	Apply the basics of Laser Mechanism and fiber optics for the communications systems.	K3
CO4	Understand the electrical conductivities in semiconductors and study the types of semiconductors using Hall Effect.	K2
CO5	Understand the polarization phenomenon in dielectric materials and magnetic materials to study dependence on temperature and frequency response.	K2

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	1	1	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	-	-	-
CO5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT**UNIT I****WAVE OPTICS****INTERFERENCE**

Introduction-Principle of Superposition – Coherent Sources – Interference in parallel and non - parallel thin films (reflection geometry), Newton's rings & Applications.

DIFFRACTION

Introduction- Differences between Interference and Diffraction, Differences between Fresnel and Fraunhofer diffraction Fraunhofer diffraction in single slit (Qualitative), Fraunhofer diffraction Double slit(Qualitative), Grating equation (analytical Treatment)-Rayleigh criterion of resolution and Resolving power of grating,

UNIT II**QUANTUM MECHANICS**

Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment –

Heisenberg's Uncertainty Principle –interpretation of wave function – Schrödinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT III

LASERS

Introduction-Characteristics–Spontaneous and Stimulated emission of radiation – population inversion - Pumping Mechanisms - Ruby laser – Helium Neon laser – Semiconductor laser– Applications

FIBER OPTICS:

Introduction- Structure of Optical Fiber – Total Internal Reflection-Numerical Aperture and Acceptance Angle-classification of Optical fibers- optical fiber communication system- Advantages of Optical fibers- Applications

UNIT IV

SEMICONDUCTOR PHYSICS

Introduction–Intrinsic semi conductors - density of charge carriers- Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers -Hall effect- Hall coefficient - Applications of Hall effect.

UNIT V

DIELECTRICS

Introduction - Dielectric polarization– Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations- Electronic Ionic and Orientational polarizations (qualitative) – Lorentz Internal field – Clausius-Mossotti equation -Applications of dielectrics.

MAGNETIC PROPERTIES

Introduction-Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials(Analytical)--Hysteresis-soft and hard magnetic materials & applications

TEXT BOOKS

1. “A Text book of Engineering Physics”by M.N.Avadhanulu, P.G.Kshirsagar -S.Chand Publications.
2. “Engineering Physics” by M.R.Srinivasan, New Age international publishers.
3. Solid State Physics” by SO Pilai., - New age International Publishers.

REFERENCE BOOKS

1. Kittles Introduction to Solid state Physics-Charles Kittel,Wiley India Edition.
2. Solid State Physics ,AJ Dekker, I Edition,Macmillan Publishers India Private Limited.

WEB RESOURCES

1. <https://youtu.be/NVlly3LlNqc>
<https://youtu.be/1TRdOjVpm-0>
<https://youtu.be/0tHcWDNCJ-o>
2. <https://study.com/academy/lesson/the-de-broglie-hypothesis-definition-significance.html>
<https://www.youtube.com/watch?v=uPvWlwOhCTo>
3. <https://www.youtube.com/watch?v=fdS12EaXH3A>
<http://folk.uio.no/ravi/cutn/cmp/band1.pdf>
4. https://www.electronics-tutorials.ws/diode/diode_1.html
<https://youtu.be/3csUvwZdsOg>
<https://www.youtube.com/watch?v=40dpUzzfhA>
5. <https://youtu.be/TuvLv6SBO5s>
<https://youtu.be/u0Qf9jVh2kc>

I Year I Semester
Programming for Problem solving using C
(Common to CE, ME, EEE, ECE, CSE, IT)

Course Category	Engineering Science	Course Code	19CS1T01
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites		Internal Assessment	30
		Semester End Examination	70
		Total Marks	100

COURSE OBJECTIVES

1	To impart adequate knowledge on the need of programming languages and problem solving techniques.
2	To develop programming skills using the fundamentals of C Language.
3	To enable effective usage of arrays, structures, functions, pointers and dynamic memory allocation.
4	To make use of file handling functions in programming.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Apply the fundamentals of C Programming for Problem solving.	K3
CO2	Identify the appropriate Decision statement and Loops for a given Problem.	K2
CO3	Make use of Arrays and Strings to solve the problems in C.	K3
CO4	Apply the concepts of Functions and Pointers in Problem solving.	K3
CO5	Develop solutions for problems using Structures, Unions and Files.	K3

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program Outcomes

(1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	-	-	-	-	-	-	-	1	1	-
CO2	3	3	3	3	1	-	-	-	-	-	-	-	1	1	-
CO3	3	3	3	2	1	-	-	-	-	-	-	-	2	1	-
CO4	2	3	3	3	1	-	-	-	-	-	-	-	2	2	-
CO5	3	3	3	3	1	-	-	-	-	-	-	-	2	2	-

COURSE CONTENT**UNIT I**

Introduction to Programming–Introduction to Computer Software, Classification of Computer Software, Representation of Data – Bits and Bytes, Programming Languages –High and Low Level Languages, Generation of Programming Languages, Program Design Tools: Algorithms, Flowcharts, Pseudo code, Types of Errors, Testing & Debugging Approaches.

Introduction to C – Structure of a C Program, Writing the First C Program, Header Files used in C Program, Compiling and Executing C Programs.

UNIT II

Tokens in C: Basic Data Types in C – Keywords, Identifiers, Variables, Constants, Input / Output statements in C, Operators in C, Precedence and Associativity Rules, Type Casting Types.

Decision Control: Decision Control Statements: Conditional Branching Statements - if, if – else, nested if, if – else – if, and Switch – Case.

Basic Loop Structures: Iterative Statements - for, while and do - while, Nested Loops, The ‘Break’, ‘Continue’, and

'goto' statements.

UNIT III

Arrays: Declaration and Initialization of Arrays, Accessing & Storing the elements of an Array, Operations on Arrays: Traversing, Inserting, Deleting, Searching, Two Dimensional Arrays: Declaring, Initializing, Accessing, Operations on Two Dimensional Arrays (Matrices), Applications of Arrays.

Strings: String Fundamentals, String Input and Output, String Library Functions

UNIT IV

Functions: Function Declaration / Function Prototypes, Function Definition, Function Call (Call by Value), Passing Parameters to Functions, Return Statement, Storage Classes, Recursive Functions, Arrays as Function Arguments.

Pointers: Declaring Pointer Variables, Pointer Arithmetic, Passing Arguments to Function using Pointers (Call by Reference), Pointers and Arrays, Pointer to Pointer, Dynamic Memory Allocation – Malloc, Calloc, Realloc, Free.

UNIT V

Structures: Introduction to Structures, Nested Structures, Array of Structures.

Unions: Introduction, Array of Union Variables, Union inside Structure, Enumerated Data Types, Bit Fields.

Files: Declaring, Opening, and Closing File, Reading from and Writing to Text Files.

TEXT BOOKS

1. Programming in C, Reema Thareja, 2nd Edition, Oxford University Press.
2. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education

REFERENCE BOOKS

1. Programming in C – Ashok N.Kamthane, Amit Ashok Kamthane, 3rd Edition, Pearson.
2. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
3. Programming in C (A Practical Approach) – Ajay Mittal, First Edition, Pearson.

WEB RESOURCES

1. <http://nptel.ac.in/courses/106104128/>
2. <http://students.iitk.ac.in/programmingclub/course/#notes>
3. <http://c-faq.com/~scs/cclass/cclass.html>
4. <http://www.youtube.com/watch?v=b00HsZvg-V0&feature=relmfu>
5. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/>

**I Year I Semester
ENGINEERING DRAWING**

Course Category	Engineering Science	Course Code	19ME1T01
Course Type	Theory	L-T-P-C	1-0-3-2.5
Prerequisites		Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES		
1	To introduce the students to use drawing instruments and to draw polygons, Engineering Curves and Scales.	
2	To introduce the students to use orthographic projections, projections of points and lines.	
3	To make the students draw the projections of the planes.	
4	To make the students draw the projections of the various types of solids.	
5	To represent the object in 3D view through isometric views.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Construct polygons, scales and engineering curves.	K3
CO2	Identify the position of points and lines with use of orthographic projections.	K3
CO3	Analyze the location and position of plane figures through orthographic projections.	K4
CO4	Analyze the location and position of solid bodies through orthographic projections.	K4
CO5	Develop 2D and 3D objects by converting their views.	K6

*k1- Remembering, k2- Understanding, k3- Applying, k4- Analyzing, k5- Evaluating, k6- Creating

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	1	-	-	1	-
CO2	3	2	1	2	1	-	-	-	-	-	1	-	-	1	-
CO3	3	2	1	2	1	-	-	-	-	-	1	-	-	1	1
CO4	3	2	1	2	1	-	-	-	-	-	1	-	-	1	1
CO5	3	2	1	3	3	-	-	-	-	-	1	-	-	1	3

COURSE CONTENT**UNIT I****Introduction to Engineering Drawing.**

Polygons: Constructing regular polygons by general method.

Curves: Parabola, Ellipse and Hyperbola by general methods tangent & normal for the curves. Cycloid and Involutés.

Scales: Vernier and Diagonal scales.

UNIT II

Orthographic Projections: Introduction, importance of reference lines, projections of points in various quadrants.

Projections of straight lines inclined to both the planes, determination of true lengths and angle of inclination.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane.

Regular planes inclined to one plane and parallel to other, inclined to both the planes.

UNIT IV

Projections of Solids: Simple positions of Prisms, Pyramids, Cones and Cylinders. Solids inclined to both the planes.

UNIT V

Isometric Projections: Introduction, Conversion of isometric views to orthographic views, Conversion of orthographic views to isometric views.

Introduction to AutoCAD (Demo only)

TEXT BOOKS

1. Engineering Drawing by N.D. Bhatt, Chariot Publications, 56th Edition.
2. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age International (P) Limited (2008).

REFERENCE BOOKS

1. Engineering Drawing by K.L.Narayana & P. Kanniah, Scitech Publishers, 3rd Edition.
2. Engineering Graphics for Degree by K.C. John, PHI Publishers.
3. Engineering Graphics by PI Varghese, Mc Graw Hill Publishers, 2013.
4. Engineering Drawing by Basant Agarwal, Tata McGraw Hill Publishers, 2014.
5. B.V.R. Gupta & M. Raja Roy, Engineering Drawing, I.K. International Publishing House Pvt. Ltd., 2009.

WEB RESOURCES

1. <http://nptel.ac.in/courses/112103019/>
2. <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_science_students/engineeringdrawing.pdf

I Year I Semester
Professional Communicative English Laboratory – I
(For CE, EEE, ME, CSE & IT)

Course Category	Humanities, Social Sciences including Management	Course Code	19HE1L01
Course Type	Laboratory	L-T-P-C	0-0-3-1.5
Prerequisites		Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

PRESCRIBED LABORATORY MANUAL FOR SEMESTER I:

STRENGTHEN YOUR STEPS: A Multimodal Course in Communication Skills' Published by Maruthi Publications.

Objectives:

To enable the students to learn the communication skills; listening, speaking, reading and writing.

Outcome:

The course enables the learner to acquire communication skills which will help the students to become successful in the competitive world.

COURSE OUTCOMES		
CO	Description	Cognitive Level
CO1	Interpret and responding appropriately in various day to day contexts and will be able to use speech sounds effectively.	K2
CO2	Apply stress, intonation and pronunciation in conversations and learn formal communicative expressions.	K3
CO3	Attain the collection of dialogues and acclimate them to their real life situations with proper intonation.	K2

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO8	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
CO3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-

The course content along with the study material is divided into six units.

UNIT 1:

Hello, I'm
Consonant Sounds

UNIT 2:

I would love to But,
Vowel Sounds

UNIT 3:

With your Permission, I would like to
Syllable and Accent

UNIT 4:

Why don't we.....
Pronunciation and Rhythm

UNIT 5:

Could you please
Tones

UNIT-6:

Dialogues

I Year I Semester
APPLIED PHYSICS LABORATORY
(ECE, CSE & IT)

Course Category	BASIC SCIENCES	Course Code	19BP1L02
Course Type	Laboratory	L-T-P-C	0 - 0 - 3-1.5
Prerequisites	Intermediate Physics	Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

COURSE OBJECTIVES

1	The student will have exposure to various experimental skills which is essential for an Engineering student.
2	To gain practical knowledge by applying the experimental methods to correlate with the Theoretical Physics.
3	Apply the Analytical techniques and graphical analysis to the experimental data

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Understand the basics of Interference, Diffraction in Physics using instruments like Spectrometer, Travelling microscope.	K2
CO2	Determine the Magnetic and Dielectric constants of materials.	K3
CO3	Apply the basics of Current Electricity and Semiconductors in engineering application	K3

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT: (Any 10 of the following listed 12 experiments)

- Determination of wavelength of laser by diffraction grating.
- Determination of wavelength of a source-Diffraction Grating-Normal incidence.
- Newton's rings – Radius of Curvature of Plano - Convex Lens.
- Determination of thickness of a spacer using wedge film and parallel interference fringes.
- Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
- Energy Band gap of a Semiconductor p - n junction.
- Characteristics of Thermistor – Temperature Coefficients.
- Determination of dielectric constant by charging and discharging method.
- Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
- Dispersive power of diffraction grating.
- To Study the V-I Characteristics and determine the breakdown voltage of a Zener Diode
- Determination of Hall Voltage and Hall coefficients of a given semiconductor using Hall effect.

