



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ACADEMIC REGULATIONS FOR B.TECH (REGULAR)

Applicable for the students of B.Tech (Regular) Admitted from the academic year 2016-2017.

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.

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 four and for not more than eight academic years.

The candidate shall register for 180 credits and secure all the 180 credits.

2. COURSES OF STUDY

The following courses of study are offered at present as specializations for the B.Tech course with English as medium of instruction.

S.No.	Branch / Course
1.	Civil Engineering (CE)
2.	Electrical and Electronics Engineering (EEE)
3.	Mechanical Engineering (ME)
4.	Electronics and Communications Engineering (ECE)
5.	Computer Science and Engineering (CSE)
6.	Information Technology (IT)

3. MINIMUM INSTRUCTIONS DAYS.

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

4. PROGRAMME/ COURSE CREDITS

Each discipline / course of the four year B.Tech programme is designed to have a total of 180 credits. Depending upon the nature of each subject and the number of periods of instruction whether it is theory, laboratory, drawing etc., weightages are given in terms of number of credits. See course structure for details.

5. ATTENDANCE REQUIREMENTS :

A student is eligible to appear for the End semester examinations only if he puts in a minimum of 75% of attendance in aggregate of all the subjects.

Condonation of shortage of attendance in the aggregate upto 10% (65% and above and below 75%) in each semester may be granted by a committee appointed for this purpose, after getting satisfied that the absence is due to genuine reasons.

Shortage of attendance below 65% in aggregate shall not be condoned.

A student who has shortage of attendance in a semester may seek readmission in to the course when offered next.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

A fee stipulated by the college shall be paid along with the application for the Condonation of shortage of attendance.

Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations and the registration shall stand cancelled.

6. DISTRIBUTION AND WEIGHTAGE OF MARKS

The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks. 40 marks for internal evaluation and 60 marks for the end examination have been earmarked. The Project Work shall be evaluated for 200 marks. The mini project/Term Paper/Seminar has a weightage of 50 marks and evaluated internally.

Depending upon the nature of the subject, the distribution and weightages for internal and external assessment are as detailed below:

Theory Subjects

i. Internal assessment : 40 marks

- For the Mid examinations there shall be two tests, one conducted in the middle and the other at the end of each semester. The duration of each test is two hours. The question paper contains **Part-A** and **Part-B**. Part-A consists of three questions. Out of three questions two questions carry seven marks and one question carry six marks. Part-B consists of twenty objective type questions each carry half mark. Answering all questions is compulsory.
- Students shall submit assignments at the end of each unit in the syllabus and the marks allotted for the assignments is 10.
- The formula for finding the total marks of internal assessment (40 marks) = $0.80 \times$ higher marks scored between the two internal tests + $0.20 \times$ marks scored in the other test + marks for the assignments.

ii. External assessment :

- The end semester examination is of 3 hours duration and contains **Part A** and **Part B**. It covers all the topics in all the 6 units and the weightage is 60 marks.
- Part A consists of 6 short questions each carrying 2 marks ($6 \times 2 = 12$ marks). These 6 questions are compulsory and cover all the 6 units in the syllabus.
- Part B consists of 6 essay type / numerical questions, One question is set from each unit in the syllabus. Some questions may have sub sections. The student has to answer 4 out of 6 questions, each question with a weightage of 12 marks ($4 \times 12 = 48$ marks).

Laboratory Courses

i. Internal assessment : 40 marks

There shall be continuous evaluation during the semester for 40 marks as shown below:

Day-to-Day work and laboratory record	-	25 marks
One internal test at the end of the semester	-	15 marks
Total	-	40 Marks

ii. External Assessment :



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

At the end of the semester an examination for 3 hours duration shall be conducted for 60 marks by the concerned teacher and an external examiner.

Subjects such as Engineering Graphics, Engineering Drawing, Machine Drawing, Design and Drawing of R.C. Structures, Steel structures, Irrigation structures, Estimation cost and valuation, Building Planning and Drawing etc.

i. Internal assessment : 40 marks

a) There shall be continuous evaluation with a weightage of 40 marks as shown below:

Day-to-Day work - 20 marks

b) 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 = $0.8 \times$ higher marks scored between the two tests

+ $0.2 \times$ marks scored in the other test. - 20 marks

Total - **40 Marks**

ii. External assessment :

Same as for theory subjects given in 6.1.ii.

Mini Project /Term paper

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

Project

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.

Seminar

For the Seminar, Each student has to be evaluated based on the presentation of any latest topic with a report of 10-15 pages and a power point presentation of minimum 10 slides. The student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

7. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned under rule 5.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

A Student is deemed to have satisfied the minimum academic requirements if he has **earned the credits allotted to each theory / practical design / drawing subject 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.**

A Student is deemed to have satisfied the minimum academic requirements if he has **earned the credits allotted to each laboratory / project by securing not less than 40% of marks in the end semester exam, and minimum 50% of marks in the sum total of the internal marks and end semester examination marks.**

A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to mini project/term paper and seminar by securing not less than 50% of Marks.

A student shall register and put in minimum attendance in all 180 credits and earn all 180 credits.

8. COURSE PATTERN

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

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.

When a student is detained due 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.

9. PROMOTION TO NEXT HIGHER CLASS

A Student shall be promoted from 1st year to II year if he fulfills the minimum attendance requirement under rule 5.

A Student shall be promoted from II year to III year, if he fulfills the academic requirement of 50% of the credits upto 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.

A student shall be promoted from III year to IV year if he fulfills the academic requirements of 50% of the credits upto 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.

10. CUMULATIVE GRADE POINT AVERAGE (CGPA)

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



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

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.

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

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.,

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

- 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 = $(\text{CGPA} - 0.75) \times 10$

11. 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 180 credits
First Class with Distinction	≥ 7.75 (Without any Supplementary Appearance)	
First Class	≥ 6.75 to < 7.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 4.75 to < 5.75	

12. WITHHOLDING OF RESULTS :

If the students has not paid the dues, if any, to the college or if any case of indiscipline or malpractice is pending against him, the examination results of the student will be withheld.

13. TRANSITORY REGULATIONS:

For Re-admitted Candidates:

- A student who is following JNTUK curriculum and detained due to shortage of attendance at the end of the first semester of first year shall join the autonomous batch of first year first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with regular candidates of Autonomous stream and will be governed by the autonomous regulations.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

- ii. A student who is following JNTUK curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of first year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the Programme prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree.
- iii. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects will be offered in place of them as decided by the Board of Studies.
- iv. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.
- v. In case the students who do not have option of acquiring required credits with the existing courses offered as per the curriculum under autonomy, credit balance can be achieved by clearing the additional courses offered. The additional courses that are offered can be of theory or laboratory courses.

Transfer candidates (from non-autonomous college affiliated to JNTUK):

- i) A student who is following JNTUK curriculum, transferred from other college to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the Programme prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree.
- ii) However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies.
- iii) The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be the sum of the credits upto previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.
- iv) In case the students who do not have option of acquiring required credits with the existing courses offered as per the curriculum under autonomy, credit balance can be achieved by clearing the additional courses offered. The additional courses that are offered can be of theory or laboratory courses.

Transfer candidates (from an autonomous college affiliated to JNTUK):

- i) A student who has secured the required credits upto previous semesters as per the regulations of other autonomous institutions shall also be permitted to be transferred to this college.
- ii) A student who is transferred from the other autonomous colleges to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

Programme prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree.

- iii) However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The total number of credits to be secured for the award of the degree will be the sum of the credits upto previous semester as per the regulations of the college from which he is transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.
- iv) In case the students who do not have option of acquiring required credits with the existing courses offered as per the curriculum under autonomy, credit balance can be achieved by clearing the additional courses offered. The additional courses that are offered can be of theory or laboratory courses.

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 2017-18.

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.

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 132 credits and secure all the 132 credits.

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

3. PROMOTION RULES

A Student shall be promoted from II year to III year, if he fulfills the minimum attendance requirement under rule 5 of B.Tech (Regular).

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 132 credits
First Class with Distinction	≥ 7.75 (Without any Supplementary Appearance)	
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.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

GENERAL:

- i) Whenever the words “he”, “him”, “his” secure in the regulations, they include “she”, “her”, “hers”.
- ii) The academic rules and regulations should be read as a whole for the purpose of interpretation.
- iii) In case of any doubt or ambiguity in the interpretation of rules, the decision of the Principal of the college is final.
- iv) 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.

MALPRACTICES RULES

The rules laid down in JNTUK R16 regulations will be followed into too.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE STRUCTURE

I Year– I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH1T01	English – I	4	-	-	3
2	16BH1T03	Mathematics – I	4	-	-	3
3	16BH1T04	Mathematics – II (Mathematical Methods)	4	-	-	3
4	16BH1T10	Applied Physics	4	-	-	3
5	16CS1T01	Computer Programming using C	4	-	-	3
6	16ME1T02	Engineering Drawing	4	-	-	3
7	16BH1L01	English - Communication Skills Lab - 1	-	-	3	2
8	16BH1L03	Engineering/Applied Physics Lab	-	-	3	2
9	16BH1L04	Engineering/Applied Physics – Virtual Labs	-	-	3	-
10	16CS1L01	C Programming Lab	-	-	3	2
Total Credits						24

I Year–II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH2T02	English – II	4	-	-	3
2	16BH2T06	Mathematics - III	4	-	-	3
3	16BH2T12	Applied Chemistry	4	-	-	3
4	16IT2T01	Object Oriented Programming through C++	4	-	-	3
5	16BH2T13	Environmental Studies	4	-	-	3
6	16EC2T02	Basic Electrical & Electronics Engineering	4	-	-	3
7	16BH2L05	Engineering/Applied Chemistry Laboratory	-	-	3	2
8	16BH2L02	English - Communication Skills Lab – II	-	-	3	2
9	16IT2L01	Object Oriented Programming Lab	-	-	3	2
Total Credits						24



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

II Year–I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH3T07	Statistics with R Programming	4	-	-	3
2	16EC3T08	Digital Logic Design	4	-	-	3
3	16CS3T02	Mathematical Foundations of Computer Science	4	-	-	3
4	16IT3T02	Python Programming	4	-	-	3
5	16CS3T03	Data Structures through C++	4	-	-	3
6	16IT3T03	Software Engineering	4	-	-	3
7	16CS3L02	Data Structures through C++ Lab	-	-	3	2
8	16IT3L02	Python Programming Lab	-	-	3	2
Total Credits						22

II Year–II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH4T14	Managerial Economics and Financial Analysis	4	-	-	3
2	16CS4T06	Computer Organization	4	-	-	3
3	16IT4T05	Language Processors	4	-	-	3
4	16IT4T06	Java Programming	4	-	-	3
5	16IT4T07	Database Management Systems	4	-	-	3
6	16IT4T08	Design and Analysis of Algorithms	4	-	-	3
7	16IT4L03	Database Management Systems Lab	-	-	3	2
8	16IT4L04	Java Programming Lab	-	-	3	2
9	16IT4P01	Term Paper	-	-	-	-
Total Credits						22



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

III Year–I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16IT5T09	Advanced Java Programming	4	-	-	3
2	16IT5T10	Unix and Shell Programming	4	-	-	3
3	16IT5T11	Object Oriented Analysis and Design Using UML	4	-	-	3
4	16CS5T13	Operating Systems	4	-	-	3
5	16IT5T12	Software Project Management	4	-	-	3
6	16IT5L05	Advanced Java Programming Lab	-	-	3	2
7	16IT5L06	Unix and Operating Systems Lab	-	-	3	2
8	16IT5L07	Unified Modeling Language Lab	-	-	3	2
9	16BH5T17	Professional Ethics & Human Values	-	2		-
10	16IT5M01	MOOCS	-	-	-	-
Total Credits						21

III Year–II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16CS6T15	Computer Networks	4	-	-	3
2	16IT6T13	Data Mining	4	-		3
3	16IT6T14	Web Technologies	4	-		3
4	16IT6T15	Software Testing	4	-		3
5	16IT6E01 16IT6E02 16EC6E01 16EC6E04 16ME6E01 16ME6E02	Open Elective: i. Artificial Intelligence ii. Management Information System iii. Digital Signal Processing iv. Embedded Systems v. Robotics vi. Operations Research	4	-		3
6	16IT6L08	Web Technologies Lab	-	-	3	2
7	16IT6L09	Software Testing & Data Mining Lab	-	-	3	2
8	16BH6T16	IPR & Patents	-	2	-	-
9	16IT6P02	Mini Project	-	-	3	2
Total Credits						21



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

IV Year–I Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16BH7T15	Management Science	4	-	-	3
2	16CS7T19	Cryptography and Network Security	4	-	-	3
3	16IT7T16	Mobile Computing	4	-	-	3
4	16IT7T17	Open Source Software	4	-	-	3
5	16IT7D01 16IT7D02 16IT7D03 16IT7D04 16IT7D05 16IT7D06	Elective-I: i. Data Analytics ii. Information Retrieval Systems iii. Distributed Systems iv. Design Patterns v. Software Quality Assurance vi. Computer Graphics	4	-	-	3
6	16IT7D07 16IT7D08 16IT7D09 16IT7D10 16IT7D11 16IT7D12	Elective-II: i. Image Processing ii. Human Computer Interaction iii. Machine Learning iv. Decision Support System v. Artificial Neural Networks vi. E-Commerce	4	-	-	3
7	16IT7L10	Mobile Computing Lab	-	-	3	2
8	16IT7L11	Open Source Software Lab	-	-	3	2
Total Credits						22

IV Year–II Semester

S.No.	Subject Code	Subject	L	T	P	C
1	16IT8T18	Cloud Computing	4	-	-	3
2	16IT8T19	Cyber Security	4	-	-	3
3	16IT8T20	Data Warehousing and Business Intelligence	4	-	-	3
4	16IT8D13 16IT8D14 16IT8D15 16IT8D16 16IT8D17 16IT8D18	Elective-III: i. Agile Methodologies ii. Internet Of Things iii. Computer Vision iv. Multimedia Programming v. Social Networking & Semantic Web vi. Concurrent & Parallel Programming	4	-	-	3
5	16IT8S01	Seminar	-	3	-	2
6	16IT8P03	Project work	-	-	-	10
Total Credits						24



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

SYLLABUS

I Year I Semester

ENGLISH – I

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students have 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 should be 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 of ideas.