TEXT BOOKS

- Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

REFERENCE BOOKS

- College customized manual

WEB RESOURCES

- https://www.youtube.com/watch?v=h_hUBXz-G-Y
- https://youtu.be/dgxFFw_1gMo
- <https://www.youtube.com/watch?v=v2B0QyW8XJ0>
- <https://www.youtube.com/watch?v=AYQLmFqFtlw>
- <https://youtu.be/toggy3WVxV4>
- https://youtu.be/1CyFsGk-_l4

I Year I Semester
Programming for Problem solving using C Laboratory
(Common to CE, ME, EEE, ECE, CSE, IT)

Course Category	Engineering Science	Course Code	19CS1L01
Course Type	Laboratory	L-T-P-C	0-0-3-1.5
Prerequisites		Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

COURSE OBJECTIVES

1	To learn various steps in program development using Raptor.
2	To write C programs using basic concepts in C like operators, control statements etc.,
3	To design modular, reusable and readable C programs using concepts like Arrays, Functions and Pointers.
4	To write programs using Structures and Unions.
5	To write programs to perform file operations.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive level
CO1	Translate given algorithms to a working programs.	K2
CO2	Design programs using Pointers to access Arrays, Strings and Functions.	K3
CO3	Develop programs using Structures, Unions and File operations.	K3

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	-	-	-	-	2	2	1
CO2	3	3	3	3	2	-	-	-	-	-	-	-	2	2	1
CO3	3	3	3	3	2	-	-	-	-	-	-	-	2	2	1

COURSE CONTENT

- Construct flowcharts using Raptor Tool to
 - calculate the maximum, minimum and average of three numbers.
 - calculate area of a triangle given three sides using Heron's formula.
- Construct flowcharts using Raptor Tool to
 - calculate simple interest for various parameters specified by the user.
 - swapping of two numbers with and without using the third variable.
- Write a C Program to Perform Addition, Subtraction, Multiplication and Division of two numbers.
- Write a C Program to find the Grade of a student by taking input of percentage using all Relational Operators (>, >=, <, <=, ==, !=)

Theory (%)	Letter Grade	Level
≥ 90	O	Outstanding
≥ 80 to < 90	S	Excellent
≥ 70 to < 80	A	Very Good
≥ 60 to < 70	B	Good
≥ 50 to < 60	C	Fair
≥ 40 to < 50	D	Satisfactory
<40	F	Fail

5. Write a C Program to swap two given input numbers
 - a) With using a temporary variable.
 - b) Without using a temporary variable.
6. Write a C Program to implement arithmetic operations using two operands and one operator using
 - a) if – else – if condition.
 - b) Switch – Case statement.
7. Write a C Program to print the following patterns
 - a) Floyd’s Triangle.
 - b) Pascal Triangle.
8. Write a C Program
 - a) To find the sum of its individual digits for a given positive number.
 - b) To check whether the given number is Prime or not.
9. Write a C Program
 - a) To check whether the given number is a Palindrome or not.
 - b) To check whether the given number is an Armstrong or not
10. Write a C Program using Functions to find both the largest and smallest number in an given array numbers.
11. Write C programs to perform swapping of two numbers by passing a value and reference.
12. Write a C Program for two Matrices by checking the compatibility
 - a) Addition.
 - b) Multiplication.
13. Write a C program on Strings to implement the following operations without string handling functions
 - a) Concatenation of two given input strings.
 - b)Length of a string.
 - c) Reverse of a given string.
14. Write C programs that use both recursive and non-recursive functions for the following
 - i) To find the factorial of a given integer.
 - ii) To find the GCD (greatest common divisor) of two given integers.
 - iii) To find Fibonacci sequence
15. Write a C program using Pointers to work on
 - a) Matrix Addition.
 - b) Transpose of a Matrix.
16. Write a C program to read and print the details of an Employee (Name, Date of the Birth, Designation, Salary) using Structures.
17. Write a C program
 - a) to read and print the student details (Name, Register number, Address, Intermediate %) using Union.
 - b) to display the name of the colour using Enum data type
18. Write a C Program to
 - a) Copy one file to another.
 - b)Count the number of characters, words and lines in a file.

**I Year I Semester
Professional Ethics and Human Values**

Course Category	Humanities including Management	Subject Code	19HM1T07
Course Type	Theory	L-T-P-C	2 -0 -0-0
Prerequisites		Total Marks (Internal Assessment)	100

Course Outcomes		Cognitive Level
On successful completion of the course, the student will be able to		
CO 1	Understand different concepts in Professional Ethics and Human Values.	K2
CO 2	Apply ethical principles to resolve the problems that arise in work place.	K3
CO 3	Make use of Engineers rights to fulfill their responsibilities.	K3
CO 4	Understand the responsibility of an engineer in designing safety.	K2
CO 5	Analyze the social media accounts in order to create and maintain a positive digital footprint.	K4

Contribution of Course Outcomes towards achievement of Program															
Outcomes: 1 – Low, 2 - Medium, 3 – High															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO1	PSO3
CO1	-	-	2	-	-	3	2	3	-	2	-	1	-	-	-
CO2	-	-	2	-	-	2	2	3	-	1	-	2	-	-	-
CO3	-	-	2	-	-	3	2	3	-	2	-	1	-	-	-
CO4	-	-	2	-	-	3	2	3	-	2	-	1	-	-	-
CO5	-	-	2	-	-	2	2	3	-	1	-	1	-	-	-

COURSE CONTENT

UNIT - I

Professional Ethics and Human values:

Ethics -History of Ethics-Types of Ethics, Professional Ethics and its forms - Morals, Values – Integrity –Civic Virtue –Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value time –Co-operation – Loyalty- Collegiality-Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT - II

Engineering & Organization Ethics:

Engineering Ethics-Meaning & Purpose of Engineering Ethics- Consensus and Controversy –Work Place Ethics and Business Ethics –Ethics in HRM, Finance & Marketing – Ethical Theories-Meaning & Uses of Ethical Theories-Theories of moral Development-Kohlberg’s Theory – Gilligan’s Argument –Heinz’s Dilemma.

UNIT - III

Engineers Responsibilities and Rights:

Key Characteristics of Engineering Professionals – Professional Roles to be played by an Engineer - Ethical egoism-Collective bargaining-Confidentiality- Acceptance of Bribes/Gifts when is a Gift and a Bribe-examples of Gifts v/s Bribes-Whistle Blowing and its types-when should it be attempted-preventing whistle blowing.

UNIT - IV**Engineers' Responsibility for Safety and Risk:**

Concept of Safety-Types of Safety, Risk-Types of Risks, Voluntary v/s Involuntary Risk- Short term v/s Long term Consequences- Expected Probability- Reversible Effects- Threshold Levels for Risk- Delayed v/s Immediate Risk- Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT - V**Ethical issues in Social Media:**

Social Media- Various Social Media Platforms: Google, Facebook, YouTube, Instagram -Social Media set-up and Uses-Ethical use of Social media-Effects of Social Media on Public- Social Media (vs) News- Social Media Fame and Reputation-Trolling, Harassing, and Hating on Social Media-Legal Aspects of Social Media.

REFERENCES :

1. "Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar- PHI Learning Pvt. Ltd-2009.
2. "Professional Ethics and Morals" by Prof.A.R.Aryasri, Dharanikota Suyodhana- Maruthi Publications.
3. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications
4. "Professional Ethics and Human Values" by Prof.D.R.Kiran
5. "Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication
6. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger -Tata McGraw- Hill -2003
7. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.

WEB RESOURCES:

1. <https://study.com/academy/lesson/ethical-issues-in-internet-social-media-marketing.html>
2. https://www.tutorialspoint.com/engineering_ethics/engineering_ethics_rights_of_engineers
3. <https://link.springer.com/article/10.1007/s11948-997-0039-x>

I Year II Semester
Numerical Methods and Multi-variable Calculus
 (Common to CE, ME, ECE, CSE, &IT)

Course Category	Basic Sciences	Course Code	19BM2T02
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Differentiation, Integration	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2	The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Apply Newton, Gauss and Lagrange interpolation formulae to find interpolating polynomials for the given data.	K3
CO2	Find the approximate roots of transcendental equations by using different numerical methods	K2
CO3	Solve ordinary differential equations by using different numerical schemes	K3
CO4	Find areas and volumes using double and triple integrals	K2
CO5	Apply a range of techniques to find solutions of standard PDEs	K3

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT**UNIT I****Interpolation**

Introduction– Errors in polynomial interpolation – Finite differences – Forward differences– Backward differences – Central differences – Symbolic relations and separation of symbols – Differences of a polynomial-Newton’s formulae for interpolation –Gauss formulae for interpolation- Interpolation with unequal intervals – Lagrange’s interpolation formula.

UNIT II**Solution of Algebraic and Transcendental Equations**

Introduction- Bisection method – Method of false position – Secant method- Iteration method – Newton-Raphson

method (One variable).

UNIT III

Numerical Integration and solution of Ordinary Differential equations

Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series- Picard's method of successive approximations-Euler's method - Runge-Kutta method (second and fourth order).

UNIT IV

Multiple integrals

Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration.

Applications: Finding Areas and Volumes.

UNIT V

Partial Differential Equations

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

TEXT BOOKS

1. **B. S. Grewal**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **Erwin Kreyszig**, Advanced Engineering Mathematics, 10th Edition, Wiley-India.

REFERENCE BOOKS

1. **Micheael Greenberg**, Advanced Engineering Mathematics, 9th edition, Pearson Edition
2. **Dean G. Duffy**, Advanced engineering mathematics with MATLAB, CRC Press.
3. **Peter O'neil**, Advanced Engineering Mathematics, Cengage Learning.
4. **Srimanta Pal, Subodh C. Bhunia**, Engineering Mathematics, Oxford University Press.
5. **T.K.V. Iyengar et. al.**, Engineering Mathematics Volume I & III S Chand Publications.
6. **T.Amarnath**, An Elementary Course in Partial Differential Equations, Narosa Publications

WEB RESOURCES

UNIT I: Interpolation

https://en.wikibooks.org/wiki/Introduction_to_Numerical_Methods/Interpolation

UNIT II: Solution of Algebraic and Transcendental Equations

https://en.wikibooks.org/wiki/Numerical_Methods/Equation_Solving

<https://www.slideshare.net/100005232690054/algebraic-and-transcendental-equations>

UNIT III: Numerical Integration and solution of Ordinary Differential Equations

<https://nptel.ac.in/courses/111107063/>

UNIT IV: Multiple Integrals

https://en.wikipedia.org/wiki/Multiple_integral

<http://tutorial.math.lamar.edu/Classes/CalcIII/MultipleIntegralsIntro.aspx>

UNIT V: Partial Differential Equations

https://en.wikipedia.org/wiki/Partial_differential_equation

I Year II Semester
Integral Transforms and Vector Calculus
(Common to CE, EEE, ME, ECE, CSE & IT)

Course Category	Basic Sciences	Course Code	19BM2T03
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	NIL	Internal Assessment	30
		Semester End Examination	70
		Total Marks	100

COURSE OBJECTIVES	
1	The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2	The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.

COURSE OUTCOMES		Cognitive Level
Upon successful completion of the course, the student will be able to:		
CO1	Examine the properties of Laplace transformation	K3
CO2	Solve ordinary differential equations by using Laplace transformation technique	K2
CO3	Expand a periodic function as a Fourier series and find Fourier transform of a given function.	K3
CO4	Understand vector differential properties of scalar and vector point functions and their applications.	K2
CO5	Apply Green's, Stokes and Divergence theorem to evaluate line, surface and volume integrals.	K3

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT

UNIT I

Laplace transforms: Laplace transforms of standard functions – Properties - Periodic functions - Unit step function – Dirac's delta function.

UNIT II

Inverse Laplace transforms: Inverse Laplace transforms – Properties – Convolution theorem (without proof).
Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT III

Fourier Analysis: Introduction- Periodic functions – Dirichlet's conditions - Fourier series of a function, even and odd functions –Change of interval – Half-range sine and cosine series. Fourier integral theorem (without proof) –

Fourier sine and cosine integrals – sine and cosine transforms – Inverse transforms.

UNIT IV

Vector Differentiation: Gradient - Directional derivative - Divergence – Curl – Laplacian and second order operators – Vector identities.

UNIT V

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

TEXT BOOKS

1. **B.S.Grewal**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **Erwin Kreyszig**, Advanced Engineering Mathematics, 10th Edition, Wiley-India

REFERENCE BOOKS

1. **Micheael Greenberg**, Advanced Engineering Mathematics, 9th edition, Pearson edn
2. **Dean G. Duffy**, Advanced engineering mathematics with MATLAB, CRC Press
3. **Peter O'neil**, Advanced Engineering Mathematics, Cengage Learning.
4. **Srimanta Pal, Subodh C.Bhunia**, Engineering Mathematics, Oxford University Press.
5. **T.K.V. Iyengar et. al.**, Engineering Mathematics Volume I & III S Chand Publications.
6. **Murray R Speigel**, Schaum's Outline of Vector Analysis, Schaum's Outline.
7. **Shanti Narayan**, Integral Calculus – Vol. 1 & II

WEB RESOURCES

UNIT I: Laplace transforms

https://en.wikipedia.org/wiki/Laplace_transform

<https://web.stanford.edu/~boyd/ee102/laplace.pdf>

UNIT II: Inverse Laplace transforms

<https://www.intmath.com/laplace-transformation/7-inverse-laplace-transform.php>

UNIT – III: Fourier Series

<https://www.mathsisfun.com/calculus/fourier-series.html>

<https://lpsa.swarthmore.edu/Fourier/Xforms/FXformIntro.html>

UNIT IV: Vector Differentiation

https://en.wikipedia.org/wiki/Vector_calculus

UNIT V: Vector Integration

https://en.wikipedia.org/wiki/Divergence_theorem

<http://tutorial.math.lamar.edu/Classes/CalcIII/StokesTheorem.aspx>

**I Year II Semester
APPLIED CHEMISTRY
(CSE)**

Course Category	Basic Sciences	Course Code	19BC2T02
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Intermediate Chemistry	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES	
1	To learn about Electrochemical cells, Batteries and Fuel cells
2	To know about spinels, magnetic materials and semi conductors
3	To study about Nano materials, their preparation, characterization, applications and also about principles of green chemistry and green engineering applications
4	To know about Polymers, plastics and Elastomers
5	To learn about non conventional energy sources and also Spectroscopic techniques
COURSE OUTCOMES	
Upon successful completion of the course, the student will be able to:	
CO	Cognitive Level
CO1	To compare different types of batteries and explain the merits of fuel cell.
CO2	Discuss the use and importance of semiconductors, magnetic materials and spinels.
CO3	To explain the Green methods of Synthesis and applications of Green technologies .
CO4	Analyze the importance of polymers in engineering applications.
CO5	List out various sources of non conventional energy.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	2	2	-	2	-	-	-	2	-	-	-	-
CO2	2	2	1	-	-	1	1	-	-	-	1	-	-	-	-
CO3	1	1	-	1	2	-	-	-	-	-	-	1	-	-	-
CO4	2	2	-	1	-	-	1	-	-	-	-	1	-	-	-
CO5	1	1	1	-	-	-	1	-	-	-	2	1	-	-	-

COURSE CONTENT

UNIT I

ELECTROCHEMICAL ENERGY SYSTEMS

Electrode Potential, Nernst Equation for a single electrode, EMF of the cell, Electro chemical Series and uses, Types of Electrodes - Hydrogen and Calomel electrode, Electrochemical Cell, Galvanic Cell vs Electrolytic Cell, Types of Ion Selective Electrodes- glass membrane electrode

Batteries- Characteristics, classification and Important applications. Classical batteries- Dry/Lechlanche cell, Modern batteries- Zinc air, Lithium cells-Li MnO₂ cell.

Fuel cells- Introduction, H₂-O₂ fuel cell.

Learning outcomes:

After the completion of the Unit I, the student will be able to

- **Explain** the significance of electrode potentials. **(L-2)**
- **Compare** different types of cells and batteries. **(L-2)**
- **Classify** ion selective electrodes. **(L-2)**
- **Explain** the concepts involved in the construction of lithium cells. **(L-2)**
- **Apply** redox principles for construction of batteries and fuel cells. **(L-3)**

UNIT II**SOLID STATE CHEMISTRY**

Solids – Crystalline and amorphous solids- 2D and 3D close packing of atoms and ions - spinels - normal and inverse spinels, semi conductor – Elemental semi conducting materials - Non-elemental semiconducting Materials:- Stoichiometric, non stoichiometric controlled valency & Chalcogen semiconductors, Preparation of Semiconductors by Zone refining and Czocharlski crystal pulling method.

Semiconducting Devices - p-n junction diode as rectifier and junction transistor.

Electrical Insulators and Applications of solid, liquid and gaseous insulators.

Magnetic materials- Ferro and ferri magnetism. Hall effect and its applications.

Learning Outcomes:

After the completion of the Unit II, the student will be able to

- Explain 2D and 3D close packing of crystals (L-3)
- identify different types of spinels. (L-3)
- describe the mechanism of photo copying. (L-2)
- explain the applications of electrical insulators. (L-3)

UNIT III**NANOMATERIALS AND GREEN CHEMISTRY**

III-A: Nano Materials: Introduction to Nano materials, Preparation of Carbon Nano Tubes(CNTs) by Laser Ablation and Chemical Vapor Deposition Methods, Fullerenes -Preparation, Properties and Applications; Chemical synthesis of nano materials : Sol-gel method, Characterization of nano materials by BET & TEM (basic principles), Applications of nano materials in waste water treatment, lubricants, Medicine and sensors.

III-B: Green Chemistry: Introduction-Principles of green chemistry, Green synthesis Methods- Phase Transfer Catalysis (PTC), Super critical fluid extraction method, Green engineering applications in environmental and power quality monitoring.

Learning outcomes:

After the completion of the Unit III, the students will be able to

- **explain** the basic principles of green chemistry. (L-3)
- **identify** different preparation methods of CNTs. (L-3)
- **discuss** the applications in green engineering. (L-2)

UNIT IV**POLYMER CHEMISTRY**

Polymers: Introduction-Methods of Polymerization (Emulsion and Suspension), Conducting polymers – Mechanism of conduction in poly acetylene – applications, Bio – degradable polymers.

Plastics: Thermoplastics and thermo setting resins; Preparation, properties and applications of Polystyrene and Bakelite.

Elastomers: Natural Rubber, Vulcanization of rubber; Synthetic Rubbers -Preparation, properties and applications of Buna-S and Thiokol.

Learning Outcomes:

At the end of this unit, the students will be able to

- **explain** different types of polymerisation mechanisms (L-2)
- **distinguish** between thermoplastic and thermo setting resins (L-4)
- **explain** the preparation, properties and applications of Bakelite and polystyrene (L-2)
- **describe** the mechanism of conduction in conducting polymers (L-2)
- **discuss** Buna-S and Thiokol elastomers and their applications (L-2)

UNIT V**Non Conventional Energy Sources & Spectroscopic Techniques**

Non Conventional Energy Sources : Introduction-Photo voltaic cell & Organic Photo voltaic cell - Design, Principle, advantages and disadvantages; Hydropower-Geo thermal Power -Tidal Power-Ocean thermal Energy Conversion.

Spectroscopic Techniques: Electro Magnetic Spectrum- Introduction, Principles of UV and IR Spectroscopic

techniques and their applications.

Learning outcomes

After the completion of the Unit V, the student will be able to

- **list** different non conventional energy sources. (L-1)
- **explain** the basic principle involved in the working of power plants. (L-2)
- **compare** Spectroscopic techniques and their importance . (L-2)

TEXT BOOKS

1. P.C. Jain and M. Jain, Engineering Chemistry, 15/e, Dhanapat Rai & Sons, Delhi (2014).
2. Engineering Chemistry by Shikha Agarwal: Cambridge University Press, 2019 edition

REFERENCE BOOKS

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003)
2. B.S Murthy and P. Shankar, A Text Book of NanoScience and NanoTechnology, University Press (2013).
3. S.S. Dara, A Textbook of Engineering Chemistry, S.Chand & Co, (2010)

WEB RESOURCES

1. Electrochemical Energy Systems
https://en.wikipedia.org/wiki/Electrochemical_cell
2. Solid state chemistry
https://en.wikipedia.org/wiki/Solid-state_chemistry
www.engineeringenotes.com › Engineering › Electronics › Semiconductors
3. Nanomaterials and Green Chemistry
https://en.wikipedia.org/wiki/Green_chemistry
<https://www.acs.org/.../greenchemistry/principles>
4. Polymer Chemistry
https://en.wikipedia.org/wiki/Polymer_chemistry
5. Non Conventional Energy Sources & Spectroscopic Techniques
https://en.wikipedia.org/wiki/Geothermal_power;
https://en.wikipedia.org/wiki/Ocean_thermal_energy_conversion
www.rsc.org/learn-chemistry/collections/spectroscopy/introduction

**I Year II Semester
DATA STRUCTURES
(Common to CSE and IT)**

Course Category:	Professional Core	Course Code:	19IT2T01
Course Type:	Theory	L-T-P-C:	3-0-0-3
Prerequisites:	Programming for Problem Solving using C	Internal Evaluation:	30
		Semester end Evaluation:	70
		Total Marks:	100

COURSE OBJECTIVES

1	To assess how the choice of data structures and algorithm design methods impacts the performance of programs.
2	To choose the appropriate data structure and algorithm design method for a specified application.
3	To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Implement sorting and searching algorithms.	K3
CO2	Develop algorithms for stacks, queues.	K3
CO3	Apply concepts of linked lists.	K3
CO4	Develop programs using concepts of trees.	K3
CO5	Implement algorithms on Graphs.	K3

Contribution of Course Outcomes towards achievement of Program

Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	1	-	-	-	-	-	-	2	1	-
CO2	2	3	1	2	1	-	-	-	-	-	-	-	1	1	1
CO3	2	3	1	1	1	-	-	-	-	-	-	-	1	1	1
CO4	2	3	1	1	1	-	-	-	-	-	-	-	1	1	1
CO5	3	3	1	1	1	-	-	-	-	-	-	-	1	1	1

COURSE CONTENT**UNIT I**

SEARCHING: Introduction, linear search, binary search, Fibonacci search.

SORTING: Introduction, Bubble Sort, Selection sort, insertion sort, merge sort.

UNIT II

Abstract Data Types (ADTs)

STACKS: Introduction, stack operations, applications.

QUEUES: Introduction, operations on queues, circular queues, priority queues, applications.
Evaluation of expressions, expression- postfix notation- infix to postfix.

NIT III

LINKED LISTS: Introduction, singly linked lists, circular linked lists, doubly linked lists with emphasis on operations and applications.

LINKED STACKS AND LINKED QUEUES: Introduction, operations on linked stacks and linked queues, dynamic memory management, implementation of linked representations, applications.

Recursion: Recursion algorithms and their implementation with stacks.

UNIT IV

TREES AND BINARY TREES: Introduction, Trees: definition and basic terminologies, representation of trees. Binary trees: basic terminologies and types, representation of binary trees, binary tree traversals, applications.

BINARY SEARCH TREES: Introduction, binary search trees: Heap Sort.

UNIT V

GRAPHS: Introduction, definitions and basic terminologies, graph representation, elementary graph Operation, graph traversals - Depth First Search, Breadth First Search, Topological Sorting.

TEXT BOOKS

1. Langsam, Augenstein and Tanenbaum, "Data Structures using C", PHI.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education. Ltd.
3. E. Horowitz, S.Sahni, Dinesh Mehta, "Fundamentals of Data structures in C", Galgotia Publications, 2006.

REFERENCE BOOKS

1. G.A.V Pai, Data Structures and Algorithms, Concepts, Techniques and Applications, Volume 1,1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg and Behrouz A. Forouzan, "Data Structures, Pseudo code Approach with C", 2nd Edition, Cengage Learning India Edition, 2007

WEB RESOURCES

1. <http://nptel.iitm.ac.in/video.php?subjectId=106105085>
2. <http://cds.iisc.ac.in/courses/ds286/>
3. <http://www.geeksforgeeks.org/data-structures>

I Year II Semester

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Category	Engineering Sciences	Course Code	19EE2T02
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	NA	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	To learn the basic principles of electrical circuit analysis.
2	To understand constructional details and operating principle of DC machines & Transformers.
3	To understand constructional details and operating principle details of alternator and 3-Phase induction motor.
4	To study operation of PN junction diode, half wave, full wave rectifiers, PNP and NPN transistors and various semiconductor devices.
5	To study the operation of OP-AMPs.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Analyze various electrical circuits	K4
CO2	Understand constructional details and operating principle of DC machines, single phase transformer, tests and analyze their performance.	K4
CO3	Explain operation of Three phase AC machines.	K2
CO4	Analyze operation of half wave, full wave bridge rectifiers and Explain single stage CE amplifier and concept of various semiconductor devices.	K4
CO5	Analyze operation of OP-AMPs.	K4

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	-	-	-	-	-	-	-	1	1	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	1	-	-
CO3	3	2	2	1	-	-	-	-	-	-	-	1	1	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	2	-	-	-	-	-	-	-	-	1	-	-

COURSE CONTENT**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.

UNIT II**DC Machines & Transformers**

Constructional details and operating principle – EMF equation – DC motor – torque equation – applications - speed control methods of DC motor – Swinburne's Test.

Constructional details and operating principle of single phase transformers – EMF equation – equivalent circuit – Losses – OC & SC tests – efficiency.

UNIT III**AC Machines**

Constructional details and operating principle of alternators – types – Regulation of alternator by synchronous impedance method.

Principle of operation of 3-Phase squirrel cage induction motor – electromagnetic torque equation - power flow - brake test - efficiency calculation – applications.

UNIT IV**Semiconductor Devices**

PN junction diodes – characteristics – half wave and full wave rectifiers - PNP and NPN junction transistor, transistor as an amplifier – transistor amplifier – frequency response of CE amplifier – concepts of feedback amplifier – SCR – MOSFET - IGBT.

UNIT V**Operational Amplifiers**

Introduction to operation amplifiers (Ideal OP-AMP) – Characteristics – applications (inverting, non-inverting, integrator and differentiator).

TEXT BOOKS

1. William Hayt and Jack E. Kemmerley, Engineering Circuit Analysis, Mc Graw Hill Company, 6th Edition.
2. Surinder Pal Bali, Electrical Technology, Vol-I, Vol-II, Pearson Publications, 1st Edition.
3. Basic Electrical and Electronics Engineering by M.S. Sukhija and T.K. Naga Sarkar, Oxford University Press.
4. R.L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, PEI/PHI 2006, 9th Edition.

REFERENCE BOOKS

1. John Bird, Electrical Circuit Theory and Technology, Routledge Taylor and Francis Group, 5th Edition.
2. M.S.Naidu and S.Kamakshiah, Basic Electrical Engineering, TMH Publications, 1st Edition.
3. Rajendra Prasad, Fundamentals of Electrical Engineering, PHI Publications, 2nd edition.
4. R. S. Sedha, A Text Book of Electronic Devices and Circuits, S.Chand & Co. 2nd Edition
5. David A. Bell, Electronic Devices and Circuits, Oxford University Press, 5th Edition.