Course Category	Humanities	Course Code	16BH1T01
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100
COURSE OBJECTIVES			
1	To improve the language proficiency of the students in English with emphasis on LSRW skills.		
2	To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.		
3	To develop the communication skills of the students in both formal and informal situations.		
LISTENING SKILLS			
1	To enable the students to appreciate the role of listening skill and improve their pronunciation.		
2	To enable the students to comprehend the speech of people belonging to different backgrounds and regions.		
3	To enable the students to listen for general content, to fill up information and for specific information.		
SPEAKING SKILLS			
1	To make the students aware of the importance of speaking for their personal and professional communication.		
2	To enable the students to express themselves fluently and accurately in social and professional success.		
3	To help the students describe objects, situations and people.		
4	To make the students participate in group activities like role-plays, discussions and debates.		
5	To make the students participate in Just a Minute talks.		
READING SKILLS			
1	To enable the students to comprehend a text through silent reading.		



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

2	To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3	To enable the students to skim and scan a text.
4	To enable the students to identify the topic sentence.
5	To enable the students to identify discourse features.
6	To enable the students to make intensive and extensive reading.
WRITING SKILLS	
1	To make the students understand that writing is an exact formal skills.
2	To enable the students to write sentences and paragraphs.
3	To make the students identify and use appropriate vocabulary.
4	To enable the students to narrate and describe.
5	To enable the students capable of note-making.
6	To enable the students to write coherently and cohesively.
7	To make the students to write formal and informal letters.
8	To enable the students to describe graphs using expressions of comparison.
9	To enable the students to write technical reports.
Methodology	
1	The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
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 completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4	The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5	The teacher is permitted to use lecture method when a completely new concept is introduced in the class.
COURSE OUTCOMES	
Upon successful completion of the course, the student will be able to:	
CO1	Enables the learners to acquire knowledge in different fields besides the acquisition of Reading and Writing skills to apply in their real life situations.
CO2	Explains the learners about transport and road safety methods to make use of them in that phenomenon and extends their reading and writing skills.
CO3	Creates awareness on importance of mass production in the survival of mankind and strengthens them in reading and writing aspects.
CO4	Helps the learners to identify the required sources of energy for rural India and practice their reading and writing skills.
</	



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

CO5	Creates awareness in the readers on ecological system and supports the learners in improving reading and writing skills.	Analyzing
CO6	Prepares the learners to have an industrial etiquette and training and promotes their reading and writing skills	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH1T01.1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
16BH1T01.2	-	-	-	-	-	2	-	-	-	3	-	-	-	-	-
16BH1T01.3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
16BH1T01.4	-	-	-	-	-	-	2	-	-	3	-	-	-	-	-
16BH1T01.5	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
16BH1T01.6	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-

COURSE CONTENT

UNIT I	<p>1. 'Human Resources' from <i>English for Engineers and Technologists</i>. Objective: To develop human resources to serve the society in different ways. Outcome: The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly.</p> <p>2. 'An Ideal Family' from <i>Panorama: A Course on Reading</i> Objective: To develop extensive reading skill and comprehension for pleasure and profit. Outcome: Acquisition of writing skills</p>
UNIT II	<p>1. 'Transport: Problems and Solutions' from <i>English for Engineers and Technologists</i>. Objective: To highlight road safety measures whatever be the mode of transport. Outcome: The lesson motivates the public to adopt road safety measures.</p> <p>2. 'War' from 'Panorama: A Course on Reading' Objective: To develop extensive reading skill and comprehension for pleasure and profit. Outcome: Acquisition of writing skills</p>
UNIT III	<p>Unit 3 has two sections: Unit 3(A) and 3(B) 3(A): 1. 'Evaluating Technology' from <i>English for Engineers and Technologists</i>. Objective:</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	<p>To highlight the advantages and disadvantages of technology.</p> <p>Outcome: The lesson creates an awareness in the readers that mass production is ultimately survival.</p> <p>2. <i>'The Verger' from 'Panorama : A Course on Reading'</i></p> <p>Objective: To develop extensive reading skill and comprehension for pleasure and profit.</p> <p>Outcome: Acquisition of writing skills</p> <p>Unit 3(B)</p> <ul style="list-style-type: none"> 1. <i>THE COP AND THE ANTHEM BY O.HENRY</i> <p>Objective: To enable students to develop interest in reading and appreciating short stories of different genres.</p> <p>Outcome: This lesson motivates students to respond and express the ideas and feelings in the story through oral, written and performative means.</p>
UNIT IV	<p>1. <i>'Alternative Sources of Energy' from English for Engineers and Technologists.</i></p> <p>Objective: To bring into focus different sources of energy as alternatives to the depleting sources.</p> <p>Outcome: The lesson helps to choose a source of energy suitable for rural India.</p> <p>2. <i>'The Scarecrow' from Panorama : A Course on Reading</i></p> <p>Objective: To develop extensive reading skill and comprehension for pleasure and profit.</p> <p>Outcome: Acquisition of writing skills.</p>
UNIT V	<p>1. <i>'Our Living Environment' from English for Engineers and Technologists.</i></p> <p>Objective: To highlight the fact that animals must be preserved because animal life is precious.</p> <p>Outcome: The lesson creates an awareness in the reader as to the usefulness of animals for the human society.</p> <p>2. <i>'A Village Host to Nation' from Panorama: A Course on Reading</i></p> <p>Objective: To develop extensive reading skill and comprehension for pleasure and profit.</p> <p>Outcome: Acquisition of writing skills</p>
UNIT VI	<p>1. <i>'Safety and Training' from English for Engineers and Technologists.</i></p> <p>Objective: To highlight the possibility of accidents in laboratories, industries and other places and to follow safety measures.</p> <p>Outcome: The lesson helps in identifying safety measures against different varieties of</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	<p>accidents at home and in the workplace.</p> <p>2. 'Martin Luther King and Africa' from <i>Panorama : A Course on Reading</i></p> <p>Objective: To develop extensive reading skill and comprehension for pleasure and profit.</p> <p>Outcome: Acquisition of writing skills</p>
NOTE: All the exercises given in the prescribed lessons in both detailed and non-detailed textbooks relating to the theme and language skills must be covered.	
DETAILED TEXTBOOKS	
1.	English for Engineers and Technologists, Orient Blackswan Pvt. Ltd.
2.	The Cop and the Anthem, O. Henry, Perfection Learning.
NON-DETAILED TEXTBOOK	
1.	Panorama: A Course on Reading, Oxford University Press India.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

MATHEMATICS – I

Course Category	Basic Sciences	Course Code	16BH1T03
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

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 from a necessary base to develop analytic and design concepts.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Solve the linear system of equations by using different methods.	Applying
CO2	Find the Eigen values and Eigen vectors and also finding inverse and power of a matrix by using Cayley - Hamilton theorem.	Applying
CO3	Find rank, index, signature and nature of a Quadratic form.	Applying
CO4	Solve first order differential equations and able to apply physical problems.	Applying
CO5	Solve higher order linear differential equations with constant coefficients.	Analyzing
CO6	Find partial derivate of different orders, finding maxima and minima of a function of two variable, three variables and functional dependence.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH1T03.1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T03.2	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T03.3	3	3	1	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T03.4	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T03.5	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T03.6	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Linear systems of equations Rank-Echelon form-Normal form – Solution of linear systems – Gauss elimination – Gauss-Jordan- Gauss Jacobi and Gauss Seidel methods. Applications: Finding the current in electrical circuits.
UNIT II	Eigen values - Eigen vectors Eigen values - Eigen vectors– Properties – Cayley-Hamilton theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Diagonalization. Applications: Free vibration of a two-mass system.
UNIT III	Quadratic forms Quadratic forms Reduction of quadratic form to canonical form – Rank - Positive, negative and semi definite- Index – Signature.
UNIT IV	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- Electrical circuits- Chemical reactions.
UNIT V	Linear differential equations of higher order Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, $xV(x)$ – Method of Variation of parameters. Applications: LCR circuit, Simple Harmonic motion.
UNIT VI	Partial differentiation Introduction- Homogeneous function-Euler's theorem-Total derivative-Chain rule Generalized Mean value theorem for single variable (without proof)-Taylor's and McLaurin'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

1. Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna Publishers.
2. Engineering Mathematics, N.P.Bali, Lakshmi Publications.
3. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, Wiley-India.

REFERENCE BOOKS

1. Advanced Engineering Mathematics, Michael Greenberg, 9th edition, Pearson edition.
2. Advanced engineering mathematics with MATLAB, Dean G. Duffy, CRC Press
3. Advanced Engineering Mathematics, Peter O'Neil, Cengage Learning.
4. Engineering Mathematics, Srimanta Pal, Subodh C. Bhunia, Oxford University Press.
5. Higher Engineering Mathematics, Dass H.K., Rajnish Verma. Er, S. Chand Co. Pvt. Ltd., Delhi.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

MATHEMATICS – II (METHAMETICAL METHODS)

Course Category	Basic Sciences	Course Code	16BH1T04
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

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 from a necessary base to develop analytic and design concepts.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Solve the algebraic and transcendental equation by using numerical methods.	Applying
CO2	Finding the required functional value using interpolation formulae with equal and unequal intervals.	Understanding
CO3	Evaluate the given integral using numerical methods by different formulae.	Understanding
CO4	Find Legendre polynomials of different orders and how to express the given polynomial into Legendre polynomials.	Applying
CO5	Find the harmonic conjugate of an analytic function & Evaluate line integrals and contour integrals using Cauchy integral theorem and Cauchy integral formula.	Analyzing
CO6	Express the given complex valued function into Taylor's series and Laurent series and calculation of residues and evaluation integrals using residue theorem.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH1T04.1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T04.2	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T04.3	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T04.4	3	3	1	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T04.5	3	3	1	-	-	-	-	-	-	-	-	2	-	-	-
16BH1T04.6	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Solution of Algebraic and Transcendental Equations Introduction- Bisection method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations)
UNIT II	Interpolation Introduction- Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences – Central differences – Symbolic relations and separation of symbols - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.
UNIT III	Numerical Integration and solution of Ordinary Differential equations Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series Picard's method of successive approximations-Euler's method - Runge-Kutta method (second and fourth order)
UNIT IV	Fourier Series Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet's conditions – Even and odd functions – Change of interval– Half-range sine and cosine series.
UNIT V	Fourier Transforms Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.
UNIT VI	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. Classification of second order partial differential equations. Applications: Method of separation of Variables- Solution of One dimensional Wave, Heat and two dimensional Laplace equations.

TEXT BOOKS

1. Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna Publishers.
2. Engineering Mathematics, N.P.Bali, Lakshmi Publications
3. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, Wiley-India

REFERENCE BOOKS

1. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, CRC Press
2. Mathematical Methods, V.Ravindranath and P.Vijayalakshmi, Himalaya Publishing House
3. Numerical Analysis-Mathematics of Scientific Computing, David Kincaid, Ward Cheney, 3rd Edition, Universities Press
4. Engineering Mathematics, Srimanta Pal, Subodh C. Bhunia, Oxford University Press.
5. Higher Engineering Mathematics, Dass H.K., Rajnish Verma. Er., S. Chand Co. Pvt. Ltd, Delhi

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

APPLIED PHYSICS

Course Category	Basic Sciences	Course Code	16BH1T10
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES: Physics curriculum which is re-oriented to the needs of Circuitual branches of graduate engineering courses. That serves as a transit to understand the branch specific advanced topics. The courses are designed to:

1	Impart Knowledge of Physical Optics phenomena like Interference, Diffraction and Polarization involving required to design instruments with higher resolution.
2	Teach Concepts of coherent sources, its realization and utility optical instrumentation
3	Study the concepts regarding the bulk response of materials to the EM fields and their analytically study in the back-drop of basic quantum mechanics
4	Understand the physics of Semiconductors and their working mechanism for their utility in sensors

COURSE OUTCOMES:

Construction and working details of instruments, i.e., Interferometer, Diffractometer and Polarimeter are learnt. Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility

**Blooms
Taxonomy
Level**

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

CO1	Apply the concepts of interference and its contribution to engineering applications.	Applying
CO2	Examine the concepts of the diffraction pattern of light for analysis of the materials and their characteristics.	Analyzing
CO3	Understand concepts of polarization phenomenon, Lasers and their engineering applications	Understanding
CO4	Examine the propagation of EM waves of Light and utilize in the analysis of the materials and to analyze the applications of the Optical fibers in the field of communication.	Applying
CO5	Analyze the phenomenon of electrical & thermal conductivities to sub-microscopic particles and to propose practical applications.	Analyzing
CO6	Interpret and apply the applications of electronics for engineering applications.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

[illegible]



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

16BH1T04.4	3	-	2	2	-	-	-	-	-	-	-	1	-	-	-
16BH1T04.5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
16BH1T04.6	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-

COURSE CONTENT

UNIT I	INTERFERENCE: Introduction-Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) - Interference in wedge shaped films – Newton’s rings –working principle of Interferometer, applications
UNIT II	DIFFRACTION: Introduction -Fraunhoffer diffraction at single slit - Cases of double slit, N-slits & Circular Aperture (Qualitative treatment only)-Grating equation - Resolving power of a grating, Telescope and Microscopes- applications.
UNIT III	POLARIZATION: Introduction -Types of Polarization – Methods of production – double refraction-Nicol Prism -Quarter wave plate and Half Wave plate – Working principle of Polari meter (Sacharimeter)-applications. LASERS: Introduction- Characteristics– Stimulated emission – Einstein’s Transition Probabilities- Pumping schemes - Ruby laser – Helium Neon laser-applications of lasers
UNIT IV	ELECTROMAGNETIC FIELDS: Introduction-Scalar and Vector Fields – Electric Potential- Gradient, Divergence of fields – Gauss and Stokes theorems-Propagation of EM waves through dielectric medium-Applications. FIBER OPTICS: Introduction, Principle of Optical Fiber – Total Internal Reflection, Working principle of an Optical fiber, Numerical Aperture and Acceptance Angle- classification of Optical fibres-Applications.
UNIT V	QUANTUM MECHANICS: Introduction - Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Introduction-Defects of Classical free electron theory – resistance of Conductor-Quantum Free electron theory - concept of Fermi Energy-Fermi Energy level of Conductors-Density of States.
UNIT VI	BAND THEORY OF SOLIDS: Introduction -Bloch’s theorem (qualitative) – Kronig – Penney model – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. SEMICONDUCTOR PHYSICS: Introduction-Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors- Conductivity and Carrier concentration – Drift & Diffusion – relevance of Einstein’s equation- Hall effect and its applications.