WEB RESOURCES

1. http://www.ncert.nic.in/html/learning_basket/electricity/electricity/machine/motor.html
2. www.electricaleasy.com
3. www.nptel.ac.in/courses/108108076/
4. <https://nptel.ac.in/courses/122106025/>

**I Year II Semester
Applied Chemistry Laboratory
(CSE)**

Course Category	Basic sciences	Course Code:	19BC2L02
Course Type	Laboratory	L-T-P-C:	0-0-3-1.5
Prerequisites	Basic Chemistry	Continuous Evaluation End Examination Total Marks	25 50 75

COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Students will learn to estimate the given amount of dissolved compounds in water by using volumetric analysis and preparation of polymers and nano particles	K3
CO2	Students will be able to learn complexometric titrations to determine the concentration of different metal ions present in water and determine the % moisture in a coal sample.	K3
CO3	Students will be able to identify the accurate value of conductivity of given solutions. and to estimate the viscosity and surface tension of given solutions.	K3

Contribution of Course Outcomes towards achievement of Program Outcomes (1–Low,2–Medium,3–High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO12	PSO1	PSO2	PSO3
CO1	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT

(Any 10 of the following listed 14 experiments)

LIST OF EXPERIMENTS:

Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis

1. Estimation of HCl using standard Na_2CO_3 solutions
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH
3. Estimation of KMnO_4 using standard Oxalic acid solution.
4. Estimation of Ferrous iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution
5. Determination of Temporary and permanent Hardness water using standard EDTA solution.

6. Determination of % moisture content in a coal sample.
7. Determination of Mg^{2+} present in an antacid
8. Conductometric Titrations between strong acid and strong base
9. Conductometric Titrations between strong acid and weak base
10. Estimation of Vitamin – C
11. Preparation of Phenol - Formaldehyde Resin
12. Determination of viscosity of a liquid
13. Determination of surface tension of a liquid
14. Preparation of Nano particles.(Cu/Zn)

TEXT BOOKS

1. Mendham J, Denney RC, Barnes JD, Thomas M and Sivasankar B Vogel's Quantitative Chemical Analysis 6/e, Pearson publishers (2000).
2. N.K Bhasin and Sudha Rani Laboratory Manual on Engineering Chemistry 3/e, Dhanpat Rai Publishing Company (2007).

REFERENCE BOOKS

1. Vogel's Textbook of Quantitative chemical analysis, J. Mendham et.al.
2. [1] College designed manual

WEB RESOURCES

1. www.bsauniv.ac.in/UploadImages/Downloads/Estimation%20of%20Hardness
2. <https://pubs.acs.org/doi/abs/10.1021/i560133a023>
3. <https://pdfs.semanticscholar.org/33d4/3b264bad212a14d660667298f12944ea11d5>

I Year II Semester
DATA STRUCTURES LABORATORY
(Common to CSE and IT)

Course Category:	Professional Core	Course Code:	19IT2L01
Course Type:	Laboratory	L-T-P-C:	0-0-3-1.5
Prerequisites:	Programming for Problem Solving using C	Continuous Evaluation:	25
		Semester end Evaluation:	50
		Total Marks:	75

COURSE OBJECTIVES		
1	To provide hands on experience to implement basic linear and non-linear data structures. This course covers implementation of Stack, Queue, List, Sorting techniques, Binary Search Trees.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		
	Cognitive Level	
CO1	Implement sorting and searching algorithms.	K3
CO2	Implement stacks and queues using arrays Develop programs using recursive functions.	K3
CO3	Apply concepts of linked lists.	K3
CO4	Develop programs using concepts of trees.	

Contribution of Course Outcomes towards achievement of Program															
Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	1	-	-	-	-	-	-	2	1	-
CO2	2	3	1	2	1	-	-	-	-	-	-	-	1	1	1
CO3	2	3	1	1	1	-	-	-	-	-	-	-	1	1	1
CO4	2	3	1	1	1	-	-	-	-	-	-	-	1	1	1

COURSE CONTENT**LAB EXPERIMENTS**

1. Write C programs to implement search algorithms
2. Write C programs to implement sorting algorithms
3. Write C programs that implement the following data structures using arrays:

- i) Stack ii) Queue.
- 4. Write C programs to implement the following Stack applications
 - i) Conversion of a given infix expression into postfix.
 - ii) Evaluations of postfix expression
- 5. Write C programs to implement the following types of Lists
 - i) Singly linked list
 - ii) Circular Linked list
 - iii) Doubly linked list.
- 6. Write C programs to implement the following data structures using Lists
 - i) Stack ii) Queue.
- 7. Write a program to implement the binary search tree operations
- 8. Write a C program to implement binary tree using arrays and to perform binary tree traversals using recursion
 - i) in order ii) post order iii) preorder.

COURSE CONTENT**LIST OF EXPERIMENTS:****Section A: Electrical Engineering(Any 6 of the following experiments are to be conducted)**

Experiment 1	Measurement of voltage, current and Power in Star and Delta Connected loads.
Experiment 2	Magnetization characteristics of DC Shunt Generator.
Experiment 3	Swinburne's test on D.C. Shunt machine (predetermination of efficiency of a given D.C. shunt machine working as motor and generator).
Experiment 4	Speed control of D.C. Shunt motor by a) Armature Voltage control b) Field control method.
Experiment 5	OC and SC tests on single phase transformer (predetermination of efficiency and regulation at given power factors).
Experiment 6	Load Test on Single Phase Transformer.
Experiment 7	Brake test on 3-phase Induction motor (determination of performance characteristics)
Experiment 8	Regulation of alternator by Synchronous impedance method.

Section B: Basic Electronics(Any 4 of the following experiments are to be conducted)

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

I Year II Semester

PROFESSIONAL COMMUNICATIVE ENGLISH LABORATORY- II
(For CE, EEE, CSE & IT)

Course Category	Humanities, Social sciences including management	Course Code	19HE2L02
Course Type	Laboratory	L-T-P-C	0-0-3-1.5
Prerequisites		Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

COURSE OUTCOMES		
CO	DESCRIPTION	COGNITIVE LEVEL
CO1	Develop the required communication skills to present effective presentations and interviews with clarity and impact.	K2
CO2	Able to create constructive and elaborative discussions to share their ideas on several issues.	K3
CO3	Ensure to use of argumentative and critical thinking skills by elaborating ideas relevantly and improve team work.	K3

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-

PRESCRIBED LABORATORY MANUAL FOR SEMESTER II:

‘**STRENGTHEN YOUR STEPS: A Multimodal Course in Communication Skills**’, Published by Maruthi Publications.

OBJECTIVES: To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing.

OUTCOME: A study of the communicative items in the laboratory will help the students become successful in the competitive world.

The course content along with the study material is divided into six units.

UNIT-1:

Small Talk & JAM Session

UNIT-2:

Interviews

UNIT-3:

Effective Telephonic Interviews

UNIT-4:

Group Discussions

UNIT-5:

Presentations & Public Speaking

UNIT-6:

Debates

**I Year II Semester
Environmental Science
(Common to All Branches)**

Course Category	Mandatory Courses	Course Code	19BE2T01
Course Type	Theory	L-T-P-C	3 – 0 – 0 – 0
Prerequisites	Exposure Basic Knowledge in Environment and protection.	Total Marks(Internal Assessment)	100

COURSE OBJECTIVE:		
1	To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		
CO1	Recognize the interconnectedness of human dependence on the earth's ecosystems	K 2
CO2	Comprehend environmental problems from multiple perspectives with emphasis on human modern lifestyles and developmental activities	K1
CO3	Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century	K1
CO4	Gain a higher level of personal involvement and interest in understanding and solving environmental problems.	K2
CO5	Learn the management of environmental hazards and to mitigate disasters and have a clear understanding of environmental concerns and follow sustainable development practices	K3
CO6	Influence their society in proper utilization of goods and services.	K1

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	1	-	-	1	2	-	-	-	1	-	-	-
CO2	-	1	-	-	-	-	1	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	1	-	-	-	-	-	-	-
CO4	-	-	-	-	1	1	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	3	1	-	-	-	-	-	-

COURSE CONTENT**UNIT I**

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance-Need for public awareness.

Natural Resources:

Forest resources : deforestation – Mining, dams and other effects on forest and tribal people.

Water resources :Use and over utilization of surface and groundwater.

Food resources: World food problems, effects of modern agriculture, fertilizer-pesticide problems.

Energy resources: renewable and nonrenewable energy sources.

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

LEARNING OUTCOMES:

Students will be able to

1. *Articulate the basic structure, functions, and processes of key social systems affecting the environment*
2. Explain why renewable and non-renewable energy resources are important..
3. Explain how water resources should be used.

UNIT II

Ecosystems, Biodiversity and its conservation: Definition of Ecosystem and its structure, Functions

Biodiversity Definition-Value of biodiversity, India as a mega-diversity nation, Threats to biodiversity, Conservation of biodiversity

LEARNING OUTCOMES:

Students will be able to

1. Get a clear picture of structure and functions of ecosystems.
2. Demonstrate knowledge and understanding of theories in the field of Biodiversity and Systematic in the broad sense.

UNIT III

Environmental Pollution: Definition, Cause, Effects of Air pollution, Water pollution, Noise pollution, Radioactive pollution, Role of an individual in prevention of pollution.

Solid Waste Management: Sources, effects and control measures of urban and industrial waste.

LEARNING OUTCOMES Students will be able to

1. Understand Cause, effects and control measures of air pollution.
2. Explain the enforcement of Environmental legislation
3. Understand solid waste management.

UNIT IV

Social Issues and the Environment: Air (Prevention and Control of Pollution) Act 1981. –Water (Prevention and control of Pollution) Act 1974, EPA act 1986, Issues involved in enforcement of environmental legislation, Rain water harvesting, Global Environmental challenges climate change and mitigations and Adaptations (Engineering technologies)

LEARNING OUTCOMES:

Students will be able to

1. Explain the enforcement of Environmental legislations
2. Acquire knowledge on various environmental challenges induced due to unplanned anthropogenic activities.

UNIT V

Human population and the Environment:

Population growth, Women and child welfare, Role of Information technology in environment and human health Awareness to Environmental Assessment & clearance, Audit. Environmental Governance in India

E-Waste management Rules (Biomedical Waste, Solid Waste) **Field work:** A mini project related to Environmental issues / To visit a local polluted site (Submission of project by every student)

LEARNING OUTCOMES Students will have

1. *Explain various types of information technologies*
2. Explain the theories of population explosion

TEXT BOOKS

1. Environmental Studies for undergraduate courses by Erach Bharucha, UGC.
2. A Textbook of Environmental Studies by Dr. S. Azeemunnisa, Academic publishing company.
3. Environmental Studies by P.N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai.
4. A Textbook EIA Notification 2006(2019)

REFERENCE BOOKS

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. Glimpses of Environment by K.V.S.G. Murali Krishna Published by Environmental Protection Society, Kakinada, A.P.
3. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi.

WEB RESOURCES

UNIT-1: MULTI DISCIPLINARY NATURE OF ENVIRONMENT and NATURAL RESOURCES

<http://www.defra.gov.uk/environment/climatechange>

UNIT-2: ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION

<http://conbio.net/vl/> and www.biodiversitya-z.org/content/biodiversity

UNIT-3: ENVIRONMENTAL POLLUTION

<https://www.omicsonline.org/environment-pollution-climate-change.php> and

UNIT-4: Social Issues and the Environment

<http://www.publichealthnotes.com/solid-waste-management/>

UNIT-5: HUMAN POPULATION AND THE ENVIRONMENT

<http://IPCC.com>

**II Year I Semester
Probability & Statistics
(Common to CE, CSE & IT)**

Course Category	Basic Sciences	Course Code	19BM3T04
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	NIL	Internal Assessment	30
		Semester End Examination	70
		Total Marks	100

COURSE OBJECTIVES	
1	The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2	The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.

COURSE OUTCOMES		Cognitive Level
Upon successful completion of the course, the student will be able to:		
CO1	apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies	K3
CO2	interpret the properties of normal distribution and its applications	K2
CO3	find the confidence intervals for a statistic from the given population	K3
CO4	apply the concept of hypothesis testing to real world problems	K2
CO5	find a curve which approximate the given data, coefficient of correlation and lines of regression.	K3

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program															
Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	1	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	1	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT	
UNIT I	Discrete Distributions: Introduction – Discrete Random variables – Distribution function – Discrete distribution: Binomial and Poisson distributions.
UNIT II	Continuous distributions: Introduction -Continuous Random variables – Normal distributions, standard normal distribution, normal approximation to Binominal, Gamma and Weibull distributions.
UNIT III	Sampling Theory: Introduction – Population and samples – Sampling distribution of means for large and small samples (with known and unknown variance) – Proportion, sums and differences of means – Sampling distribution of variance – Point and interval estimation.

UNIT IV

Test of Hypothesis: Introduction – Type I and Type II errors – Maximum error – One tail and two tail tests – Tests concerning single mean, two means and several means. Tests concerning single, two and several proportions – Problems using Z-test, t-test, F-test and Chi –square test.

UNIT V

Curve fitting and Correlation: Introduction- Method of least squares – Fitting a straight line – Second degree curve – exponential curve – power curve. Simple correlation and regression – rank correlation – multiple linear regression.

TEXT BOOKS

1. **Miller and John E. Freund**, Probability and Statistics for Engineers, Prentice Hall of India.
2. **B.V. Ramana**, Higher Engineering Mathematics, Tata Mcgraw Hill.

REFERENCE BOOKS

1. **Micheael Greenberg**, Advanced Engineering Mathematics, 9th edition, Pearson edn
2. **Peter O'neil**, Advanced Engineering Mathematics, Cengage Learning.
3. **Srimanta Pal, Subodh C.Bhunia**, Engineering Mathematics, Oxford University Press.
4. **S.L. Myers, K. Ye, Ronald E Walpole**, Probability and Statistics for Engineers and Scientists, Pearson, 8th Edition.