TEXT BOOKS

1.	A Text book of Engineering Physics, Dr. M.N.Avadhanulu and Dr.P.G.KshiraSagar, S.Chand& Company Ltd. 2014.
2.	Solid State Physics,A.J.Dekker, Mc Millan Publishers, 2011

REFERENCE BOOKS

1.	Physics, Resnick,Halliday&Krane,Volume I&II ,John Wiley& Sons, 2002.
2.	Engineering Physics, D.K.Bhattacharya and Poonam Tandon, Oxford press, 2015.
3.	Applied Physics, P.K.Palanisamy , SciTechPublications, 2014.
4.	Lasers and Non-Linear Optics, B.B.Laud, NewageInternationalPublishers, 2008.

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER PROGRAMMING USING C

Course Category	Engineering Sciences	Course Code	16CS1T01
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES: Formulating algorithmic solutions to problems and implementing algorithms in C

1	Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux
2	Understanding branching, iteration and data representation using arrays
3	Modular programming and recursive solution formulation
4	Understanding pointers and dynamic memory allocation
5	Understanding miscellaneous aspects of C
6	Comprehension of file operations

COURSE OUTCOMES:

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

	Blooms Taxonomy Level
1. Explain the importance of the cell membrane in maintaining the cell's internal environment.	2
2. Describe the structure and function of the nucleus.	2
3. Compare and contrast the processes of mitosis and meiosis.	3
4. Analyze the role of the Golgi apparatus in protein transport.	3
5. Evaluate the impact of cellular respiration on energy production.	4
6. Synthesize the information from various sources to understand the complexity of cellular signaling.	4
7. Create a model of a cell and its organelles, showing their relative sizes and functions.	4
8. Apply knowledge of cell biology to understand the effects of environmental factors on cell growth and differentiation.	5
9. Design an experiment to investigate the effect of a specific nutrient on cell division.	5
10. Communicate the findings of the experiment to a classmate, using appropriate scientific language and terminology.	5

CO1	Differentiate Procedural and Object-oriented languages	Understanding
CO2	Use different data types, learn programming styles, and assignment variations in a C program	Applying
CO3	Choose the loops and decision making statements to solve the problem	Applying
CO4	Demonstrate the use of functions to solve the given problem	Understanding
CO5	Implement different operations on arrays and use string functions	Applying
CO6	Make use of pointers, structures and unions and also implement file operations in C programming for a given application	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS1T01.1	3	3	2	-	3	-	-	-	-	-	-	-	2	2	2
16CS1T01.2	3	3	2	-	3	-	-	-	-	-	-	-	2	2	2
16CS1T01.3	3	3	2	-	3	-	-	-	-	-	-	-	2	1	1
16CS1T01.4	3	3	1	-	3	-	-	-	-	-	-	-	1	1	1
16CS1T01.5	3	3	1	-	3	-	-	-	-	-	-	-	2	2	2
16CS1T01.6	3	3	2	-	-	-	-	-	-	-	-	-	2	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	History and Hardware - Computer Hardware, Bits and Bytes, Components, Programming Languages - Machine Language, Assembly Language, Low- and High-Level Languages, Procedural and Object-Oriented Languages, Application and System Software, The Development of C Algorithms The Software Development Process
UNIT II	Introduction to C Programming- Identifiers, The main () Function, The printf() Function Programming Style - Indentation, Comments, Data Types, Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization. Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers
UNIT III	Control Flow-Relational Expressions - Logical Operators: Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples. Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition- Controlled Loops, while Statement, for Statement, Nested Loops, do-while Statement
UNIT IV	Modular Programming: Function and Parameter Declarations, Returning a Value, Functions with Empty Parameter Lists, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Storing Addresses, Using Addresses, Declaring and Using Pointers, Passing Addresses to a Function. Case Study: Swapping Values, Recursion - Mathematical Recursion, Recursion versus Iteration
UNIT V	Arrays & Strings Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays-Matrices. Strings: String Fundamentals, String Input and Output, String Processing, Library Functions
UNIT VI	Pointers, Structures, Files Pointers: Concept of a Pointer, Initialization of pointer variables, pointers as function arguments, passing by address, Dangling memory, address arithmetic, character pointers and functions, pointers to pointers, Dynamic memory management functions, command line arguments. Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, bit-fields. Data Files: Declaring, Opening, and Closing File Streams, Reading from and Writing to Text Files, Random File Access
TEXT BOOKS	
1.	ANSI C Programming, Gary J. Bronson, Cengage Learning.
2.	Programming in C, B. L.Juneja, Anita Seth, Cengage Delmar Learning India Pvt.
3.	The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.
REFERENCE BOOKS	
1.	C Programming, A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2.	Programming with C, R S Bichkar, University Press, 2012.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

3.	Programming in C, ReemaThareja, Oxford.
4.	C by Example, Noel Kalicharan, Cambridge University Press.
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/

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ENGINEERING DRAWING

Course Category	Engineering Sciences	Course Code	16MEIT02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

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

Blooms Taxonomy Level	Question
1	1. Which of the following is a primary function of the digestive system?
2	2. How does the digestive system break down food into nutrients?
3	3. What are the main components of the digestive system?
4	4. How does the digestive system absorb nutrients?
5	5. What are the consequences of a malfunctioning digestive system?
6	6. How can diet and lifestyle choices impact the digestive system?

CO1	Construct polygons, curves and scales	Applying
CO2	Identify the position of points and lines	Applying
CO3	Identify the position of lines when inclined to both the planes	Applying
CO4	Analyze the location and position of plane figures	Analyzing
CO5	Analyze the location and position of solid bodies	Analyzing
CO6	Develop an Isometric view and orthographic views	Creating

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16MEIT02.1	3	3	1	1	-	-	-	-	-	-	-	-	2	1	1
16MEIT02.2	1	3	1	-	-	-	-	-	-	-	-	-	2	-	1
16MEIT02.3	3	3	1	-	-	-	-	-	-	-	-	-	2	-	-
16MEIT02.4	3	3	1	1	-	-	-	-	-	-	-	-	2	-	1
16MEIT02.5	3	3	1	1	-	-	-	-	-	-	-	-	2	-	1
16MEIT02.6	3	2	2	1	2	-	-	-	-	-	-	-	2	2	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Objective: To introduce the students to use scales and orthographic projections, projections of points & simple lines. Introduction to orthographic projections; projections of points; projections of straight lines parallel to both the planes; projections of straight lines – parallel to one plane and inclined to the other plane.
UNIT II	Objective: To introduce the students to use scales and orthographic projections, projections of points & simple lines. Introduction to orthographic projections; projections of points; projections of straight lines parallel to both the planes; projections of straight lines – parallel to one plane and inclined to the other plane
UNIT III	Objective: The objective is to make the students draw the projections of simple lines inclined to both the planes. Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.
UNIT IV	Objective: The objective is to make the students draw the projections of the plane inclined to both the planes. Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.
UNIT V	Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes. Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.
UNIT VI	Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa. Conversion of isometric views to orthographic views, Conversion of orthographic views to isometric views.

TEXT BOOKS

1. Engineering Drawing, N.D. Bhatt, Chariot Publications.
2. Engineering Drawing + AutoCad, K Venugopal, V. Prabhu Raja, New Age International.

REFERENCE BOOKS

1. Engineering Drawing, K.L.Narayana and P. Kannaiah, SciTech Publishers.
2. Engineering Graphics for Degree, K.C. John, PHI Publishers.
3. Engineering Graphics, P. Varghese, McGrawHill Publishers.
4. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers

WEB RESOURCES

1. <http://nptel.ac.in/courses/112103019/>
2. <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
3. <http://www.engineeringdrawing.org>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ENGLISH - COMMUNICATION SKILLS LAB- I

Course Category	Humanities	Course Code	16BH1L01
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES:

1	To enable the students to learn through practice the communication skills of listening, speaking, reading and writing
----------	---

COURSE OUTCOMES:

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

CO1	Distinguish spoken language & use it appropriately with clarity and confidence by choosing the right expressions according to social and professional contexts.
CO2	Interpret and responding appropriately in various day to day contexts and to demonstrate the need of learning speech sounds
CO3	Identify the sounds of English and improve their pronunciation and to utilize the stress and intonation in their pronunciation according to the context which in turn reduces the mother tongue influence.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH1L01.1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
16BH1L01.2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
16BH1L01.3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2

COURSE CONTENT

UNIT I	1. Why study Spoken English? 2. Making Inquiries on the phone, thanking and responding to Thanks -- Practice work.
UNIT II	1. Responding to Requests and asking for Directions -- Practice work.
UNIT III	1. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating 2. Apologizing, Advising, Suggesting, Agreeing and Disagreeing -- Practice work.
UNIT IV	1. Letters and Sounds -- Practice work.
UNIT V	1. The Sounds of English -- Practice work.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIT VI	1. Pronunciation 2. Stress and Intonation -- Practice work
REFERENCE BOOKS	
1.	Strengthen your Communication Skills, Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications
2.	English for Professionals, Prof Eliah, B.S Publications, Hyderabad.
3.	Unlock, Listening and Speaking Skills 2, Cambridge University Press.
4.	Spring Board to Success, Orient BlackSwan
5.	A Practical Course in Effective English Speaking Skills, PHI Publications.
6.	Word Power Made Handy, Dr Shalini Verma, S. Chand Company.
7.	Let Us Hear Them Speak, Jayashree Mohanraj, Sage Texts.
8.	Professional Communication, ArunaKoneru, Mc GrawHill Education
9.	Cornerstone, Developing Soft Skills, Pearson Education.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ENGINEERING/APPLIED PHYSICS LAB

(Common to ECE, CSE& IT)

(only 10 out of 14 Experiments prescribed)

Course Category	Basic Sciences	Course Code	16BH1L03
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OUTCOMES:

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

CO1	Students will learn to utilize the basics of Interference, Diffraction in Physics through experimentation
CO2	Students will be able to interpret and analyze concepts of Waves and Oscillations through experimentation
CO3	Students will be able to apply the basics of Current and Electricity, Semiconductors in engineering projects

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH1L03.1	2	-	-	-	1	-	-	-	-	-	-	-	1	-	-
16BH1L03.2	2	-	-	-	1	-	-	-	-	-	-	-	2	-	-
16BH1L03.3	2	-	2	-	1	-	-	-	-	-	-	-	1	-	-

COURSE CONTENT

1	To verify the Laws of Transverse vibrations of a stretched string using sonometer
2	To determine the Rigidity Modulus of a given wire using Torsional Pendulum
3	To determine the velocity of sound in air using Volume Resonator Method
4	To determine the acceleration due to gravity using Compound Pendulum
5	To determine the frequency of an electric tuning fork using Melde's Apparatus
6	To Study the V-I Characteristics and determine the breakdown voltage of a Zener Diode



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

7	To determine the wavelength of a given source using diffraction Grating in Normal Incidence Method
8	To determine the energy Band Gap of a Semiconductor using P-N Junction diode
9	To Study the variation of the Magnetic field along the axis of a current carrying circular coil using Stewart and Gee's Apparatus
10	To study the R-I Characteristics of a Themistor
11	To determine the refractive index of the medium of the film using the formation of Newton's Rings
12	To determine the thickness of a paper using the formation of parallel fringes
13	To Determine Planck's constant using photoconductor
14	To determine the refractive index of the Prism using spectrometer
REFERENCE BOOKS	
1.	Engineering Physics Lab Manual by Dr.Y.Aparnaand Dr.K.Venkatesswara Rao.(V.G.S. Book Links)
2.	Physics Manual cum Observation book (College Designed Manual)



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

C PROGRAMMING LAB

Course Category	Engineering Sciences	Course Code	16CS1L01
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES:

1	Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
2	Acquire knowledge about the basic concept of writing a program
3	Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language
4	Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions
5	Role of Functions involving the idea of modularity

COURSE OUTCOMES:

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

CO1	Development of conditional and iterative statements
CO2	Design of programs with homogeneous sequences and code reusability features
CO3	Implement programs with heterogeneous sequences, static & dynamic memory management and file handling

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS1L01.1	3	3	3	3	-	-	-	-	-	-	-	-	2	2	-
16CS1L01.2	3	3	3	3	-	-	-	-	-	-	-	-	2	2	-
16CS1L01.3	3	3	3	3	-	-	-	-	-	-	-	-	2	2	-

COURSE CONTENT

1	a) System Assembling, Disassembling and identification of Parts / Peripherals. b) Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers
----------	--



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

2	<p>a) MS-Office / Open Office</p> <p>i) Word - Formatting, Page Borders, Reviewing, Equations, symbols.</p> <p>ii) Spread Sheet - organize data, usage of formula, graphs, charts.</p> <p>iii) Power point - features of power point, guidelines for preparing an effective presentation.</p> <p>b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewall settings. Installing application software, system software & tools</p>
3	<p>Basics</p> <p>a) What is an OS Command, Familiarization of Editors - vi, Emacs</p> <p>b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man</p> <p>c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line</p>
4	<p>Basic Math</p> <p>a) Write a C Program to Simulate 3 Laws at Motion</p> <p>b) Write a C Program to convert Celsius to Fahrenheit and vice versa</p>
5	<p>Control Flow - I</p> <p>a) Write a C Program to Find Whether the Given Year is a Leap Year or not.</p> <p>b) Write a C Program to Add Digits & Multiplication of a number</p>
6	<p>Control Flow - II</p> <p>a) Write a C Program to Find Whether the Given Number is</p> <p>i) Prime Number</p> <p>ii) Armstrong Number</p> <p>b) Write a C program to print Floyd Triangle</p> <p>c) Write a C Program to print Pascal Triangle</p>
7	<p>Functions</p> <p>a) Write a C Program demonstrating of parameter passing in Functions and returning values.</p> <p>b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion</p>
8	<p>Control Flow - III</p> <p>a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch-case</p> <p>b) Write a C Program to convert decimal to binary and hex (using switch call function the function)</p>
9	<p>Functions - Continued</p> <p>Write a C Program to compute the values of $\sin x$ and $\cos x$ and e^x values using Series expansion. (use factorial function)</p>
10	<p>Arrays</p> <p>Demonstration of arrays</p> <p>a) Search-Linear.</p> <p>b) Sorting-Bubble, Selection.</p> <p>c) Operations on Matrix.</p>
11	<p>Structures</p> <p>a) Write a C Program to Store Information of a Movie Using Structure</p> <p>b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation</p> <p>c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

12	Arrays and Pointers a) Write a C Program to Access Elements of an Array Using Pointer b) Write a C Program to find the sum of numbers with arrays and pointers.
13	Dynamic Memory Allocations a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function. b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Understand the difference between the above two programs
14	Strings a) Implementation of string manipulation operations with library function. i) copy ii) concatenate iii) length iv) compare b) Implementation of string manipulation operations without library function. i) copy ii) concatenate iii) length iv) compare
15	Files a) Write a C programming code to open a file and to print its contents on screen. b) Write a C program to copy files
16	Files Continued a) Write a C program merges two files and stores their contents in another file. b) Write a C program to delete a file.
Note: a) All the Programs must be executed in the Linux Environment. (Mandatory) b) The Lab record must be a print of the LATEX (.tex) Format.	



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

I Year II Semester

ENGLISH-II

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students have 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 should be 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 of ideas.

Course Category	Humanities	Course Code	16BH2T02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES:

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

LISTENING SKILLS

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

SPEAKING SKILLS

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

READING SKILLS

1	To enable the students to comprehend a text through silent reading
----------	--



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

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

WRITING SKILLS

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

Methodology

1	The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher
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 completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise
4	The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement
5	The teacher is permitted to use lecture method when a completely new concept is introduced in the class

COURSE OUTCOMES:

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

		Blooms Taxonomy Level
CO1	Enables the learners to acquire knowledge in different fields besides the acquisition of Reading and Writing skills to apply in their real life situations.	Applying
CO2	Explains the learners about transport and road safety methods to make use of them in that phenomenon and extends their reading and writing skills.	Understanding
CO3	Creates awareness on importance of mass production in the survival of mankind and strengthens them in reading and writing aspects.	Understanding



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

CO4	Helps the learners to identify the required sources of energy for rural India and practice their reading and writing skills.	Analyzing
CO5	Creates awareness in the readers on ecological system and supports the learners in improving reading and writing skills.	Applying
CO6	Prepares the learners to have an industrial etiquette and training and promotes their reading and writing skills.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH2T02.1	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-
16BH2T02.2	-	-	-	-	-	-	-	2	-	3	-	-	-	-	-
16BH2T02.3	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-
16BH2T02.4	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
16BH2T02.5	-	-	-	-	-	-	2	-	-	2	-	-	-	-	-
16BH2T02.6	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-

COURSE CONTENT	
UNIT I	<p>1. 'The Greatest Resource- Education' from English Encounters</p> <p>Objective: Schumacher describes the education system by saying that it was mere training, something more than mere knowledge of facts.</p> <p>Outcome: The lesson underscores that the ultimate aim of Education is to enhance wisdom.</p> <p>2. 'A P J Abdul Kalam' from The Great Indian Scientists.</p> <p>Objective: The lesson highlights Abdul Kalam's contributions to Indian science and the awards he received.</p> <p>Outcome: Abdul Kalam's simple life and service to the nation inspires the readers to follow in his footsteps.</p>
UNIT II	<p>1. 'A Dilemma' from English Encounters</p> <p>Objective: The lesson centers on the pros and cons of the development of science and technology.</p> <p>Outcome: The lesson enables the students to promote peaceful co-existence and universal harmony among people and society.</p> <p>2. 'C V Raman' from The Great Indian Scientists.</p> <p>Objective: The lesson highlights the dedicated research work of C V Raman and his achievements in Physics.</p> <p>Outcome: The Achievements of C V Raman are inspiring and exemplary to the readers and all</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	scientists.
UNIT III	<p><u>Unit 3 has two sections: Unit 3(A) and 3(B)</u></p> <p>3 (A)</p> <p>1. 'Cultural Shock': Adjustments to new Cultural Environments from English Encounters.</p> <p>Objective: The lesson depicts of the symptoms of Cultural Shock and the aftermath consequences</p> <p>Outcome: The lesson imparts the students to manage different cultural shocks due to globalization.</p> <p>2. 'Homi Jehangir Bhabha' from The Great Indian Scientists.</p> <p>Objective: The lesson highlights Homi Jehangir Bhabha's contributions to Indian nuclear program as architect.</p> <p>Outcome: The seminal contributions of HomiJehangirBhabha to Indian nuclear program provide an aspiration to the readers to serve the nation and strengthen it.</p> <p>Unit 3 (B)</p> <p>1. 'What can we learn from West?' from A Better India, A Better World</p> <p>Objective: To enable students to appreciate the differences in cultural perspectives.</p> <p>Outcome: This lesson motivates students to develop a multicultural outlook and appreciate the diverse cultures.</p>
UNIT IV	<p>1. 'The Lottery' from English Encounters.</p> <p>Objective: The lesson highlights insightful commentary on cultural traditions.</p> <p>Outcome: The theme projects society's need to reexamine its traditions when they are outdated.</p> <p>2. 'Jagadish Chandra Bose' from The Great Indian Scientists.</p> <p>Objective: The lesson gives an account of the unique discoveries and inventions of Jagadish Chandra Bose in Science.</p> <p>Outcome: The Scientific discoveries and inventions of Jagadish Chandra Bose provide inspiration to the readers to make their own contributions to science and technology, and strengthen the nation</p>
UNIT V	<p>1. ' The Health Threats of Climate Change' from English Encounters.</p> <p>Objective: The essay presents several health disorders that spring out due to environmental changes</p> <p>Outcome: The lesson offers several inputs to protect environment for the sustainability of the future generations.</p> <p>2. ' Prafulla Chandra Ray' from The Great Indian Scientists.</p> <p>Objective: The lesson given is an account of the experiments and discoveries in Pharmaceuticals of Prafulla Chandra Ray.</p> <p>Outcome: Prafulla Chandra Ray's scientific achievements and patriotic fervour provide inspiration to the reader</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIT VI	<p style="text-align: center;"><i>1. 'The Chief Software Architect' from English Encounters</i></p> <p>Objective: The lesson supports the developments of technology for the betterment of human life.</p> <p>Outcome: Pupil gets inspired by eminent personalities who toiled for the present day advancement of software development.</p> <p style="text-align: center;"><i>2. 'Srinivasa Ramanujan' from The Great Indian Scientists.</i></p> <p>Objective: The lesson highlights the extraordinary achievements of Srinivasa Ramanujan, a great mathematician and the most romantic figure in mathematics.</p> <p>Outcome: The lesson provides inspiration to the readers to think and tap their innate talents</p>
DETAILED TEXTBOOK	
1.	English Encounters, Maruthi Publishers.
2.	A Better India, A Better World, N.R. Narayana Murthy, Penguin Books India Pvt. Ltd.
DETAILED NON-DETAIL:	
1.	The Great Indian Scientists, Cengage Learning.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

MATHEMATICS – III

Course Category	Basic Sciences	Course Code	16BH2T06
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

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 from a necessary base to develop analytic and design concepts
3	Understand the most basic numerical methods to solve simultaneous linear equations

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Find the Laplace transform of functions and evaluation of integrals.	Understanding
CO2	Find the inverse Laplace transform of different functions and solve the differential equations using Laplace transform.	Applying
CO3	Tracing the curve for the given equation evaluate the double and triple integrals by direct method change of order of integration and change of variables.	Applying
CO4	Evaluate the given integrals by using Beta and Gamma functions.	Applying
CO5	Find the gradient of a scalar field, divergence and curl of vector field and vector identities.	Understanding
CO6	Evaluate the line, surface and volume integrals. Solve the problems using vector integral theorems.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH2T06.1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH2T06.2	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH2T06.3	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
16BH2T06.4	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
16BH2T06.5	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
16BH2T06.6	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Laplace transforms Laplace transforms of standard functions-Shifting theorems - Transforms of derivatives and integrals – Unit step function –Dirac’s delta function
UNIT II	Inverse Laplace transforms Inverse Laplace transforms – Shifting Theorems - Transforms of derivatives and integrals - Convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.
UNIT III	Multiple integrals Curve tracing: Cartesian, Polar and Parametric forms. Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration. Applications: Finding Areas and Volumes.
UNIT IV	Special functions Beta and Gamma functions- Properties - Relation between Beta and Gamma functions - Evaluation of improper integrals. Applications: Evaluation of integrals.
UNIT V	Vector Differentiation Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities. Applications: Equation of continuity, potential surfaces
UNIT VI	Vector Integration Line integral – Work done – Potential function – Area- Surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems. Applications: Work done, Force.

TEXT BOOKS

1. Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna Publishers.
2. Engineering Mathematics, N.P.Bali, Lakshmi Publications.
3. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, WileyIndia.

REFERENCE BOOKS

1. Advanced Engineering Mathematics, Greenberg, 2nd edition, Pearson edition.
2. Advanced Engineering Mathematics, Peter O’Neil, 7th edition, Cengage Learning
3. Mathematical Techniques, D.W. Jordan and T.Smith,Oxford University Press
4. Engineering Mathematics, Srimanta Pal, SubodhC.Bhunia,OxfordUniversityPress
5. Higher Engineering Mathematics, Dass H.K., RajnishVerma. Er., S.ChandCo.Pvt. Ltd, Delhi



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

APPLIED CHEMISTRY

Course Category	Basic Sciences	Course Code	16BH2T12
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

- | | |
|---|---|
| 1 | Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources |
|---|---|

COURSE OUTCOMES

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

		Blooms Taxonomy Level
CO1	To have an understanding on the plastic materials and their suitable design for engineering applications.	Applying
CO2	To learn about various fuels and their calorific values for use in various industrial applications.	Analyzing
CO3	Create awareness on corrosion and its impacts and the causes and control of corrosion.	Applying
CO4	To create knowledge on nano materials, liquid crystals and super conductors and their applications to learn green chemistry and to identify the green technologies to be implemented in industry.	Understanding
CO5	To acquire knowledge on crystal structure, semiconductors, insulators for their effective applications.	Applying
CO6	To create awareness on non- conventional energy sources for effective utilization to minimize in the national wealth and environmental impacts.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH2T12.1	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
16BH2T12.2	3	3	-	-	-	-	1	-	-	-	-	2	-	-	-
16BH2T12.3	3	-	1	3	-	3	3	-	-	-	-	1	-	-	-
16BH2T12.4	3	3	3	-	-	2	-	-	-	-	-	-	-	-	-
16BH2T12.5	3	-	-	2	-	-	3	-	-	-	-	1	-	-	-
16BH2T12.6	3	-	2	-	-	2	2	-	-	-	-	-	-	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	HIGH POLYMERS AND PLASTICS Polymerization:- Definition- Types of Polymers - Mechanism of polymerization- Stereo regular polymers- Methods of polymerization(emulsion and suspension)-Physical and Mechanical properties. Plastics as engineering materials: advantages and limitations- Thermoplastics and Thermosetting plastics Compounding and fabrication (Compression, Injection, Extrusion and Blown Techniques) - Preparation, properties and applications of polyethylene, PVC, Bakelite Teflon, Poly Methyl Methacrylate (PMMA) and polycarbonates Elastomers: - Natural rubber- Disadvantages- Mastication - compounding and vulcanization - Synthetic rubbers : Buna S, Buna N, Thiokol and polyurethanes - Applications of elastomers. Composite materials & Fiber reinforced plastics - Biodegradable polymers - Conducting polymers.
UNIT II	FUEL TECHNOLOGY Fuels – Definition –Classification - Characteristics of a good fuel - Calorific value - HCV and LCV - Dulong's formula - Bomb calorimeter – Numerical problems - Coal -- Proximate and Ultimate analysis and their Significance - Liquid fuels - Petroleum- Origin and Refining - Cracking - Synthetic petrol -Petrol knocking - Diesel knocking - Octane and Cetane ratings - Anti-knock agents - Power alcohol – Bio diesel, Gaseous fuels: - Natural gas, LPG and CNG, Combustion - Calculation of air for the combustion of a fuel, Flue gas analysis – Orsat's apparatus - Numerical problems on combustion Explosives: - Rocket fuels
UNIT III	ELECTROCHEMICAL CELLS AND CORROSION Galvanic cells - Reversible and irreversible cells - Single electrode potential - Electro chemical series and uses of this series- Standard electrodes (Hydrogen, Calomel and Glass electrode) - Concentration Cells - Batteries: Dry Cell - Ni-Cd cells - Ni-Metal hydride cells - Li cells - Zinc - air cells. Fuel cells:- Introduction - cell representation, H ₂ -O ₂ fuel cell: Design and working, advantages and limitations. Types of fuel cells: Alkaline fuel cell - methanol-oxygen - phosphoric acid fuel cells - molten carbonate fuel cells. Corrosion :- Definition - Theories of Corrosion (chemical & electrochemical) - Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion - Passivity of metals -Pitting corrosion – Corrosion under insulation -Galvanic series - Factors which influence the rate of corrosion –Protection from corrosion -Design and material selection - Cathodic protection - Protective coatings: - Surface preparation - Metallic (galvanizing and tinning) coatings - Methods of application on metals (Electroplating, Electroless plating).
UNIT IV	CHEMISTRY OF ADVANCED MATERIALS Nano materials:- Introduction - Sol-gel method & chemical reduction method of preparation- Characterization by Brunauer Emmett Teller (BET)method, Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM) methods - Carbon nano tubes : Types, preparation(Laser ablation and Chemical vapour deposition method), properties and applications, Fullerenes. Liquid crystals:- Introduction - Types - Applications Super conductors:-Type -I, Type II - Characteristics and applications Green synthesis:- Principles of Green Chemistry - Methods of synthesis (Aqueous Phase Method, Super Critical Fluid Extraction and Phase Transfer Catalysis) with examples - R4M4 principles
UNIT V	SOLID STATE CHEMISTRY Types of solids - close packing of atoms and ions - BCC , FCC, structures of rock salt cesium chloride- spinel - normal and inverse spinels, Non-elemental semiconducting Materials:- Stoichiometric, controlled valency & Chalcogen