WEB RESOURCES**UNIT I: Discrete Distributions**

https://en.wikipedia.org/wiki/List_of_probability_distributions

https://en.wikipedia.org/wiki/Binomial_distribution

UNIT II: Continuous distribution

https://en.wikipedia.org/wiki/Normal_distribution

UNIT III: Sampling Theory

[https://en.wikipedia.org/wiki/Sampling_\(statistics\)](https://en.wikipedia.org/wiki/Sampling_(statistics))

<https://nptel.ac.in/courses/111104073/>

UNIT IV: Test of Hypothesis

https://en.wikipedia.org/wiki/Statistical_hypothesis_testing

<https://machinelearningmastery.com/statistical-hypothesis-tests/>

UNIT V: Curve fitting and Correlation

https://en.wikipedia.org/wiki/Regression_analysis

<https://www.surveysystem.com/correlation.htm>

II Year I Semester
Python Programming
 (Common to CE, ME, EEE, ECE, CSE, IT)

Course Category	Engineering Science	Course Code	19CS3T03
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Exposure to Programming for Problem Solving using C	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	To impart various programming constructs in Python.	
2	To introduce the usage of fundamental data structures like List, Tuples and Dictionaries.	
3	To imbibe the philosophy of object oriented programming in Python.	
4	To bring the awareness of file handling.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		
CO1	Develop python programs using conditional statements and expressions	Cognitive Level K3
CO2	Apply loop statements for List and String manipulations	K3
CO3	Differentiate Tuples and Dictionary data structures	K2
CO4	Design classes with private and public members	K3
CO5	Develop Python programs using file concepts.	K3

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	-	1	3	3	2
CO2	3	2	1	1	1	-	-	-	-	-	-	1	3	3	2
CO3	3	2	1	1	1	-	-	-	-	-	-	1	3	3	2
CO4	3	2	2	3	3	-	-	-	-	-	-	1	3	3	2
CO5	3	2	2	3	3	-	-	-	-	-	-	1	3	3	2

COURSE CONTENT**UNIT I****Basics of Python Programming & Decision Statements**

Features of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved words, Indentation, Operators and Expressions, if, if-else, Nested if and if-elif-else.

UNIT II**Control Statements and Lists**

while loop, for loop, nested loops, break statement, continue statement and pass statement.

Strings- Concatenating, Appending and Multiplying strings, Slice operation,

Lists: Access values in List, Updating values in List, Nested Lists, Basic List Operations, List Methods

UNIT III**Tuples and Dictionaries**

Tuples: Creating a Tuple, Accessing values in a Tuple, updating Tuple, Basic Tuple operations, Nested Tuples, Checking the index, Counting the elements, List comprehension and Tuples, Advantages of Tuple over List.

Dictionaries: Creating a Dictionary, Accessing values, Adding and modifying an item I a Dictionary, deleting items, Sorting Items in a Dictionary, Looping over a Dictionary, Nested Dictionaries, Difference between a List and a Dictionary.

UNIT IV

Functions- Introduction, Function Definition, the return statement, Required Arguments, Keyword Arguments, Default Arguments, Variable length Arguments.

Object Oriented Programming: Features of OOP, Merits and Demerits of OOP, Defining Classes, Creating Objects, Data Abstraction, and Hiding through classes, Class Method and Self Argument, The `__init__()` method, Public and Private data members, Private Methods.

UNIT V

Inheritance- Introduction, Inheriting Classes in python, Types of Inheritance- Single, Multiple, Multi-level, Multi-path inheritance.

File Handling- Introduction, Types of Files, Opening and Closing Files, Reading and Writing Files.

TEXT BOOKS

1. Python: The Complete Reference, Martin C Brown, McGraw Hill Education
2. Python Programming using Problem Solving Approach, Reema Thareja, OXFORD University Press, 2017.

REFERENCE BOOKS

1. Fundamentals of Python, Kenneth A Lambert, B L Juneja, Cengage Learning
2. Programming and Problem Solving with Python, Ashok Namdev Kamthane, Amit Ashok Kamthane, McGraw Hill Education

WEB RESOURCES

1. <https://docs.python.org/3/tutorial/index.html>
2. https://swayam.gov.in/nd1_noc19_cs40/preview
3. <https://www.udemy.com/pythonforbeginnersintro/>
4. <https://www.coursera.org/learn/python-programming>

**II Year I Semester
Digital Marketing
(CSE)**

Course Category	Professional Core	Course Code	19CS3T04
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Exposure to Programming for Problem Solving using C	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES		
1	To introduce markup languages which helps in designing websites.	
2	To introduce Java Script for client side validation of websites.	
3	To understand the role and importance of digital marketing in a rapidly changing business landscape.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		
	Cognitive Level	
CO1	Design web pages with basic html tags using CSS, XML.	K3
CO2	Develop client-side scripts with JavaScript and DHTML.	K3
CO3	Apply search engine optimization techniques to a website.	K3
CO4	Make use of Social Media Channels for Digital Marketing.	K3
CO5	Develop a marketing strategy using Mobile, E-mail, and Content.	K3

Contribution of Course Outcomes towards achievement of Program															
Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	-	-	-	-	-	-	1	2	1	1
CO2	3	3	3	3	3	-	-	-	-	-	-	1	2	1	1
CO3	3	1	2	1	3	-	-	-	-	-	-	1	-	-	-
CO4	3	1	2	1	3	-	-	-	-	-	-	1	-	-	-
CO5	3	1	2	1	3	-	-	-	-	-	-	1	-	-	-

COURSE CONTENT

UNIT I

HTML: Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5, audio Element, video Element, organizing Elements

CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, Property-value Forms, Font Properties, color, Background Images, and <div> tags, The Box Model, Conflict Resolution.

UNIT II

JavaScript: The Basic of JavaScript, Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions, Positioning Moving and Changing Elements using Java Script.

XML: Syntax of XML, XML Document Structure, Namespaces, XML Schemas, XSLT Style Sheets, XML Processors.

UNIT III

SEO: Search Engine Marketing, Search Engine Optimization, Measuring SEO Success, Mapping with SEO Journey,

Search Advertising: Online Advertising Payment Models, Search Advertising (Desktop & Mobile Devices), Planning & Executing a search Advertising Campaign, Strategic Implications of Advertising on the Search Network.

UNIT IV

Social Media Marketing: What is Social Media? Social Media Marketing, Social Media Marketing Strategy, Adopting Social Media in Organizations: Internal Learning, Paid-Owned-Earned Media, Social CRM,

Mobile Marketing: Mobile Internet in India, what is Mobile Marketing? Mobile Marketing Strategy, Forms of Mobile Marketing, Mobile Advertising, M-Commerce.

UNIT V

E-mail Marketing: E-mail Marketing in India, what is E-mail Marketing? E-mail Marketing Strategy, Executing E-mail Marketing.

Internet Marketing: Internet Marketing Strategy, Content Marketing, Content Marketing in India.

TEXT BOOKS

1. Programming the World Wide Web, Robert W Sebesta, Pearson, 8th edition, 2015.
2. Internet Marketing – A Practical approach in the Indian Context by Moutusy Maity, Oxford University Press 2017.

REFERENCE BOOKS

1. Web Technologies, Uttam K Roy, Oxford, 2010
2. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrell, Gosselin, Zak, Karparhi, MacIntyre, Morrissey, Cengage, 2003
3. Digital Marketing Handbook: A Guide to Search Engine Optimization by Shivani Karwal
4. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley

WEB RESOURCES

1. www.w3schools.com
2. <https://neilpatel.com/what-is-digital-marketing/>
3. <https://learndigital.withgoogle.com/digitalunlocked/course/digital-marketing>

II Year I Semester
DIGITAL LOGIC DESIGN
(Common to CSE & IT)

Course Category	Professional Core	Course Code	19EC3T06
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites		Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	To solve a typical number base conversion and analyze new error coding techniques.
2	Theorems and functions of Boolean algebra and behavior of logic gates, Boolean function simplification using Karnaugh maps and Quine-McCluskey methods
3	To understand concepts of combinational circuits
4	To understand concepts of basic sequential circuits
5	To develop advanced sequential circuits

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Classify different number systems and apply to generate various codes.	K2
CO2	Use the concept of Boolean algebra and K-map technique in minimization of switching functions.	K2
CO3	Design different types of combinations logic circuits.	K3
CO4	Apply knowledge of combinational logic for designing flip-flops	K3
CO5	Design registers and counters.	K3

K1: Remember, K2: Understand, K3: Apply, K4: Analyze, K5: Evaluate, K6: Create.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	-	1	-	-	-	-	-	-	-	-	1	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-	-	1
CO3	3	-	-	3	-	-	-	-	-	-	-	-	1	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-	-	1
CO5	3	-	-	3	-	-	-	-	-	-	-	-	1	-

COURSE CONTENT**UNIT I****NUMBER SYSTEMS**

Binary, Octal, Decimal, Hexadecimal Number Systems. Conversion of Numbers from One Radix To Another Radix, r's Complement and (r-1)'s Complement Subtraction of Unsigned Numbers, Problems, Signed Binary Numbers, Weighted and Non weighted codes, error detection and correction codes.

UNIT II**LOGIC GATES AND BOOLEAN ALGEBRA**

Basic Gates NOT, AND, OR, Boolean Theorems, Complement And Dual of Logical Expressions, Universal Gates, Ex-Or and Ex-Nor Gates, SOP,POS, Minimizations of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates, Karnaugh Map Method (K-Map): Minimization of Boolean Functions maximum up to Four Variables, POS and SOP, Simplifications With Don't Care Conditions Using K-Map.

UNIT III**COMBINATIONAL LOGIC CIRCUITS I**

Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractors, Ripple Adder/Subtractor Using Ones and Twos Complement Method.

COMBINATIONAL LOGIC CIRCUITS II

Design of Decoders, Encoders, Multiplexers, De-multiplexers, Priority Encoder, Code Converters, Magnitude Comparator, PLA,PAL,PROM.

UNIT IV**INTRODUCTION TO SEQUENTIAL LOGIC CIRCUITS**

Classification of Sequential Circuits, Basic Sequential Logic Circuits: Latch and Flip-Flop, RS- Latch Using NAND and NOR Gates, Truth Tables. RS,JK, T and D Flip Flops, Truth and Excitation Tables.

UNIT V**REGISTERS AND COUNTERS**

Design of Registers, Buffer Register, Control Buffer Registers, Bidirectional Shift Registers, Universal Shift Register, Design of Ripple Counters, Synchronous Counters and Variable Modulus Counters, Ring Counter, Johnson Counter.

TEXT BOOKS

1. Switching and finite Automata theory - Zvi kohavi, third edition, Cambridge university press
2. Switching Theory and Logic Design by A. Anand Kumar, PHI, 3rd Edition.
3. Digital Logic and Computer Design by M Morris Mano, PHI.

REFERENCE BOOKS

1. Modern Digital Electronics by RP Jain, TMH, 4th Edition.
2. Fundamentals of Logic Design by Charles H. Roth Jr, Jaico Publishers, 5th Edition
3. Digital electronics logic and design-Cherry Bhargava, BS Publications, 2019

WEB RESOURCES

1. <https://www.youtube.com/watch?v=4fV47wABBj8>
2. Lecture series on Digital Circuits & Systems by Prof.S.Srinivasan, Department of Electrical Engineering, IIT Madras.For more details on NPTEL visit <http://nptel.iitm.ac.in>
3. <https://www.elprocus.com/tutorial-on-sequential-logic-circuits/>
4. <http://web.ee.nchu.edu.tw/~cpfan/FY92b-digital/Chapter6.pdf>
5. https://www.electronics-tutorials.ws/combination/comb_1.html

II Year I Semester
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE and IT)

Course Category	Professional Core	Course Code	19IT3T04
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites		Internal Assessment	30
		Semester End Examination	70
		Total Marks	100

COURSE OBJECTIVES

1	To familiarize with the syntax and semantics of propositional and predicate logic.
2	To understand number theory.
3	To explain with examples the basic terminology of functions, relations, and sets.
4	To use graph theory for solving problems
5	To imbibe how basic concepts in Algebra can be applied in computer science.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Distinguish Propositional Logic from Predicate Logic.	K3
CO2	Practice problems related to fundamental theorems.	K3
CO3	Illustrate with examples the basic terminology of functions, relations and demonstrate knowledge of their associated operations.	K2
CO4	Represent graphs as mathematical structure and apply graph theory in solving computer science problems.	K3
CO5	Describe the properties of homomorphism and poset and lattices and solve problems in Abstract Algebra.	K3

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	3	2	1
CO2	1	2	2	-	-	-	-	-	-	-	-	-	1	1	1
CO3	3	2	1	-	-	-	-	-	-	-	-	-	1	1	1
CO4	2	2	1	-	-	-	-	-	-	1	-	1	2	1	1
CO5	3	2	2	-	-	-	-	-	-	-	-	-	1	1	1

COURSE CONTENT**UNIT I**

Mathematical logic: Propositional calculus: statements and notations, connectives, Truth tables, Tautologies, Equivalence of formulas, Tautological Implications, Normal forms, Theory of inference for statement calculus. Predicate Calculus: predicate logic, statement functions, variables and quantifiers, free and bound variables.

UNIT II

Number Theory: Properties of integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing Prime numbers, The Fundamental Theorem of Arithmetic (Fermat's Theorem and Euler's Theorem) Mathematical induction– Principle of Mathematical Induction, Exercises

UNIT III

Relations: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Hasse diagram, Lattice and its Properties.

Functions: Inverse Function Composition of functions, recursive Functions.