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	photo/semiconductors, Preparation of Semiconductors - Semiconductor Devices:- p-n junction diode as rectifier - junction transistor. Insulators (electrical and electronic applications) Magnetic materials:- Ferro and ferri magnetism. Hall effect and its applications.
UNIT VI	NON CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) - photovoltaic cell: design, working and its importance Non-conventional energy sources (i)Hydropower include setup a hydropower plant (schematic diagram) (ii)Geothermal energy: Introduction-schematic diagram of a geothermal power plant (iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level. (iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation. (v) Biomass and biofuels
TEXT BOOKS	
1.	Engineering Chemistry, Jain and Jain, Dhanpat Rai Publication Co.
2.	Engineering Chemistry, Shikha Agarwal, Cambridge University Press, 2015 edition
REFERENCE BOOKS	
1.	Engineering Chemistry, Vairam and others, Wiley India Pvt. Ltd., 2014 second edition.
2.	Engineering Chemistry, Prasanth Rath, Cengage Learning, 2015 edition
3.	A Text Book of engineering Chemistry, S. S. Dara; S. Chand & Co Ltd., Latest Edition
4.	Applied Chemistry by H.D. Gesser, Springer Publishers
5.	Text book of Nano-science and Nanotechnology, B.S. Murthy, P. Shankar and others, University Press, IIM

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT-ORIENTED PROGRAMMING THROUGH C++

Course Category	Basic Sciences	Course Code	16IT2T01
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and portable code. The nature of C language is emphasized in the wide variety of examples and applications. To learn and acquire art of computer programming. To know about some popular programming languages and how to choose
2	Programming language for solving a problem

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Enumerate the Key Concepts of Object Oriented Programming	Understanding
CO2	Use of Object oriented technology to experiment special class operations	Applying
CO3	Implement the concept of polymorphism through operator overloading that enhances reusability	Understanding
CO4	Analyze binding, polymorphism and virtual functions	Analyzing
CO5	Apply Exception Handling Techniques for resolving run-time errors and use of templates to provide generic programming	Applying
CO6	Demonstrate the concept of template library and Containers, Associative Containers, Algorithms, Iterators, Vectors, Lists, Maps	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT2T01.1	3	1	1	-	3	-	-	-	-	-	-	-	1	1	-
16IT2T01.2	3	2	3	2	2	-	-	-	-	-	-	-	1	3	-
16IT2T01.3	3	2	2	2	3	-	-	-	-	-	-	-	2	1	-
16IT2T01.4	3	2	3	2	2	-	-	-	-	-	-	-	2	2	2
16IT2T01.5	3	2	3	2	2	-	-	-	-	-	-	2	2	2	3
16IT2T01.6	3	3	3	2	2	-	-	-	-	-	-	-	2	2	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to C++ Difference between C and C++- Evolution of C++- The Object Oriented Technology- Disadvantage of Conventional Programming- Key Concepts of Object Oriented Programming- Advantage of OOP- Object Oriented Language
UNIT II	Classes and Objects & Constructors and Destructor Classes in C++-Declaring Objects- Access Specifiers and their Scope- Defining Member Function- Overloading Member Function- Nested class, Constructors and Destructors, Introduction- Constructors and Destructor- Characteristics of Constructor and Destructor- Application with Constructor- Constructor with Arguments (parameterized Constructor- Destructors- Anonymous Objects
UNIT III	Operator Overloading and Type Conversion & Inheritance The Keyword Operator- Overloading Unary Operator- Operator Return Type- Overloading Assignment Operator (=)- Rules for Overloading Operators, Inheritance, Reusability- Types of Inheritance- Virtual Base Classes- Object as a Class Member- Abstract Classes- Advantages of Inheritance-Disadvantages of Inheritance
UNIT IV	Pointers & Binding Polymorphisms and Virtual Functions Pointer, Features of Pointers- Pointer Declaration- Pointer to Class- Pointer Object- The this Pointer- Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions, Introduction- Binding in C++- Virtual Functions- Rules for Virtual Function- Virtual Destructor
UNIT V	Generic Programming with Templates & Exception Handling Generic Programming with Templates, Need for Templates- Definition of class Templates- Normal Function Templates- Over Loading of Template Function-Bubble Sort Using Function Templates- Difference Between Templates and Macros- Linked Lists with Templates, Exception Handling- Principles of Exception Handling- The Keywords try throw and catch- Multiple Catch Statements – Specifying Exceptions
UNIT VI	Overview of Standard Template Library Overview of Standard Template Library- STL Programming Model- Containers- Sequence Containers- Associative Containers- Algorithms- Iterators- Vectors- Lists- Maps

TEXT BOOKS

1. A First Book of C++, Gary Bronson, Cengage Learning.
2. The Complete Reference C++, Herbert Schildt, TMH.
3. Programming in C++, Ashok N Kamathane, Pearson 2nd Edition.

REFERENCE BOOKS

1. The C++ Programming Language, Bjarne Stroustrup, 4th Edition.
2. Object oriented Programming in C++, Robert Lafore, 4th Edition.
3. Object Oriented Programming C++, Joyce Farrell, Cengage.
4. C++ Programming: From problem analysis to program design, DS Malik, Cengage Learning.

WEB RESOURCES

1. <http://www.doc.ic.ac.uk/~wjk/c++Intro/>
2. http://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm
3. <http://www.cis.upenn.edu/~cis190/fall2014/lectures.html>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

4.	http://www.oualline.com/books.free/teach/intro.html
Reference (Advanced) Material	
1.	Effective C++: 55 Specific Ways to Improve Your Programs and Designs (Third Edition), Scott Meyers, 2005.
2.	More Effective C++, Scott Meyers, 2002.
3.	Modern C++ Design, Andrei Alexandrescu, 2004.
4.	Exceptional C++: 47 Engineering Puzzles, Programming Problems, and Solutions by Herb Sutter, 1999.
5.	C++ Templates: The Complete Guide, David Vandevor and Nicolai M. Josuttis, 2002.
6.	The C++ Standard Library: A Tutorial and Reference, Nicolai M. Josuttis, 2012.
7.	Effective STL: 50 Specific Ways to Improve Your Use of the Standard Template Library.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ENVIRONMENTAL STUDIES

Course Category	Basic Sciences	Course Code	16BH2T13
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	Basic understanding of the environment, global problems and ecosystems.
2	Overall understanding of the natural resources
3	Basic understanding of Biodiversity
4	Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
5	Awareness on the social issues, environmental legislation and global treaties
6	An understanding of the environmental impact of developmental activities

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	The importance of environment and global environmental problems. The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web.	Applying
CO2	The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources	Remembering
CO3	The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity	Applying
CO4	Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices	Remembering
CO5	Social issues both rural and urban environment and the possible means to combat the challenges. The environmental legislations of India and the first global initiatives towards sustainable development	Understanding
CO6	About environmental assessment and the stages involved in EIA and the environmental audit. Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, Parking & Curriculum	Applying



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH2T13.1	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-
16BH2T13.2	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-
16BH2T13.3	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-
16BH2T13.4	-	-	-	-	-	1	2	2	-	-	-	1	-	-	-
16BH2T13.5	-	-	-	-	-	3	1	2	-	-	-	-	-	-	-
16BH2T13.6	-	-	-	-	-	2	2	1	-	2	-	-	-	-	-

COURSE CONTENT

UNIT I	<p>Multidisciplinary nature of Environment and Ecology: Definition, Scope and Importance, Introduction to Brief works of noted Environmentalists & Naturalists (Wangari Mathai, Salim Ali and Sunderlal Bahuguna), Sustainability: Stockholm and Rio Summit-Global Environmental Challenges: Global warming and climate change, Carbon Credits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health.</p> <p>Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. Classification of ecosystems-characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems: Estuaries and Mangroves</p>
UNIT II	<p>Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Sustainable mining of Granite, Laterite, Coal, Sea and River sands. Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles</p>
UNIT III	<p>Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity.</p>
UNIT IV	<p>Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, <i>Heavy Metal pollution</i>, Soil pollution, Noise pollution, Radioactive pollution: Sources and risks. Role of an individual in prevention of pollution. - Pollution case</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	studies, Sustainable Life Style, Impact of Fire Crackers on Man and his well being. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e - waste management
UNIT V	Social Issues and the Environment: Urban problems related to energy -Water conservation- <i>Coastal Regulatory zone management</i> , rainwater harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act- Issues involved in enforcement of environmental legislation. -Public awareness
UNIT VI	Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. <i>Environmental Modeling: Definition (Box Model and Gaussian Plume Modeling)</i> , Ecotourism, Green Campus – Green business, Green politics and <i>Green Building</i> . The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation
TEXT BOOKS	
1.	Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2.	Environmental Studies, R. Rajagopalan, 2 nd Edition, 2011, Oxford University Press
3.	Environmental Studies, P.N. Palanisamy, P. Manikandan, A. Geetha, and K.Manjula Rani; Pearson Education, Chennai
REFERENCE BOOKS	
1.	Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning
2.	A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3.	Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4.	Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014
5.	Environmental pollution, Monitoring and Control by Khopkar.S.M, New Age Publishers
6.	A Text Book of Fundamentals of Ecology, E.P.Odam, Philadelphia: W.B. Saunders Company



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Category	Engineering Sciences	Course Code	16EC2T02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Study the basics of Electronic Devices and Circuits.		Remembering
CO2	Analyze the Linear Integrated Circuit Applications.		Analyzing
CO3	observe the internal design of electronic instruments and basic concepts of communication		Understanding
CO4	Analyze DC circuits and AC circuits using Network Analysis.		Analyzing
CO5	Study the principle of operation of various electrical machines.		Remembering
CO6	Observe the internal operation of measuring instruments.		Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16EC2T02.1	2	2	2	-	-	-	-	-	-	-	-	-	2	-	-
16EC2T02.2	1	2	3	-	-	-	-	-	-	-	-	-	-	3	-
16EC2T02.3	3	3	2	-	-	-	-	-	-	-	-	-	2	3	-
16EC2T02.4	3	2	2	-	-	-	-	-	-	-	3	-	-	-	-
16EC2T02.5	3	3	2	-	-	-	-	-	-	-	-	-	-	3	-
16EC2T02.6	1	3	2	-	-	-	-	-	-	-	3	3	2	-	-

COURSE CONTENT	
UNIT I	Electronics Systems: Introduction to electronics, review of p-n junction operation, diode applications, Zener diode as regulator. Transistor and applications: Introduction to transistors, BJT Characteristics, biasing and applications, simple RC coupled amplifier and frequency response. Cascaded amplifiers, FET and MOSFET characteristics



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIT II	Feedback in Electronic Systems: open loop and closed loop systems, Negative and positive feedback merits and demerits, Principle of oscillators, LC and RC oscillators. Integrated Circuits: Operational amplifiers, Applications: adder, subtractor, Integrator and Differentiators
UNIT III	Electronic Instrumentation: Measurement, Sensors, Laboratory measuring instruments: digital multi-meters and Cathode Ray Oscilloscopes (CRO's). Principles of Communication: Need for Modulation, Modulation and Demodulation techniques
UNIT IV	DC Circuits: Kirchhoff's Voltage & Current laws, Superposition Theorem, Star – Delta Transformations. AC Circuits: Complex representation of Impedance, Phasor diagrams, Power & Power Factor, Solution of Single Phase Series & Parallel Circuits. Solution of Three Phase circuits and Measurement of Power in Three Phase circuits
UNIT V	Single Phase Transformers: Principle of Operation of a Single Phase Transformer, EMF equation, Phasor diagram, Equivalent Circuit, Determination of Equivalent Circuit Parameters, Regulation and Efficiency of a single phase transformer. Principle of operation of an Auto Transformer. DC Machines: Principle of Operation, Classification, EMF and Torque equations, Characteristics of Generators and Motors, Speed Control Methods and Starting Techniques
UNIT VI	Measuring Instruments: Moving Coil and Moving Iron Ammeters and Voltmeters, Dynamometer Type Wattmeter and Induction Type Energy Meter
TEXT BOOKS	
1.	Edward Hughes, Electrical Technology, 10 th Edition, ELBS, 2010
2.	Vincent Del Toro, Electrical Engineering Fundamentals, 2 nd Edition, PHI, 2003
3.	Neil Storey, "Electronics A Systems Approach", 4/e - Pearson Education Publishing Company Pvt. Ltd., 2011.
4.	Salivahanan, N Suresh Kumar, "Electronic Devices and Circuits" 3/e, McGraw Hill Publications, 2013.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ENGINEERING/APPLIED CHEMISTRY LAB

Course Category	Basic Sciences	Course Code	16BH2L05
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OUTCOMES

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

CO1	To create knowledge on differentiating hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life
CO2	Students have the knowledge in carrying out different types of titrations for estimation of concerned in materials comparatively more quantities of materials involved for good results.
CO3	Students will have the knowledge in handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH2L05.1	2	1	-	3	-	-	-	-	2	3	2	-	-	2	-
16BH2L05.2	3	2	-	-	-	-	-	-	1	2	-	-	-	1	-
16BH2L05.3	3	2	-	1	-	-	1	-	-	-	-	-	-	-	-

COURSE CONTENT

1	Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Quantitative analysis etc.,
2	Trial experiment – Estimation of HCl using standard Na ₂ CO ₃ solutions
3	Estimation of KMnO ₄ using standard Oxalic acid solution
4	Estimation of Ferric iron using standard K ₂ Cr ₂ O ₇ solution
5	Estimation of Copper using standard K ₂ Cr ₂ O ₇ solution
6	Estimation of Total Hardness water using standard EDTA solution
7	Estimation of Copper using standard EDTA solution



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

8	Estimation of Copper using Colorimeter
9	Estimation of pH of the given sample solution using pH meter
10	Conductometric Titrations between strong acid and strong base
11	Conductometric Titrations between strong acid and Weak base
12	Potentiometric Titrations between strong acid and strong base
13	Potentiometric Titrations between strong acid and Weak base
14	Estimating of Zinc using standard potassium ferrocyanide solution
15	Estimation of Vitamin – C
TEXT BOOKS	
1.	Dr. Jyotsna Cherukuis (2012) Laboratory Manual of Engineering Chemistry-II, VGS Techno Series
2.	Chemistry Practical Manual, Lorven Publications
3.	K. Mukkanti (2009) Practical Engineering Chemistry, B.S.Publication



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ENGLISH - COMMUNICATION SKILLS LAB- II

Course Category	Humanities	Course Code	16BH2L02
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing
----------	--

COURSE OUTCOMES

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

CO1	Make use of argumentative and critical thinking skills by elaborating ideas relevantly and improve team working skills.
CO2	Select and adopt appropriate non-verbal communication and other presentation required skills to deliver effective presentation with clarity and impact. And to develop fluency in communication and present themselves in interviews confidently.
CO3	Analyze and compose the unique qualities of professional writing styles to meet the needs and demands in both academics and professions to demonstrate the harmony of language and avoiding mistakes.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH2L02.1	-	-	-	-	-	-	-	-	2	2	-	-	-	-	2
16BH2L02.2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
16BH2L02.3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-

COURSE CONTENT

UNIT-1	Debating- Practice work
UNIT-2	Group Discussion- Practice work
UNIT-3	Presentation Skills- Practice work
UNIT-4	Interview Skills- Practice work
UNIT-5	Email Curriculum Vitae- Practice work



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIT-6	Idiomatic Expressions Common Errors in English- Practice work
TEXT BOOKS	
1.	Strengthen Your Communication Skills, Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications
2.	English for Professionals, Prof.Elijah, B.S Publications, Hyderabad
3.	Unlock, Listening and Speaking Skills 2, Cambridge University Press
4.	Spring Board to Success, Orient BlackSwan
5.	A Practical Course in Effective English Speaking Skills, PHI
6.	Word Power Made Handy, Dr Shalini Verma, S Chand Company
7.	Let Us Hear Them Speak, Jayashree Mohanraj, Sage texts
8.	Professional Communication, ArunaKoneru, Mc Grawhill Education
9.	Cornerstone, Developing Soft Skills, Pearson Education
PRESCRIBED LAB MANUAL FOR SEMESTER II:	
1.	INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt. Ltd.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT-ORIENTED PROGRAMMING LAB

Course Category	Engineering Sciences	Course Code	16IT2L01
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	To strengthen their problem solving ability by applying the characteristics of an Object oriented approach
2	To introduce object oriented concepts in C++ and Java

COURSE OUTCOMES

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

CO1	Development of object oriented programming
CO2	Design of programs using data encapsulation, abstraction, Inheritance, Polymorphism and Exceptions Handling.
CO3	Demonstration of Templates

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT2L01.1	3	3	2	-	2	-	-	-	-	-	-	-	1	2	-
16IT2L01.2	3	3	2	2	2	-	-	-	-	-	-	2	1	2	3
16IT2L01.3	3	2	2	-	2	-	-	-	-	-	-	-	2	2	-

COURSE CONTENT

1	(Basics) Write a Simple Program on printing “Hello World” and “Hello Name” where name is the input from the user a) Convert any two programs that are written in C into C++ b) Write a description of using g++ (150 Words)
2	(Expressions Control Flow) a) Write a Program that computes the simple interest and compound interest payable on Principle amount (in Rs.) of loan borrowed by the customer from a bank for a given period of time (in years) at specific rate of interest. Further determine whether the bank will benefit by charging simple interest or compound interest. b) Write a Program to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks “What distance will you travel?” On knowing distance from passenger (as an approximate integer), the conductor mentions the fare to the passenger according



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	to following criteria
3	(Variables, Scope, Allocation) a) Write a program to implement call by value and call by reference using reference variable. b) Write a program to illustrate scope resolution, new and delete Operators. (Dynamic Memory Allocation) c) Write a program to illustrate Storage classes d) Write a program to illustrate Enumerations
4	(Functions) Write a program illustrating Inline Functions a) Write a program illustrate function overloading. Write 2 overloading functions for power. b) Write a program illustrate the use of default arguments for simple interest function
5	(Functions –Exercise Continued) a) Write a program to illustrate function overloading. Write 2 overloading functions for adding two numbers b) Write a program illustrate function template for power of a number. c) Write a program to illustrate function template for swapping of two numbers
6	(Classes Objects) Create a Distance class with: • feet and inches as data members • member function to input distance • member function to output distance • member function to add two distance objects a) Write a main function to create objects of DISTANCE class. Input two distances and output the sum. b) Write a C++ Program to illustrate the use of Constructors and Destructors (use the above program.) c) Write a program for illustrating function overloading in adding the distance between objects (use the above problem) d) Write a C++ program demonstrating a Bank Account with necessary methods and variables
7	(Access) Write a program for illustrating Access Specifiers public, private, protected a) Write a program implementing Friend Function b) Write a program to illustrate this pointer c) Write a Program to illustrate pointer to a class
8	(Operator Overloading) a). Write a program to Overload Unary, and Binary Operators as Member Function, and Non Member Function. i. Unary operator as member function ii. Binary operator as nonmember function b). Write a c ++ program to implement the overloading assignment = operator c).Write a case study on Overloading Operators and Overloading Functions (150 Words)
9	(Inheritance) a) Write C++ Programs and incorporating various forms of Inheritance i. Single Inheritance ii. Hierarchical Inheritance iii. Multiple Inheritances iv. Multi-level inheritance v. Hybrid inheritance b) Write a program to show Virtual Base Class c) Write a case study on using virtual classes (150 Words)



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

10	(Inheritance –Continued) a) Write a Program in C++ to illustrate the order of execution of constructors and destructors in inheritance b) Write a Program to <i>show</i> how <i>constructors</i> are invoked in <i>derived class</i>
11	(Polymorphism) a) Write a program to illustrate runtime polymorphism b) Write a program to illustrate this pointer c) Write a program illustrates pure virtual function and calculate the area of different shapes by using abstract class. d) Write a case study on virtual functions (150 Words)
12	(Templates) a) Write a C++ Program to illustrate template class b) Write a Program to illustrate class templates with multiple parameters c) Write a Program to illustrate member function templates
13	(Exception Handling) a).Write a Program for Exception Handling Divide by zero b). Write a Program to re-throw an Exception
14	(STL) a) Write a Program to implement List and List Operations b) Write a Program to implement Vector and Vector Operations
15	(STL Continued) a) Write a Program to implement Dequeue and Dequeue Operations b) Write a Program to implement Map and Map Operations



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

II Year I Semester

STATISTICS WITH R PROGRAMMING (Common to CSE & IT)

Course Category	Basic Sciences	Course Code	16BH3T07
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	The course is designed to equip the students with the necessary statistical skills and techniques that are essential part of R programming.
2	The skills derived from the course will help the student how to write the R program and interpret the statistics to analyse and make decision to the data.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Find different discrete distributions and installation of R software and basic commands and execution using R software.	Understanding
CO2	Classify continuous random variable, normal distribution and how to interpret in R.	Understanding
CO3	Test of hypothesis and construction of confidence interval in R.	Analyzing
CO4	Classify different types of tests like Z-test, t-test, F-test and Chi-square test and interpret with R software.	Analyzing
CO5	Analyze the Analysis of variance for one way and two-way classification and interpret using R software.	Analyzing
CO6	Find correlation and regression of the given data and interpret using R.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH3T07.1	3	1	2	-	3	-	-	-	-	-	-	2	3	-	-
16BH3T07.2	3	3	2	2	3	-	-	-	-	-	-	2	3	-	-
16BH3T07.3	3	3	2	3	3	-	-	-	-	-	-	2	3	-	-
16BH3T07.4	3	3	2	3	3	-	-	-	-	-	-	2	3	-	-
16BH3T07.5	3	3	3	3	3	-	-	-	-	-	-	2	3	-	-
16BH3T07.6	3	3	3	3	3	-	-	-	-	-	-	2	3	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Discrete probability distributions and Introduction to R Descriptive Statistics – Random variables – Discrete random variable – Expectation – Binomial, Poisson distributions. Introduction to R software – Vectors – Matrices – Arrays – Lists – Data frames – Basic arithmetic operations in R – Importing and exporting files in R.
UNIT II	Continuous Probability distribution and Computing with R Continuous random variable – Normal distribution – Properties – Gamma distribution – Weibul distribution. R commands for computing probability distributions.
UNIT III	Sampling Theory and Test of Hypothesis Sampling – Central limit theorem (without proof) – Sampling distribution of means – point estimation – interval estimation Construction of confidence intervals using R.
UNIT IV	Test of Significance Introduction to test of Hypothesis – Type-I Error – Type-II Error – One tail and Two tail tests concerning single mean and two means – single proportion – two proportions. R programming for Z-test, t-test and F-test and Chi square test.
UNIT V	Analysis of Variance ANOVA for one way classification – ANOVA for two way classification. R programming – ANOVA for one way classification – ANOVA for two way classification.
UNIT VI	Correlation and regression Simple correlation and regression – Regression by the method of least squares – Rank correlation – Multiple linear regression R programming for correlation and regression.
TEXT BOOKS	
1.	Probability and Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.
2.	Introduction to Probability and Statistics Using R, G. Jay Kerns, First Edition ISBN: 978-0-557-24979-4. (Free e-book from R software website)
REFERENCE BOOKS	
1.	R in Action, Robert I. Kabacoff, Second Edition, Data analysis and graphics with R ISBN: 9781617291388, Printed in the United States of America.
2.	Advanced Engineering Mathematics, Erwin Kreyszig, 10 th Edition, Wiley-India
3.	Probability and Statistics, T.K.V. Iyengar et al., S Chand Publications.
4.	Probability and Statistics for Engineering and Sciences, Jay L. Devore, 8 th Edition, Cengage Learning. ISBN 13: 978-81-315-1839-7.

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DIGITAL LOGIC DESIGN

(Common to CSE & IT)

Course Category	Engineering Science	Course Code	16EC3T08
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	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.
3	To optimize logic gates for digital circuits using various techniques.
4	Boolean function simplification using Karnaugh maps and Quine-McCluskey methods.
5	To understand concepts of combinational circuits.
6	To develop advanced sequential circuits.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Classify different number systems and apply to generate various codes.	Applying
CO2	Use the concept of Boolean algebra in minimization of switching functions	Analyzing
CO3	Design different types of combinational logic circuits.	Applying
CO4	Apply knowledge of flip-flops in designing of Registers and counters	Understanding
CO5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.	Applying
CO6	Produce innovative designs by modifying the traditional design techniques.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

[illegible]



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

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
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, Minimization of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates Gate Level Minimization: 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 Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractors, Ripple Adder/Subtractor Using Ones and Twos Complement Method. Design of Decoders, Encoders, Multiplexers, Demultiplexers, Higher Order Demultiplexers and Multiplexers, Priority Encoder, Code Converters, Magnitude Comparator.
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, Conversion of Flip Flops. Flip Flops with Asynchronous Inputs (Preset and Clear).
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.
UNIT VI	Introduction to Programmable Logic Devices (PLOs) PLA, PAL, PROM. Realization of Switching Functions Using PROM, PAL and PLA. Comparison of PLA, PAL and PROM.
TEXTBOOKS	
1.	Switching and Finite Automata Theory, 3/e, Kohavi, Jha, Cambridge.
2.	Digital Design, 4/e, M. Morris Mano, Michael D Ciletti, PEA.
3.	Fundamentals of Logic Design, 5/e, Roth, Cengage.
REFERENCE BOOKS	
1.	Digital Logic Design, Leach, Malvino, Saha, TMH.
2.	Modern Digital Electronics, R.P. Jain, TMH.
WEB LINKS	
1.	https://www.youtube.com/watch?v=CeD2L6KbtVM
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.youtube.com/watch?v=K73N9ES_8nI
4.	https://www.youtube.com/watch?v=62WxkICo2Bc

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to CSE & IT)

Course Category	Engineering Science	Course Code	16CS3T02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	The syntax and semantics of propositional and predicate logic.
2	How basic concepts in Algebra can be applied in computer science.
3	Proof techniques such as Mathematical Induction and Contradiction, these techniques will come in handy for courses such as Analysis of Algorithms and Automata Theory.
4	Understanding of Number Theory will help in Cryptanalysis.
5	To explain with examples the basic terminology of functions, relations, and sets.
6	To perform the operations associated with sets, functions, and relations.
7	To use Graph Theory for solving problems

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Learn the Difference between Propositional Logic and Predicate Logic.	Understanding
CO2	Enumerate algorithms in Number Theory.	Understanding
CO3	Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.	Understanding
CO4	Ability to represent and Apply Graph theory in solving computer science problems.	Applying
CO5	Ability to demonstrate in practical applications the use of basic counting principles of permutations and combinations.	Applying
CO6	Solve recurrence relations.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS3T02.1	3	3	3	2	-	-	-	-	-	-	-	-	1	-	-
16CS3T02.2	3	3	2	2	-	-	-	-	-	-	-	-	1	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

16CS3T02.3	3	3	2	2	-	-	-	-	-	-	-	-	2	-	-
16CS3T02.4	3	3	2	2	-	1	-	-	-	-	-	2	1	-	-
16CS3T02.5	3	3	2	2	-	2	-	-	-	-	-	2	1	-	-
16CS3T02.6	3	3	-	2	-	2	-	-	-	-	-	-	1	-	2

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, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties
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 principles and its application.
UNIT VI	Recurrence Relations: Generating Function of Sequences, Partial Fractions, Calculating coefficient of Generating Functions recurrence relations. Formulation as Recurrence relations, solving linear recurrence relations, methods of Characteristics roots, solutions of Inhomogeneous recurrence relations

TEXT BOOKS

1.	Discrete Mathematics for Computer Scientists & Mathematicians, Mott, Kandel, Baker, PHI, 2/e.
2.	Discrete Mathematical Structures with Applications to Computer Science, Trembly J.P. and Manohar R, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30 th Re-print (2007).
3.	Discrete Mathematics and its Applications, Kenneth H.Rosen, 6 th Edition, Special Indian edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, (2007).