UNIT IV

Graph Theory: Basic Concepts of Graphs, Matrix representation of graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian graphs, Planar Graphs, Graph coloring, spanning trees.

UNIT V

Algebraic Structures: Algebraic systems – Semi groups and monoids, Homomorphism of Semi group and Monoids, Groups, Cosets. Partial ordering – Posets – Lattices as Posets Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principle and its application.

TEXT BOOKS

1. Mott, Kandel, and Baker, “Discrete Mathematics for Computer Scientists and Mathematicians”, 2nd Edition, PHI.
2. Trembly J.P. and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill, 30th Re-print (2007).
3. Kenneth H Rosen, “ Discrete Mathematics and its Applications”, 7th Edition, McGraw – Hill.

REFERENCE BOOKS

1. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, 4th Edition, Pearson Education Asia, 2002.
2. Thomas Koshy, “Discrete Mathematics with Applications”, Elsevier Publications, 2006.
3. Seymour Lipschutz and Mark Lipson, “Discrete Mathematics”, Second edition, Schaum's Outlines, Tata McGraw – Hill, 2007.

WEB RESOURCES

1. https://www.cs.cmu.edu/~emc/15414-f12/lecture/propositional_logic.pdf.
2. https://www.tutorialspoint.com/discrete_mathematics/discrete_mathematics_propositional_logic.htm
3. https://www.tutorialspoint.com/discrete_mathematics/discrete_mathematics_functions.htm
4. <http://discretemathnotes.blogspot.in/2008/08/groups.html>
5. <https://people.cs.pitt.edu/~milos/courses/cs441/lectures/Class25.pdf>

**II Year I Semester
Managerial Economics and Financial Analysis**

Course Category	Humanities including Management	Course Code	19HM3T01
Course Type	Theory	L-T-P-C	3 -0 -0-3
Prerequisites		Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OUTCOMES		Cognitive Level
On successful completion of the course, the student will be able to		
CO 1	Make use of the concepts of managerial economics and demand in managerial decision making and predicting demand for goods and services	K3
CO 2	Assess the functional relation among production, cost of production, cost concepts and Break-Even Analysis.	K5
CO 3	Classify market structures as perfect and imperfect markets for price and output decisions	K2
CO 4	Appraise the forms of business organizations and trade cycles in economic growth.	K5
CO 5	Apply accounting and capital budgeting techniques in financial decision making	K3

Contribution of Course Outcomes towards achievement of Program															
Outcomes: 1 – Low, 2 - Medium, 3 – High															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	3	-	-	-	-
CO3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	1	-	-	-	-

COURSE CONTENT :**UNIT – I**

Introduction to Managerial Economics and demand Analysis: Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Basic Economic Tools used in Managerial Economics-Concepts of Demand-Types-Determinants-Law of Demand its Exceptions-Elasticity of Demand-Types and Measurement- Law of Supply -Demand forecasting and Methods of demand forecasting.

UNIT – II

Production and Cost Analysis: Production function- Law of Variable proportions- Iso-quants and Isocosts-Laws of Returns to Scale-Cobb-Douglas Production function-Economies of Scale-Cost Concepts- Fixed vs Variable Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis-Determination of Break-Even Point (Simple Problems).

UNIT – III

Introduction to Markets: Market Structures: Perfect Competition, Monopoly, Monopolistic and Oligopoly – Features – Price and Output Determination.

Theories of the Firm & Pricing Policies: Managerial Theories of firm: Marris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT – IV

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

UNIT – V

Introduction to Accounting and Capital Budgeting: Introduction to Double Entry Systems-Journal-Ledger-Trail Balance - Preparation of Financial Statements

Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Need for Capital Budgeting-Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXTBOOKS:

1. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
2. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
3. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011

REFERENCE BOOKS :

1. V. Maheswari: Managerial Economics, Sultan Chand.
2. Suma Damodaran: Managerial Economics, Oxford 2011.
3. Prof. J.V.PrabhakaraRao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.
4. Vanitha Agarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.
6. Maheswari: Financial Accounting, Vikas Publications. 7. S. A. Siddiqui & A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012

WEB RESOURCES:

1. <https://economictimes.indiatimes.com/definition/law-of-supply>
2. <https://sites.google.com/site/economicsbasics/managerial-theories-of-the-firm>
3. <https://www.managementstudyguide.com/capitalization.htm>

**II Year I Semester
Python Programming Laboratory
(Common to CSE, IT)**

Course Category	Engineering Science	Course Code	19CS3L01
Course Type	Laboratory	L-T-P-C	0-0-3-1.5
Prerequisites	Exposure to Programming for Problem Solving using C Laboratory	Internal Assessment Semester End Examination Total Marks	25 50 75

COURSE OBJECTIVES

1	To introduce the usage of fundamental data structures like List, Tuples and Dictionaries.
2	To imbibe the philosophy of object oriented programming using Python
3	To perform file handling in python.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Develop python programs using conditional statements and expressions	K3
CO2	Apply List and String manipulations to solve given problem.	K3
CO3	Develop programs with Tuples and Dictionary data structures	K3
CO4	Develop Python programs using file concepts.	K3

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	-	2	3	3	2
CO2	3	2	1	1	1	-	-	-	-	-	-	2	3	3	2
CO3	3	2	1	1	1	-	-	-	-	-	-	2	3	3	2
CO4	3	2	2	3	3	-	-	-	-	-	-	2	3	3	2

COURSE CONTENT

1	a) Write a program to compute distance between two points taking input from the user																																				
	b) Light travels at 3 * 10 ⁸ meters per second. A light-year is the distance a light beam travels in one year. Write a program that calculates and displays the value of a light year.																																				
	c) The marks obtained by a student in 5 different subjects are input through the keyboard. Print the student SGPA as per the Pragati Engineering College examination policy as shown below. Assume all the five subjects have 3 credits																																				
	<table border="1"> <thead> <tr> <th>Theory (%)</th> <th>Letter Grade</th> <th>Level</th> <th>Grade Point</th> </tr> </thead> <tbody> <tr> <td>≥ 90</td> <td>O</td> <td>Outstanding</td> <td>10</td> </tr> <tr> <td>≥ 80 to < 90</td> <td>S</td> <td>Excellent</td> <td>9</td> </tr> <tr> <td>≥ 70 to < 80</td> <td>A</td> <td>Very Good</td> <td>8</td> </tr> <tr> <td>≥ 60 to < 70</td> <td>B</td> <td>Good</td> <td>7</td> </tr> <tr> <td>≥ 50 to < 60</td> <td>C</td> <td>Fair</td> <td>6</td> </tr> <tr> <td>≥ 40 to < 50</td> <td>D</td> <td>Satisfactory</td> <td>5</td> </tr> <tr> <td><40</td> <td>F</td> <td>Fail</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>Absent</td> <td>0</td> </tr> </tbody> </table>	Theory (%)	Letter Grade	Level	Grade Point	≥ 90	O	Outstanding	10	≥ 80 to < 90	S	Excellent	9	≥ 70 to < 80	A	Very Good	8	≥ 60 to < 70	B	Good	7	≥ 50 to < 60	C	Fair	6	≥ 40 to < 50	D	Satisfactory	5	<40	F	Fail	0			Absent	0
	Theory (%)	Letter Grade	Level	Grade Point																																	
	≥ 90	O	Outstanding	10																																	
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	≥ 50 to < 60	C	Fair	6																																	
≥ 40 to < 50	D	Satisfactory	5																																		
<40	F	Fail	0																																		
		Absent	0																																		
The SGPA is the ratio of sum of 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) = $\sum(C_i \times G_i) / \sum C_i$																																					
Where C _i is the number of credits of the i th course and G _i is the grade point scored by the student in the i th course.																																					

<p>2</p>	<p>a) Write a program to calculate the Income Tax as per the rules of Indian Government. b) Develop a program that performs arithmetic operations (Addition, Subtraction, Multiplication, and Division) on integers. Input the two integer values and operator for performing arithmetic operation through keyboard. The operator codes are as follows: •For code '+', perform addition. • For code '-', perform subtraction. • For code '*', perform multiplication. • For code '/', perform division. c) If the first name of a student is input through the keyboard, write a program to display the vowels and consonants present in his/her name.</p>
<p>3</p>	<p>a) The factorial of an integer N is the product of all of the integers between 1 and N, inclusive. Write a while loop that computes the factorial of a given integer N. b) The \log_2 of a given number N is given by M in the equation $N = 2^M$. The value of M is approximately equal to the number of times N can be evenly divided by 2 until it becomes 0. Write a loop that computes this approximation of the \log_2 of a given number N. c) The German mathematician Gottfried Leibniz developed the following method to approximate the value of π: $\pi/4 = 1 - 1/3 + 1/5 - 1/7 + \dots$ Write a program that allows the user to specify the number of iterations used in this approximation and that displays the resulting value.</p>
<p>4</p>	<p>a) A list of integers is said to be a valley if it consists of a sequence of strictly decreasing values followed by a sequence of strictly increasing values. The decreasing and increasing sequences must be of length at least 2. The last value of the decreasing sequence is the first value of the increasing sequence. Write a Python program that takes a list of integers and returns True if the list is a valley and False otherwise. Here are some examples to show how your program should work. [3,2,1,2,3] True [3,2,1] False [3,3,2,1,2] False b) Write a python program to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b. c) Two numbers r (number of rows) and c (number of columns) in a single line separated by a space. Print the Elements of the generated matrix. Each row should be printed in a new line with each element separated by a space. Also, the matrix should have elements starting from 1 to $r \times c$ with an increment of one in row manner.</p>
<p>5</p>	<p>a) Write a program to create a list 'A' to generate squares of a number (from 1 to 10), list 'B' to generate cubes of a number (from 1 to 10) and list 'C' with those elements that are even and present in list 'A', using List Comprehension. b) Demonstrate the usage of + operator, * operator and slicing operator on Tuples.</p>
<p>6</p>	<p>a) Write a program to read a text sentence from the user and create a dictionary with the number of occurrences of each word in the given sentence. Print the word which occurred more number of times in the sentence as output. b) Demonstrate Insert, Modify, Delete and Traversal of Dictionary.</p>
<p>7</p>	<p>a) Write a function eval_Quadratic_Equation(a,b,c,x) which returns the value of any quadratic equation of the form ax^2+bx+c b) Write a function calc_GCD_recur(a,b) which calculates the GCD recursively of two numbers. The function should take two positive integers and should an integer as GCD.</p>
<p>8</p>	<p>a) Write a program to create a class called Rectangle, with the method named Calc_Rect_Area() which takes the length and breadth as parameters and returns the computed area. Demonstrate the usage of the method Calc_Rect_Area() of class Rectangle. b) Write a program to create a class called Box with three member variables like width, height and depth. Provide the __init__() method for initialization. Also define the method calculate_volume() to compute and return the volume of the box. Demonstrate the usage of the method calculate_volume() of class Box.</p>
<p>9</p>	<p>a) Write a program to create a base class called Point. Define the method Set_Coordinate(X,Y). Define the new class New_Point, which inherits the Point class. Also add draw() method inside the subclass to display the x and y coordinate values. b) Write a simple program to demonstrate the concept of multilevel inheritance.</p>
<p>10</p>	<p>a) Write a program to generate a list of numbers which are multiples of 5 from 1 to 1000. Write all the odd numbers in this list to a file named 'OddMultiplesOffive.txt' and write all the even numbers in this list to file named 'EvenMultiplesOffive.txt' b) Write a function Find_Largest() which accepts a file name as parameter and reports the longest line in the input text file.</p>

II Year I Semester

Essence of Indian Traditional Knowledge

Course Category	Humanities including Management	Course Code	19HM3T06
Course Type	Theory	L-T-P-C	2 -0 -0-0
Prerequisites		Total Marks (Internal Assessment)	100

COURSE OUTCOMES		Cognitive Level
On successful completion of the course, the student will be able to		
CO 1	Understand the significance of Indian Traditional Knowledge.	K2
CO 2	Classify the Indian Traditional Knowledge	K4
CO 3	Compare Modern Science with Indian Traditional Knowledge system.	K5
CO 4	Analyze the role of Government in protecting the Traditional Knowledge	K4
CO 5	Understand the impact of Philosophical tradition on Indian Knowledge System.	K2

Contribution of Course Outcomes towards achievement of Program
Outcomes: 1 – Low, 2 - Medium, 3 – High

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	1	2	-	-	3	-	1	-	2	-	-
CO2	-	-	2	-	-	2	-	2	-	-	-	-
CO3	-	-	2	-	-	3	-	1	1	2	2	1
CO4	-	-	2	-	-	2	-	2	-	-	-	-
CO5	-	-	1	-	-	3	-	1	-	3	-	1

COURSE CONTENT**UNIT I**

Introduction to Traditional Knowledge: Define Traditional Knowledge- Nature and Characteristics- Scope and Importance- kinds of Traditional Knowledge- The historical impact of social change on Traditional Knowledge Systems- Value of Traditional knowledge in global economy.

UNIT II

Basic structure of Indian Knowledge System: Astadash Vidya- 4 Ved - 4 Upaved (Ayurved, Dhanurved, Gandharva Ved & Sthapthya Adi), 6 vedanga (Shisha, Kalppa ,Nirukha, Vyakaran, Jyothisha & Chand), 4 upanga (Dharmashastra, Meemamsa, purana & Tharka Shastra).

UNIT III

Modern Science and Indian Knowledge System-Indigenous Knowledge, Characteristics- Yoga and Holistic Health care-cases studies.

UNIT IV

Protection of Traditional Knowledge: The need for protecting traditional knowledge -Significance of Traditional knowledge Protection-Role of government to harness Traditional Knowledge.