REFERENCE BOOKS

1.	Discrete and Combinatorial Mathematics: An Applied Introduction, Ralph. P. Grimaldi, Fourth Edition, Pearson Education Asia, Delhi, (2002).
----	---



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

2.	Discrete Mathematics with Applications, Thomas Koshy, Elsevier Publications, (2006).
3.	Discrete Mathematics, Seymour Lipschutz and Mark Lipson, Schaum's Outlines, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2007, Second edition, Fifth reprint.
WEB LINKS	
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



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING

(Common to CSE & IT)

Course Category	Professional Core	Course Code	16IT3T02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	To make the students understand the fundamentals of python programming.
2	To expose the students to object oriented concepts.
3	To make the students to develop applications using python.
4	To make students to use python for automation.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Understand various data types ,operators in python	Understanding
CO2	Elaborate file handling in python.	Remembering
CO3	Compare mutable and immutable objects.	Applying
CO4	Build applications using list and dictionary.	Applying
CO5	Design functions oriented programming in python.	Understanding
CO6	Develop object oriented principles in python.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT3T02.1	3	2	2	2	2	-	-	-	-	-	-	2	2	2	2
16IT3T02.2	3	3	2	2	2	-	-	-	-	-	-	2	2	2	2
16IT3T02.3	3	3	2	2	2	-	-	-	-	-	-	2	2	2	2
16IT3T02.4	3	3	2	3	3	-	-	-	-	-	-	2	2	2	2
16IT3T02.5	3	2	2	3	3	-	-	-	-	-	-	2	2	2	2
16IT3T02.6	3	3	2	3	3	-	-	-	-	-	-	2	2	2	2



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction to Python, Installing Python: Basic syntax, interactive shell, editing, saving, and running a script. The concept of data types variables, assignments immutable variables numerical types; arithmetic operators and expressions comments in the program understanding error messages
UNIT II	Conditions, Boolean logic, logical operators; ranges: Control statements: If-else, loops (for, while) short-circuit (lazy) evaluation, Strings and text files manipulating files and directories, os and sys modules; text files: reading/writing text and numbers From/to a file creating and reading a formatted file (csv or tab-separated).
UNIT III	String manipulations: Subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers, Lists, tuples, and dictionaries.
UNIT IV	Basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries.
UNIT V	Design with functions: Hiding redundancy, complexity; arguments and return values; formal vs. Actual arguments, named arguments, Program structure and design, Recursive functions.
UNIT VI	Classes and OOP: Classes, objects, attributes and methods; defining classes; design with classes, data modeling; persistent storage of objects, inheritance, polymorphism, operator overloading (eq, _str, etc) abstract classes; exception handling, try block, Multithreading, Automation using Python.
TEXT BOOKS	
1.	Think Python, How to Think Like a Computer Scientist, Version 2.0.17, Allen Downey, Green Tea Press.
REFERENCE BOOKS	
1.	Python Essential Reference, David M. Beazley, Pearson Education, Inc.
2.	Fluent Python, Luciano Ramalho, O'Reilly Media.
3.	Python Cookbook, David Beazley and Brian K. Jones, O'Reilly Atlas, 3e.
4.	Fundamentals of Python: First Programs, Kenneth Lambert, Course Technology, Cengage Learning, 2012. ISBN-13: 978-1-111-82270-5.
WEB LINKS	
1.	Think Python: How to Think Like a Computer Scientist by Allen B. Downey http://www.greenteapress.com/thinkpython/thinkpython.html
2.	Dive into Python by Mark Pilgrim- http://www.diveintopython.net http://staff.washington.edu/jon/python-course/
3.	https://wiki.python.org/moin/PythonBooks

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES THROUGH C++ (Common to CSE & IT)

Course Category	Professional Core	Course Code	16CS3T03
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	Assess how the choice of data structures and algorithm design methods impacts the performance of programs.
2	Choose the appropriate data structure and algorithm design method for a specified application.
3	Solve problems using data structures such as linear lists, stacks, queues, binary trees, heaps 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:		Blooms Taxonomy Level
CO1	Distinguish between procedures and object oriented programming.	Understanding
CO2	Apply advanced data structure strategies for exploring complex data structures.	Applying
CO3	Implement linked representation models and apply in various types of applications.	Understanding
CO4	Implement data structure algorithms to the applications like binary search trees, threaded binary trees etc.	Applying
CO5	Incorporate data structures for developing graphs and their applications.	Applying
CO6	Implement various sorting algorithms.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS3T03.1	3	3	2	2	2	-	-	-	-	-	-	2	2	-	-
16CS3T03.2	3	3	3	2	2	-	-	-	-	-	-	-	2	-	-
16CS3T03.3	3	3	3	3	-	-	-	-	-	-	-	-	2	-	-
16CS3T03.4	3	3	3	3	1	-	-	-	-	-	-	-	2	-	-
16CS3T03.5	3	3	3	3	2	-	-	-	-	-	-	-	2	-	-
16CS3T03.6	3	3	2	-	-	-	-	-	-	-	-	-	2	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	ARRAYS Abstract Data Types and the C++ Class, An Introduction to C++ Class- Data Abstraction and Encapsulation in C++- Declaring Class Objects and Invoking Member Functions- Special Class Operations- Miscellaneous Topics- ADTs and C++Classes, The Array as an Abstract Data Type, The Polynomial Abstract Data type- Polynomial Representation- Polynomial Addition. Spares Matrices, Introduction- Sparse Matrix Representation- Transposing a Matrix- Matrix Multiplication, Representation of Arrays.
UNIT II	STACKS AND QUEUES Templates in C++, Template Functions- Using Templates to Represent Container Classes, The Stack Abstract Data Type, The Queue Abstract Data Type, Subtyping and Inheritance in C++, Evaluation of Expressions, Expression- Postfix Notation- Infix to Postfix.
UNIT III	LINKED LISTS Single Linked List and Chains, Representing Chains in C++, Defining a Node in C++- Designing a Chain Class in C++- Pointer manipulation in C++- Chain Manipulation Operations, The Template Class Chain, Implementing Chains with Templates- Chain Iterators- Chain Operations- Reusing a Class, Circular Lists, Available Space Lists, Linked Stacks and Queues, Polynomials, Polynomial Representation- Adding Polynomials- Circular List Representation of Polynomials, Equivalence Classes, Sparse Matrices, Sparse Matrix Representation- Sparse Matrix Input- Deleting a Sparse Matrix, Doubly Linked Lists
UNIT IV	TREES Introduction, Terminology, Representation of Trees, Binary Trees, The Abstract Data Type, Properties of Binary Tress, Binary Tree Representations, Binary Tree Traversal and Tree Iterators, Introduction, Inorder Traversal Preorder Traversal, Postorder Traversal, Thread Binary Trees, Threads, Inorder Traversal of a Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree, , Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree.
UNIT V	GRAPHS The Graph Abstract Data Type, Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search
UNIT VI	SORTING Insertion Sort, Quick Sort, Merge Sort Merging, Iterative Merge Sort, Recursive Merge Sort, Heap Sort.
TEXT BOOKS	
1.	Fundamentals of Data structures in C++, E. Horowitz, S.Sahni, Dinesh Mehta, GalgotiaPublications, 2006.
2.	Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson EducationLtd., Second Edition.
3.	Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount,WileyStudentEdition, John Wiley and Sons.
REFERENCE BOOKS	
1.	Data structures and algorithms in C++, 3 rd Edition, Adam Drozdek, Thomson
2.	Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3.	Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.
WEB LINKS	
1.	https://www.tutorialspoint.com/cplusplus/cpp_data_structures.htm
2.	http://people.cs.vt.edu/~shaffer/Book/C++3elatest.pdf
3.	http://cds.iisc.ac.in/courses/ds286/
4.	http://www.geeksforgeeks.org/data-structures



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING (Information Technology)

Course Category	Professional Core	Course Code	16IT3T03
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100
COURSE OBJECTIVES			
1	The students will have a broad understanding of the discipline of software engineering and its application to the development and management of software systems.		
2	Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.		
COURSE OUTCOMES			
Upon successful completion of the course, the student will be able to:			Blooms Taxonomy Level
CO1	Understand SW engineering methods and practices, and Software process models.		Understanding
CO2	Perform SR Analysis and Write SRS Document.		Analyzing
CO3	Apply Design Methodologies to Develop Software		Applying
CO4	List the Software Metrics		Understanding
CO5	Understand Testing Method Risk Assessment techniques		Understanding
CO6	Perform Reengineering, Reverse Engineering		Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT3T03.1	3	3	3	2	2	-	-	-	-	-	-	-	2	2	2
16IT3T03.2	3	3	3	3	1	-	-	-	-	-	-	-	1	3	2
16IT3T03.3	3	3	3	2	3	-	-	-	-	-	-	3	2	2	3
16IT3T03.4	3	3	3	2	2	-	-	-	-	-	-	-	3	2	3
16IT3T03.5	3	2	3	3	2	-	-	-	-	-	-	-	3	2	3
16IT3T03.6	3	3	2	3	3	-	-	-	-	-	-	2	3	2	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to Software Engineering: The evolving role of Software, Software, The changing nature of Software, Legacy Software, Software Myths A Generic View of Process: Software Engineering – A layered Technology, A Process Framework, the capability Maturity Model Integration (CMMI), Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process Process Models: Prescriptive Models, the Waterfall Model, Incremental Process Models, Evolutionary Process Models, the Concurrent Development Model
UNIT II	Software Engineering Practice: Software Engineering Practice, Communication Practice, Planning Practice, Modeling Practice, Construction Practice, Deployment. Requirements Engineering: Requirements engineering Tasks, Initiating the Requirements Engineering Process, Eliciting Requirements, Developing Use-Cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.
UNIT III	Building the Analysis Model: Requirements Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Scenarios-Based Modeling, Flow- Oriented Modeling. Design Engineering: Design within the Context of Software Engineering, Design Process and Design Quality, Design Concepts, the Design Model, Pattern-Based Software Design.
UNIT IV	Creating an Architectural Design: Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design. Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, The art of Debugging. Testing Tactics: Software Testing Fundamentals, Black-Box and White-Box Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing.
UNIT V	Product Metrics: Software Quality, A Framework for Product Metrics, Metrics for the Analysis Model, Metrics for the Design Model, Metrics for Testing.
UNIT VI	Risk Management: Reactive vs. Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring, and Management, The RMMM Plan, Quality Management: Quality Concepts, Software Quality Assurance, Reengineering: Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering

TEXT BOOKS

1. Software Engineering, Roger S. Pressman, 6/e, TMH.
2. Software Engineering, Somerville, 8/e, Pearson.

REFERENCE BOOKS

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley.
2. Software Engineering Principles and Practice, W S Jawadkar, TMH.
3. Software Engineering Concepts, R Fairley, TMH
4. Fundamentals of Software Engineering, Rajib Mall, PHI Publications.

WEB LINKS

1. http://www.tutorialspoint.com/software_engineering/
2. <http://www.codesters.org/resource/topic/software-engineering/>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES THROUGH C++ LAB

(Common to CSE & IT)

Course Category	Professional Core	Course Code	16CS3L02
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1

This course is aimed to provide hands on experience to implement basic linear and nonlinear data structures. This course covers implementation of stack, queue, list, sorting techniques, binary search trees, and balanced search trees.

COURSE OUTCOMES

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

CO1

Be able to design and analyze the time and space efficiency of the data structure

CO2

Be capable to identify the appropriate data structure for given problem

CO3

Have practical knowledge on the application of data structures

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS3L02.1	3	2	1	-	-	-	-	-	-	-	-	-	-	1	-
16CS3L02.2	3	2	2	2	-	-	-	-	-	-	-	-	-	1	-
16CS3L02.3	3	1	1	-	-	-	-	-	-	-	-	-	-	1	-

COURSE CONTENT

1	a) Write a Program to implement linear search algorithm. b) Write a Program to implement binary search algorithm.
2	Write a Program to Sort the set of elements by using i) Quick Sort. ii) Merge Sort.
3	a) Write a Program to Implement Stack Operations by using Array. b) Write a Program to implement the operations of Queue using array.
4	a) Write a program that uses stack operations to convert a given infix expression into its postfix. b) Write a program that uses stack operations to evaluate given postfix expression.
5	Write a Program to Implement Singly Linked List and its operations.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

6	a) Write a Program to Implement Stack Operations by using Linked List. b) Write a Program to implement the operations of Queue using linked list.
7	Write a Program to Implement Circular Queue Operations by using Array.
8	Write a Program to Implement the Binary Search Tree Operations.
9	Write a Program to Perform the Tree Traversal Techniques by using Iterative Method
10	Write a Program to Perform the Tree Traversal Techniques by using recursion.
11	Write a program for implementing the Depth First Search graph traversal algorithm.
12	Write a program for implementing the Breadth First Search graph traversal algorithm.
Note: Use Classes and Objects to implement the above programs.	



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB

(Common to CSE& IT)

Course Category	Professional Core	Course Code	16IT3L02
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	To practice the students understand the fundamentals of python programming.
2	To expose the students to object oriented concepts.
3	To practice the students to develop applications using python.
4	To practice students to use python for automation.