UNIT V

Impact of Traditions: Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec, Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain & Boudh - Indian Artistic Tradition - Chitra kala, Moorthi kala, Vasthu kala , Sthapthya, Sangeetha, Nruthya Yevam Sahithya

REFERENCE BOOKS :

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and
3. Vipin Kumar Singh, Pratibha Prakashan 2012.
4. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya
5. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan
6. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata.
7. Pramod Chandra, India Arts, Howard Univ. Press, 1983.
8. Krishna Chaitanya, Arts of India, Abhinav Publications, 1987.

WEB RESOURCES:

1. https://www.wipo.int/wipo_magazine/en/2017/01/article_0004.html
2. <http://iks.iitgn.ac.in/wp-content/uploads/2016/01/Indian-Knowledge-Systems-Kapil-Kapoor.pdf>
3. https://www.wipo.int/edocs/mdocs/tk/en/wipo_grtkf_ic_21/wipo_grtkf_ic_21_ref_facilitators_text.pdf

**II Year II Semester
Object Oriented Programming through Java**

Course Category	Professional Core	Course Code	19CS4T05
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Exposure to Programming for Problem Solving using C	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	To understand how to use Java to write applications.
2	To impart primitive data types in Java and programming constructs.
3	To make use of Java Classes and Objects, methods and constructors.
4	To understand the concepts of Inheritance, Interfaces and Packages.
5	To implement Java programs using exceptions and multithreading.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Apply the fundamentals of Java to solve problems	K3
CO2	Differentiate the application of decision and iteration control structures	K2
CO3	Implement classes and method overloading concepts	K3
CO4	Apply the concepts of inheritance and packages	K3
CO5	Implement Java programs using exceptions and multithreading	K3

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	-	-	-	-	-	-	-	3	3	2
CO2	3	3	3	2	3	-	-	-	-	-	-	-	3	3	2
CO3	3	3	3	3	3	-	-	-	-	-	-	-	3	3	2
CO4	3	3	3	3	3	-	-	-	-	-	-	-	3	3	2
CO5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	2

COURSE CONTENT**UNIT I**

Introduction to JAVA: The History of Java, Java Virtual Machine, Java Buzzwords, Evolution of Java, An overview of Java, Object Oriented Programming and its principles, First Java Program, Lexical Issues-Identifiers, Java Keywords, Java Primitive Data types, Variables, Type Conversion and Casting, Arrays.

Programming Constructs: Operators- Arithmetic, Bitwise, Relational, Boolean Logical, Assignment, ? Operator, Operator Precedence, Control Statements – Selection, Iteration and Jump Statements.

UNIT II

Classes and Objects:Class Fundamentals, declaring Objects, Introducing Methods, Constructors, The this Keyword, Garbage collection.

A Closer look at Methods and Classes: Overloading Methods, using objects as parameters, returning objects, Introducing Access Control, Understanding static, introducing final, Nested and Inner Classes, Exploring the String class, using Command-Line Arguments.

UNIT III

Inheritance: Types of Inheritance, Using super, Method Overriding, Using Abstract class, Using final with Inheritance.

Interfaces & Packages: Interfaces, Multiple Inheritance Issues, Defining a Package, Finding Packages and CLASSPATH, Access protection, Importing packages, package example, Introducing to *java.lang* and *java.io* packages.

UNIT IV

Exceptions: Introduction, Exception handling fundamentals, Exception types, using try and catch, Multiple catch clauses, nested try statements, throw, throws, finally block, Java's Built-in-Exceptions, user defined exception, Chained Exceptions, using Exceptions.

UNIT V

Multi-Threading: The Java Thread Model, the Main Thread, Creating a Thread, Multiple threads, Using isAlive() and join(), Thread priorities, Synchronization, Interthread Communication, Suspending, Resuming threads and Stopping Threads, using Multithreading.

TEXT BOOKS

1. The Complete Reference Java, 9ed, Herbert Schildt, TMH
2. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Second Edition, Oxford.

REFERENCE BOOKS

1. Object oriented programming with JAVA, Essentials and Applications, Raj Kumar Buyya, Selvi, Chu TMH
2. Core Java Volume 1.Fundamentals, 8ed, Cay S.Horstmann, Gray Cornell, Pearson.
3. Advanced Programming in Java2: Updated to J2SE6 with Swing, Servlet and RMI, K.Somaundaram.

WEB RESOURCES

1. <https://nptel.ac.in/courses/106105191/>
2. <https://docs.oracle.com/javase/tutorial/java/index.html>
3. <https://www.w3schools.com/java/>

**II Year II Semester
OPERATING SYSTEMS
(Common to CSE and IT)**

Course Category	Professional Core	Course Code	19IT4T06
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites		Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES	
1	To introduce the structure and functions of Operating Systems.
2	To impart process, disk and memory management.
COURSE OUTCOMES	
Upon successful completion of the course, the student will be able to:	
CO1	Classify the operating system services.
CO2	Evaluate Scheduling algorithms for process management.
CO3	Compare various memory management schemes.
CO4	Illustrate process synchronization techniques to avoid deadlocks.
CO5	Analyze the structure of file systems on secondary storage devices.
	BTL
	K2
	K4
	K2
	K2
	K4

Contribution of Course Outcomes towards achievement of Program															
Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	2	-	1	-	-	-	-	-	-	-	1	-	-
CO2	2	2	-	1	-	-	-	-	-	-	-	-	1	-	-
CO3	2	2	-	-	3	-	-	-	-	-	-	-	1	1	-
CO4	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	3	2	3	-	-	-	-	-	-	-	2	-	-

COURSE CONTENT**UNIT I**

Operating System Overview: Operating systems objectives and functions, evolution of operating systems, system calls, types of system calls.

UNIT II

Process Management: Process concept – The process, process state diagram, process control block, process scheduling – scheduling queues, schedulers, context switch, operations on processes, inter-process communication, multithreading models, threading issues, scheduling – basic concepts, scheduling criteria, scheduling algorithms.

UNIT III

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

Virtual Memory Management: Virtual memory, demand paging, page-replacement algorithms, thrashing

UNIT IV

Concurrency: Process synchronization, the critical-section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, monitors, synchronization examples

Principles of deadlock: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock

UNIT V

File system Interface: The concept of a file, access methods, directory structure, file system mounting, files sharing, protection.

File System Implementation: File system structure, allocation methods, free-space management, secondary storage structure – overview of mass-storage structure, disk scheduling and algorithms

TEXT BOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", John Wiley and Sons Inc., 8th Edition, 2012.
2. William Stallings, "Operating Systems – Internals and Design Principles", Prentice Hall, 7th Edition, 2011.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, "Modern Operating Systems", Addison Wesley, 2nd Edition, 2001.
2. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata Mc Graw Hill Education", 1996.
3. D M Dhamdhere, "Operating Systems: A Concept-Based Approach", Tata Mc Graw-Hill Education, 2nd Edition, 2007.

WEB RESOURCES

1. <http://nptel.ac.in/courses/106108101> (Prof. P.C.P. Bhatt, IISc Bangalore)
2. https://www.tutorialspoint.com/operating_system/

II Year II Semester
DATABASE MANAGEMENT SYSTEMS
 (Common to CSE and IT)

Course Category	Professional Core	Course Code	19IT4T02
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites		Internal Assessment	30
		Semester End Examination	70
		Total Marks	100

COURSE OBJECTIVES

1	To impart theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.
2	To familiarize logical design, physical design and implementation of relational databases.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		BTL
CO1	Understand database system architecture, data models and construct Entity-Relationship diagrams.	K2
CO2	Write queries using Relational algebra, SQL	K3
CO3	Design a database with understanding on Normalization.	K3
CO4	Apply indexing techniques on relations and store data as per some RAID levels.	K3
CO5	Understand Transactions and their concurrency issues, protocols.	K2

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2	-	-	-	-	-	-	-	-	-	1	3	-
CO2	2	3	3	1	-	-	-	-	1	-	-	1	1	1	2
CO3	1	1	2	1	1	-	-	-	1	-	-	1	1	1	1
CO4	3	3	1	3	-	-	-	-	1	-	-	1	1	1	2
CO5	3	3	1	3	1	1	-	-	1	1	-	1	1	1	2

COURSE CONTENT**UNIT I**

Overview & Introduction to Database Design: Managing data, File systems versus a DBMS, advantages of a DBMS, describing and storing data in a DBMS, Database system structure, Database Design and ER Diagrams, Entities, Attributes, Entity sets, Relationship, Relationship sets, additional features of the ER Model, Conceptual Design with the ER Model

UNIT II

The Relational Model: Introduction to Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER Relational, Introduction to Views, Destroying/ Altering Tables and views

Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational Calculus, Expressive power of Algebra Calculus

UNIT III

SQL - Queries, Constraints, Triggers: Overview, the form of a basic SQL query, UNION, INTERSECT, EXCEPT, nested queries, aggregate Operators, NULL values, complex integrity constraints in SQL, Triggers and Active

Databases.

Schema Refinement and normal Forms: Introduction to schema refinement, functional dependencies, normal forms, Properties of Decompositions, Normalizations.

UNIT IV

Overview of Storage and Indexing: Database files organizations and Indexing, Index Data Structures,

Storing Data: Disks and Files, Redundant Arrays of Independent Disks

Tree- Structured Indexing: Indexed sequential access Method (ISAM), B+ Trees- Search, Insert, Delete Operations

Hash-Based Indexing: Static hashing, Extendible Hashing, Linear Hashing

UNIT V

Overview of Transaction Management: Acid Properties, Transactions and Schedules, Concurrent Execution of Transactions

Concurrency Control: 2PL, Serializability, Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks, Concurrency Control without Locking

Crash Recovery: Introduction to ARIES, The log, other recovery-related structures, the Write-Ahead Log Protocol, Check Pointing, Recovering from a System Crash

TEXT BOOKS

1. Raghuram Krishnan, Johannes Gehrke “Database Management Systems”, 3/e, Mc GrawHill, 2003.
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “Database. System Concepts”, Sixth Edition, McGraw Hill Education, 2010.
3. Ramez Elmasri, Shamkant B. Navathe, “Database Systems”, 6/e Kindle.

REFERENCE BOOKS

1. C.J. Date, “Introduction to Database Systems”, 8/e, Pearson Education, 2006.
2. Corlos Coronel, Steven Morris, Peter Robb, “Database Principles Fundamentals of Design Implementation and Management, Cengage Learning.

WEB RESOURCES

1. <http://www.myreadingroom.co.in/notes-and-studymaterial/65-dbms/534-concurrency-control-with-locking.html>
2. http://www.service-architecture.com/articles/database/concurrency_control_and_locking.html
3. <http://codex.cs.yale.edu/avi/db-book/db4/slide-dir/ch1-2.pdf>
4. <https://www.techopedia.com/definition/24361/database-management-systems-dbms>
5. <http://www.myreadingroom.co.in/notes-and-studymaterial/65-dbms/534-concurrency-control-with-locking.html>

**II Year II Semester
Computer Organization
(Common to CSE, IT)**

Course Category	Professional Core	Course Code	19CS4T06
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Exposure to Digital Logic Design	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES

1	To understand the internal organization and operations of a computer functional units.
2	To familiarize with the single and multiprocessor design architectures.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		BTL
CO1	Identify the architecture and data types of modern computer.	K2
CO2	Apply Register Transfer Language to perform micro-operations and instructions	K3
CO3	Illustrate the CPU operations to deal with computer arithmetic.	K2
CO4	Compare memory mapping techniques in a computer.	K4
CO5	Outline interfacing of input- output devices in single and multi processor systems	K2

Contribution of Course Outcomes towards achievement of Program**Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	1	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT**UNIT I**

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures.

Data Representation: Data types, complements, fixed point representation, floating – point representation, other binary codes, Error detection codes.

UNIT II

Register Transfer Language, Micro-operations: Register transfer language. Register transfer bus and memory transfers, arithmetic micro operations, logic micro operations, shift micro operations, arithmetic logic shift unit.

Basic Computer Organization and Design: Stored Program Organization, Computer Registers Instruction Cycle, Memory – Reference Instructions, Input – Output and Interrupt.

UNIT III

Central Processing Unit: General register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation.

Computer Arithmetic: Fixed point Arithmetic- Addition, subtraction, multiplication and division algorithms.

UNIT IV

The Memory System: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory.

UNIT V

Input-Output Organization: Peripheral devices, Input-Output Interface, Asynchronous data transfer - Strobe Control and Hand Shaking, Modes of transfer, priority interrupts, direct memory access.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures.

TEXT BOOKS

1. Computer Organization, Carl Hamacher, ZvonksVranesic, SafeaZaky, 5/e, McGraw Hill.
2. Computer System Architecture, M.Morris Mano, 3/e, Pearson/PHI

REFERENCE BOOKS

1. Computer Organization and Architecture – William Stallings, 6/e, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4/e, PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int.

WEB RESOURCES

1. https://www.tutorialspoint.com/videos/computer_organization/index.htm
2. <http://nptel.iitm.ac.in/video.php?subjectId=106106092>
3. <https://www.reference.com/technology/computer-organization-36c3a064b20f9b33>

**II Year II Semester
Formal Languages and Automata Theory
(Common to CSE, IT)**

Course Category	Professional Core	Course Code	19CS4T07
Course Type	Theory	L-T-P-C	3-0-0-3
Prerequisites	Exposure to Mathematical Foundations of Computer Science	Internal Assessment Semester End Examination Total Marks	30 70 100

COURSE OBJECTIVES		
1	To understand various types of finite automata	
2	To understand the grammar and PDA Push Down Automata for a given language	
3	To impart the comprehensive knowledge of Turing Machine	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		Cognitive Level
CO1	Apply core concepts of automata theory and Formal Languages	K3
CO2	Compare different types of Finite Automata and Transducers	K2
CO3	Solve Regular Expressions and Simplification of Context Free Grammars	K3
CO4	Construct Pushdown automata for formal languages	K3
CO5	Construct Turing Machines and List the undecidable problems	K3

Contribution of Course Outcomes towards achievement of Program

Outcomes (1 – Low, 2 - Medium, 3 – High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	1	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	1	1	-	-	-	-	-	-	-	-	-	-
CO3	2	3	2	2	1	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	1	1	-	-	-	-	-	-	-	-	-	-
CO5	2	2	3	2	1	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT

UNIT I

Fundamentals of Automata: Finite State Machine, Components of Finite State Automata, Elements of Finite State System, Mathematical representation of Finite State Machine

Formal Language Theory: Symbols, Alphabets and Strings, Operations on Strings, Formal Languages, Operations on Languages

UNIT II

Finite Automata: Deterministic Finite Automata(DFA), Non Deterministic Finite Automata(NFA), Non-Deterministic Automata with ϵ -moves, Equivalence of NFA/NFA- ϵ and DFA

Transducers: Moore Machine, Mealy Machine, Equivalence of Moore and Mealy Machines.

UNIT III

Regular Expressions: Regular Languages, Properties of Regular Expressions, Arden's theorem, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma for Regular Languages(RL) Closure Properties of RL.

Context Free Grammar: Formal Definition of CFG, Types of Grammars, Derivation Tree, Ambiguous Grammars, Simplification of CFG, Chomsky Normal Form and Greibach Normal Form, Pumping Lemma for Context Free Languages(CFL), Closure Properties of CFL.

UNIT IV

Pushdown Automata: The formal definition of PDA, Graphical Notation for PDA, Instantaneous Descriptions of PDA, The languages of PDA.

UNIT V

Turing Machine: Components of a TM, Description of a TM, Elements of TM, Instantaneous Descriptions of a TM, Design of Turing Machines

Undecidability: Un-decidable Problem, P and NP Classes of Languages.

TEXT BOOKS

1. Introduction to Automata Theory, languages and computation, John E Hopcroft, Rajeev Motwani, Jeffery D Ullman , 3rd Edition, Pearson Education.
2. A Text Book on Automata Theory, P.K. Srimani, Nasir S.F.B, Cambridge university Press

REFERENCE BOOKS

1. Theory of Computer Science Automata Language and Computation, 3rd edition K. L P Mishra, N.Chandra Sekharan
2. Theory of Computation , a problem solving approach, kavi Mahesh, Wiley

WEB RESOURCES

1. <http://nptel.ac.in/courses/106106049/>
2. <https://www.iitg.ernet.in/dgoswami/Flat-Notes.pdf>
3. <http://www.ics.uci.edu/~goodrich/teach/cs162/notes/>
4. https://www.tutorialspoint.com/automata_theory/automata_theory_tutorial.pdf
5. <http://freevidelectures.com/Course/3379/Formal-Languages-and-Automata-Theory>

II Year II Semester
Object Oriented Programming through Java Laboratory
(Common to CSE, IT)

Course Category	Professional Core	Course Code	19CS4L04
Course Type	Laboratory	L-T-P-C	0-0-3-1.5
Prerequisites	Exposure to Programming for Problem Solving using C	Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

COURSE OBJECTIVES		
1	To understand how to use Java to write applications.	
2	To impart primitive data types in Java and programming constructs.	
3	To make use of Java Classes and Objects, methods and constructors.	
4	To understand the concepts of Inheritance, Interfaces and Packages.	
COURSE OUTCOMES		
Upon successful completion of the course, the student will be able to:		
	Cognitive Level	
CO1	Implement object oriented concepts using Java	K3
CO2	Apply the concepts of inheritance and packages.	K3
CO3	Implement Java programs using exceptions and multithreading.	K3

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	2	2	3	3	3	-	-	-	-	-	-	-	3	3	2	
CO2	2	2	3	3	3	-	-	-	-	-	-	-	3	3	2	
CO3	2	2	3	3	3	-	-	-	-	-	-	-	3	3	2	

COURSE CONTENT																
1	A) Write a JAVA program to display default value of all primitive data types of JAVA B) Write a JAVA program to highlight the even numbers in the Fibonacci sequence using recursive and non recursive functions.															
2	A) Write a JAVA program to check the number of words which satisfies the palindrome condition in the given string. Example String: “Our Java subject madam is non local”. B) Write a JAVA program to sort prices of all the given items as per 2017 price: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Grocery item</th> <th>2007 price</th> <th>2017 price</th> </tr> </thead> <tbody> <tr> <td>Pasta</td> <td>52</td> <td>128</td> </tr> <tr> <td>Dried beans</td> <td>72</td> <td>132</td> </tr> <tr> <td>Ground beef</td> <td>130</td> <td>250</td> </tr> <tr> <td>All-purpose flour</td> <td>40</td> <td>95</td> </tr> </tbody> </table>	Grocery item	2007 price	2017 price	Pasta	52	128	Dried beans	72	132	Ground beef	130	250	All-purpose flour	40	95
Grocery item	2007 price	2017 price														
Pasta	52	128														
Dried beans	72	132														
Ground beef	130	250														
All-purpose flour	40	95														
3	A) Write a JAVA program to display the sum of the arguments passed through command line and also print “can’t do addition” if any of the argument is a string. B) Write a JAVA program to sort an array of strings from the given input excluding the Integer values from the input.															
4	A) Write a JAVA program to swap two numbers using call by value and call by reference. B) Write a JAVA program to calculate the area of a rectangle using “this” keyword having three different parameterized constructors.															

5	<p>A) Write a JAVA program to compute the area of a circle using static variables, methods and block. B) Write a JAVA program to calculate the volume of a shape selected using 'super' keyword</p>
6	<p>A) Write a JAVA program assuming there is a method getInterestRate() which returns the interest rate of a bank. RBI is the superclass and it returns 7 for getInterestRate(). There are various banks like SBI, AXIS, ICICI, etc which extend RBI class and override the getInterestRate() method to return 7.5, 8, 8.5, etc respectively using Method overloading, method overriding and constructor overloading. B) Write a JAVA program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea() that prints the area of the given Shape.</p>
7	<p>A) Write a JAVA program that implements educational hierarchy using inheritance.</p> <div style="text-align: center;"> <pre> classDiagram class Admin_Office { empno: empname: salary: cellno: getSalary() } class Teaching { empno: empname: salary: department: getDepartment() } class Unnamed { empno: empname: cellno: getName() } Admin_Office < -- Teaching Admin_Office < -- Unnamed </pre> </div> <p>B) Write a JAVA program to find the details of the students eligible to enroll for the examination (Students, Department combined give the eligibility criteria for the enrollment class) using interfaces.</p> <div style="text-align: center;"> <pre> classDiagram class Students { sno: sname: class: getvalue() } class Department { sno: attendense: getattendense() } class Exam { calattendese() bool eligible() } Students < -- Exam Department < -- Exam </pre> </div>
8	<p>A) Write a program to identify the accessibility of a variable by means of different access specifiers within and outside package. B) Write a JAVA program to create a package named my pack and import it in circle class.</p>
9	<p>A) Write a java program that implements Array Index out of bound Exception using built-in-Exception. B) Write a JAVA program to check a person is eligible for vote or not using user defined exception</p>
10	<p>A) Write an application that displays deadlock between threads. B) Write an application that executes two threads. One thread displays "An" every 1000 milliseconds and other displays "B" every 3000 milliseconds. Create the threads by extending the Thread class.</p>

**II Year II Semester
OPERATING SYSTEMS LABORATORY**

Course Category	Professional Core	Course Code	19IT4L05
Course Type	Laboratory	L-T-P-C	3-0-0-1.5
Prerequisites		Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

COURSE OBJECTIVES

1 To provide an understanding of the design aspects of operating system.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

Cognitive Level

CO1	Stimulate CPU scheduling algorithms in operating system.	K3
CO2	Evaluate memory management techniques in operating system.	K3
CO3	Implement page replacement algorithms in operating system.	K3
CO4	Illustrate process concurrency.	K3
CO5	Implement file allocation strategies used in operating system.	K3

**Contribution of Course Outcomes towards achievement of Program
Outcomes (1 – Low, 2 - Medium, 3 – High)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	-	-	-	-	2	-	-	1	2	3	3
CO2	2	2	2	2	-	-	-	-	2	-	-	1	2	3	3
CO3	2	2	2	2	-	-	-	-	1	-	-	1	2	3	3
CO4	2	1	1	2	-	-	-	-	1	-	-	1	2	3	3
CO5	2	2	2	1	-	-	-	-	2	-	-	1	2	2	3

COURSE CONTENT**LIST OF EXPERIMENTS**

- 1 Simulate the following CPU scheduling algorithms
a) Round Robin b) Shortest Job First c) Priority
- 2 Multiprogramming-Memory management- Implementation of fork (), wait (), exec() and exit(), System calls
- 3 Simulate the following
a) Multiprogramming with a fixed number of tasks (MFT)
b) Multiprogramming with a variable number of tasks (MVT)
- 4 Simulate Bankers Algorithm for Dead Lock Avoidance
- 5 Simulate Bankers Algorithm for Dead Lock Prevention.
- 6 Simulate the following page replacement algorithms.
a) First In First Out b) Least Recently Used
- 7 Simulate the following File allocation strategies
a) Sequenced b) Indexed

II Year II Semester
DATABASE MANAGEMENT SYSTEMS LABORATORY
(Common to CSE and IT)

Course Category	Professional Core	Course Code	19IT4L02
Course Type	Laboratory	L-T-P-C	0-0-3-1.5
Prerequisites		Internal Assessment	25
		Semester End Examination	50
		Total Marks	75

COURSE OBJECTIVES		
1	To impart database design, query and PL/SQL.	
COURSE OUTCOMES		Cognitive Level
Upon successful completion of the course, the student will be able to:		
CO1	Make use of DDL and DML commands for Database design and manipulation	K3
CO2	Utilize Sub-Query, Nested Query and Joins concepts in a given problem-domain	K3
CO3	Apply Built-in functions on Database	K3
CO4	Develop programs in PL/SQL with Procedures, Functions, Cursors, Packages.	K3

Contribution of Course Outcomes towards achievement of Program															
Outcomes (1 – Low, 2 - Medium, 3 – High)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	3	3	-	-	-	-	-	-	-	3	2	1
CO2	2	2	3	2	3	-	-	-	-	-	-	-	3	1	3
CO3	2	-	3	2	2	-	-	-	-	-	1	1	1	3	3
CO4	3	1	3	3	3	-	1	-	1	1	1	1	3	2	3

COURSE CONTENT															
LIST OF EXPERIMENTS															
1 Creation, altering and dropping 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, INTERSECT, Constraints. Example: Select the roll number and name of the student who secured fourth rank in the class.															
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), dateFunctions (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 Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.															
11 Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.															
12 Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.															

**II Year II Semester
Constitution of India
(Common to all branches)**

Course Category	Humanities including Management	Course Code	19HM4T0
Course Type	Theory	L-T-P-C	2 -0 -0-0
Prerequisites		Total Marks (Internal Assessment)	100

COURSE OUTCOMES		Cognitive Level
On successful completion of the course, the student will be able to		
CO 1	Understand the evolution of Constitution of India	K2
CO 2	Make use of their Fundamental rights.	K3
CO 3	Understand the functioning of the Union Government	K2
CO 4	Understand the functioning of the State and local self Government.	K2
CO 5	Understand the value of Indian Constitution in functioning of the country.	K2

Contribution of Course Outcomes towards achievement of Program

Outcomes: 1 – Low, 2 - Medium, 3 – High

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	3	-	1	-	2
CO2	-	-	-	-	-	1	-	2	1	1	-	1
CO3	-	-	-	-	-	1	-	1	1	1	-	-
CO4	-	-	-	-	-	1	-	1	1	1	-	-
CO5	-	-	-	-	-	1	1	1	1	1	-	2

COURSE CONTENT :

UNIT – I

Introduction to Indian constitution: Meaning of the term constitution - History and development – Preamble of the Constitution – Constituent Assembly – The salient features of Indian Constitution.

UNIT –II

Fundamental Rights and Directive principles of state policy: Individual and Collective Rights – Limitations of the fundamental Rights – Judicial Interpretation of Fundamental Rights.

UNIT –III

Union Government: Union Legislature – Lok sabha and Rajya sabha (powers and functions) – President of India (powers and functions) – Prime minister of India (powers and functions) – Union Judiciary (supreme court powers and functions).

UNIT – IV STATE AND LOCAL SELF GOVERNMENT:

State Government: State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council / Vidhan Parishad) – Powers and functions of state legislature – The Chief Minister of the state (powers and functions)

Local Self Government: Election commission of India (Powers and Functions)- The Union Public Service Commission (Powers and Functions)

UNIT – V WORKING OF THE INDIAN CONSTITUTION

The values of the Indian Constitution and Ushering of Social Revolution in India – Nature and Role of Higher Judiciary in India – Amendments (Recent)

REFERENCE BOOKS :

1. 'Indian Polity' by Laxmikanth
2. 'Indian Administration' by Subhash Kashyap
3. 'Indian Constitution' by D.D. Basu
4. 'Indian Administration' by Avasti and Avasti

WEB RESOURCES:

1. <https://www.clearias.com/historical-background-of-indian-constitution/>
2. <https://www.civilserviceindia.com/subject/General-Studies/notes/functions-and-responsibilities-of-the-union-and-the-states.html>
3. https://www.tutorialspoint.com/indian_polity/indian_polity_how_constitution_works