COURSE OUTCOMES

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

CO1	Use various data types, operators in Python.
CO2	Write programs using loop and branch statements to manipulate data in files.
CO3	Perform string manipulations.
CO4	Perform list and dictionaries operations in python
CO5	Use functions for modular programming.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT3L02.1	2	1	2	1	1	-	-	-	2	-	-	-	1	2	1
16IT3L02.2	2	1	1	2	1	-	-	-	2	-	-	-	2	2	1
16IT3L02.3	2	2	3	1	3	-	-	-	2	-	-	-	2	1	1
16IT3L02.4	3	2	2	1	2	-	-	-	2	-	-	-	3	3	3
16IT3L02.5	2	3	3	3	3	-	-	-	2	-	-	-	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
1	Basics a) Running instructions in Interactive interpreter and a Python Script b) Write a program to purposefully raise Indentation Error and Correct it
2	Operations a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem) b) Write a program to convert a given decimal number to other base systems
3	Control Flow a) Write a program to calculate the Income Tax as per the rules of Indian Government. b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89 By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.
4	DS a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.
5	Files a) Write a program encrypts the message in a given file and write the encrypted message in an output file. Write a decrypt program and verify. b) Write a program to compute the number of characters, words and lines in a file.
6	Functions a) Write a function ball collides that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding. Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius If (distance between two balls centers) \leq (sum of their radii) then (they are colliding) b) Find mean, median, mode for the given set of numbers in a list.
7	Functions - Continued a) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b. b) Write a function dups to find all duplicates in the list. c) Write a function unique to find all the unique elements of a list.
8	Multi-D Lists a) Write a program that defines a matrix and prints b) Write a program to perform addition of two square matrices c) Write a program to perform multiplication of two square matrices
9	Modules a) Install packages requests, flask and explore them. using (pip) b) Write a script that imports requests and fetch content from the page. Eg. (Wiki) c) Write a simple script that serves a simple HTTP Response and a simple HTML Page
10	OOP a) Class variables and instance variable and illustration of the self-variable for ATM Machine
11	Advanced Write a program (using threads) to allocate 100 students (each student modeled as a single thread) to 5 sections of a course.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

II

Year II Semester

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (Common for CSE & IT)

Course Category	Basic Sciences	Course Code	16BH4T14
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	The Learning objective of this Unit is to understand the concept and nature of Managerial Economics and its relationship with other disciplines, Concept of Demand and Demand forecasting
2	The Learning objective of this Unit is to understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost-Volume-Profit Analysis
3	The Learning Objective of this Unit is to understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods
4	The Learning objective of this Unit is to know the different forms of Business organization and their Merits and Demerits both public & private Enterprises and the concepts of Business Cycles
5	The Learning objective of this Unit is to understand the different Accounting Systems preparation of Financial Statements
6	The Learning objective of this Unit is to understand the concept of Capital, Capitalization, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods and uses of different tools for performance evaluation

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand	Understanding
CO2	One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs	Applying
CO3	One has to understand the nature of different markets and Price Output determination under various market conditions	Understanding
CO4	One should be equipped with the knowledge of different Business Units	Understanding
CO5	The Learner is able to prepare Financial Statements	Applying
CO6	The Learner is able to understand the usage of various Ratios for financial Analysis and evaluates various investment project proposals with the help of capital budgeting techniques for decision making	Applying



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH4T14.1	-	1	-	-	-	-	-	-	-	-	2	-	-	-	1
16BH4T14.2	-	1	-	-	-	-	-	-	-	-	1	-	-	-	1
16BH4T14.3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
16BH4T14.4	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
16BH4T14.5	-	-	-	-	-	-	-	-	-	-	3	-	-	-	1
16BH4T14.6	-	-	-	-	-	-	-	-	-	-	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-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Law of Supply -Demand forecasting and it's Methods.
UNIT II	Production and Cost Analyses: Production function-Isoquants and Isocosts-Law of Variable proportions- 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, Theories of the Firm & Pricing Policies: Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – 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 Cycle.
UNIT V	Introduction to Accounting: Introduction to Double Entry Systems-Journal-Ledger- Trail Balance - Preparation of Financial Statements - Analysis and Interpretation of Financial Statements-Ratio Analysis – liquidity ratios, profitability ratios, solvency ratios, turnover ratios – Preparation of the Funds flow Statement (Simple Problems)
UNIT VI	Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Sources of Finance (with special reference to Shares and Debentures)-Meaning of Capital Budgeting-Need for Capital Budgeting-Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS

1.	Managerial Economics and Financial Analysis, Dr. N. Appa Rao, Dr. P. Vijay Kumar, Cengage Publications, New Delhi – 2011
2.	Managerial Economics and Financial Analysis, Dr. A. R. Aryasri, TMH 2011



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

3.	Managerial Economics and Financial Analysis, Prof. J.V.Prabhakararao, Prof. P. Venkatarao. Ravindra Publication.
REFERENCE BOOKS	
1.	Managerial Economics, V. Maheswari, Sultan Chand.
2.	Managerial Economics, Suma Damodaran, Oxford 2011.
3.	Managerial Economics & Financial Analysis, Dr. B. Kuberudu and Dr. T. V. Ramana: Himalaya Publishing House, 2011.
4.	Managerial Economics, Vanitha Agarwal, Pearson Publications 2011.
5.	Financial Accounting for Managers, Sanjay Dhameja, Pearson.
6.	Financial Accounting, Maheswari, Vikas Publications.
7.	Managerial Economics and Financial Analysis, S. A. Siddiqui and A. S. Siddiqui, New Age International Publishers, 2012

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER ORGANIZATION

(Common for CSE & IT)

Course Category	Professional Core	Course Code	16CS4T06
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	Gives a view of computer system from user's perspective, representation of data
2	Understanding RTL, Micro operations, ALU, organization of stored program computer, types of instructions and design of basic components of the system
3	Illustration of data paths and control flow for sequencing in CPUs, Microprogramming of control unit of CPU
4	Illustration of algorithms for basic arithmetic operations using binary and decimal representation
5	Description of different parameters of a memory system, organization and mapping of various types of memories
6	Describes the means of interaction devices with CPU, their characteristics, modes and introduction to multiprocessors.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Compare fixed point and floating point data representations.	Understanding
CO2	Enumerate arithmetic micro operations and logic micro operations	Understanding
CO3	Differentiate various addressing modes.	Understanding
CO4	Apply algorithms for basic arithmetic operations using binary and decimal representation.	Understanding
CO5	List out various types of memory.	Understanding
CO6	Enumerate characteristics of multi-processor.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

[illegible]



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

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-BCD-8421, 2421, excess-3, gray and excess-3 gray, error detection codes.
UNIT II	Register Transfer Language and Micro-operations: Register transfer language, register transfer bus and memory transfers, arithmetic micro operations, logic micro operations, shift micro operations, arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, Computer Register Computer instructions, 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, program control, reduced instruction set computer. Micro Programmed Control: Control memory, address sequencing, micro program example.
UNIT IV	Computer Arithmetic: Addition and subtraction, multiplication algorithms, division algorithms, floating – point arithmetic operations.
UNIT V	The Memory System: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory. Pipelining Arithmetic and Instruction Pipeline, Basics of vector processing and Array Processors.
UNIT VI	Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupts, direct memory access. Multi Processors: Introduction, characteristics or multiprocessors, interconnection structures, inter processor arbitration.
TEXT BOOKS	
1.	Computer System Architecture, M.Morris Mano, 3/e, Pearson/PHI
2.	Computer Organization, Carl Hamacher, ZvonksVranesic, SafeaZaky, 5/e, McGraw Hill.
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, SivaraamaDandamudi Springer Int. Edition.
4.	Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 4/e, Elsevier
WEB LINKS	
1.	http://nptel.iitm.ac.in/video.php?subjectId=106106092
2.	https://www.tutorialspoint.com/videos/computer_organization/index.htm
3.	https://www.reference.com/technology/computer-organization-36c3a064b20f9b33
4.	https://www.youtube.com/watch?v=CDO28Esqmcg&list=PLhwVAYxIh5dvB1MkZrcRZy6x_a2yORNAu



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

LANGUAGE PROCESSORS (Information Technology)

Course Category	Professional Core	Course Code	16IT4T05
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Describes how a programming language works, how input is converted into output from the machine hardware level and various phases of compiler.
2	Delineation of various components of formal languages and grammars, regular expressions and Equivalence of finite automata and regular expressions.
3	Illustration of grammars and their role in compilers and various parsing techniques.
4	Description of Syntax trees, its variants, language classifications.
5	Focus on various storage allocation schemes.
6	Enforces various schemes for optimizing code.
7	Describes the role of code generator and its design issues.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Design DFA and NFA to accept given languages.	Applying
CO2	Understand Laws, Properties of Regular Expression.	Understanding
CO3	Explain Structure of Compiler and Building it.	Understanding
CO4	Perform Lexical Analysis.	Applying
CO5	Perform Top-Down, Bottom Up, LR Parsing for Syntax Analysis.	Applying
CO6	Explain Syntax-directed translation schemes and translates expressions.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT4T05.1	3	3	3	2	-	-	-	-	-	-	-	1	-	-	-
16IT4T05.2	3	2	2	2	-	-	-	-	-	-	-	1	-	-	-
16IT4T05.3	3	2	2	2	2	-	-	-	-	-	-	2	-	-	-
16IT4T05.4	3	3	3	3	-	-	-	-	-	-	-	1	-	-	-
16IT4T05.5	3	3	2	3	-	-	-	-	-	-	-	1	-	-	-
16IT4T05.6	3	3	2	2	-	-	-	-	-	-	-	1	-	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Finite Automata: An Informal Picture of Finite Automata, Deterministic Finite Automata, Non deterministic Finite Automata.
UNIT II	Regular Expressions and Languages: Regular Expressions, Finite Automata and Regular Expressions, Algebraic Laws for Regular Expressions. Properties of Regular Languages: Proving Languages Not to be Regular, Closure Properties of Regular Languages.
UNIT III	Languages Processors, The Structure of a Compiler, The Science of Building a Compiler, Programming Language Basics.
UNIT IV	A Simple Syntax- Directed Translator: Syntax Definition, Syntax- Directed Translation, Parsing, A Translator for simple Expressions, Lexical Analysis, Symbol Tables, Intermediate Code Generation Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens.
UNIT V	Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR
UNIT VI	Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's, Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking. Brief overview of code optimization and code generation phases.
TEXT BOOKS	
1.	Introduction to Automata Theory, Languages, and Computation, John Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, 3 rd Edition.
2.	Compilers Principles, Techniques, & Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, 2 nd Edition,
REFERENCE BOOKS	
1.	Theory of Computer Science, Automata Languages and Computation, Mishra, Chandra Shekaran, 3/e, PHI
2.	Theory of Computation, A Problem Solving Approach, Kavi Mahesh, Wiley
WEB LINKS	
1.	http://www.nptelvideos.in/2012/11/compiler-design.html
2.	https://www.tutorialspoint.com/compiler_design/index.htm
3.	http://www.diku.dk/~torbenm/Basics/basics_lulu2.pdf
4.	http://www.cse.iitd.ernet.in/~sak/courses/cdp/slides.pdf



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING

(Common to CSE, IT)

Course Category	Professional Core	Course Code	16IT4T06
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	To make the students understand the fundamentals of Java programming and how to use Java to write applications.
2	To train the learners to implement and use inheritance and polymorphism, including interfaces and abstract classes, Packages.
3	To make the students to design appropriate Exception Handling in Java methods.
4	To make the students to understand the concepts of Threads, Files and I/O Streams, Applets in java.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Understand object oriented concepts and Java features.	Understanding
CO2	Identifying classes and objects in various applications.	Understanding
CO3	Implementing the concepts of inheritance, packages.	Applying
CO4	Implementing multi-threading and exceptions in Java	Applying
CO5	Create Applet programs.	Applying
CO6	Develop various programs using event handling mechanisms and AWT components.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT4T06.1	3	3	3	3	-	-	-	-	-	-	-	2	3	3	2
16IT4T06.2	3	3	3	3	-	-	-	-	-	-	-	2	3	3	2
16IT4T06.3	3	3	3	3	2	-	-	-	2	-	-	3	3	3	2
16IT4T06.4	3	3	3	3	2	-	-	-	2	-	-	3	3	3	2
16IT4T06.5	3	3	3	3	2	-	-	-	-	-	-	2	3	3	2
16IT4T06.6	3	3	3	3	2	-	-	-	-	-	-	2	3	3	2



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction to OOP: Introduction, Need of Object Oriented Programming, Principles of Object Oriented Languages, C++ vs Java, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features, Program structures, Installation of JDK1.6Variables , Primitive Data types, Identifiers- Naming Conventions, Keywords, Literals
UNIT II	Programming Constructs: Operators- Binary, Unary and ternary, Expressions, Precedence rules and Associative, Primitive Type Conversion and Casting, Flow of control- Conditional, loops., Classes and Objects: Classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments.
UNIT III	Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class Interfaces, Packages and Enumeration: Interface-Extending interface, Interface vs. Abstract classes, Packages-Creating packages, using Packages, Access protection, java.lang package
UNIT IV	Exceptions & Assertions – Introduction, Exception handling techniques-try...catch, throw, throws, finally block, user defined exception, Exception Encapsulation and Enrichment, Assertions Multi-Threading: java.lang.Thread, the main Thread, Creation of new threads, Thread priority, Multithreading- Using isAlive () and join(), Synchronization, suspending and Resuming threads, Communication between Threads
UNIT V	Input/output: reading and writing data, java.io package Applets- Applet class, Applet structure, An Example Applet Program, Applet Life Cycle, paint(),update() and repaint()
UNIT VI	Event Handling: Introduction, Event Delegation Model, java.awt.event Description, Sources of Events, Event Listeners, Adapter classes, Inner classes. Abstract Window Toolkit Why AWT?,java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar
TEXT BOOKS	
1.	The Complete Reference Java, 9ed, Herbert Schildt, TMH
2.	Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.
REFERENCE BOOKS	
1.	JAVA Programming, K.Rajkumar. Pearson
2.	Object oriented programming with JAVA, Essentials and Applications, Raj KumarBuyya, Selvi, Chu TMH
3.	Introduction to Java Programming, 7/e, Y Daniel Liang, Pearson.
4.	Core Java Volume 1.Fundamentals, 8ed, Cay S.Horstmann, Gray Cornell, Pearson.
5.	Advanced Programming in Java2: Updated to J2SE6 with Swing, Servlet and RMI, K.Somasundaram.
6.	A Java Programming Book, N.B.Venkateswarlu
WEB LINKS	
1.	https://www.tutorialspoint.com/java/java_object_classes.htm
2.	http://beginnersbook.com/2015/07/java-swing-tutorial/
3.	http://www.realapplets.com/tutorial/
4.	https://www.youtube.com/watch?v=aUlwgdakBug
5.	http://beginnersbook.com/2013/04/java-exception-handling/



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS (Information Technology)

Course Category	Professional Core	Course Code	16IT4T07
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.
2	The logical design, physical design and implementation of relational databases are covered.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Understand database system architecture and data models.	Remembering
CO2	Write queries using Relational algebra.	Remembering
CO3	Use SQL, JDBC to answer queries on databases.	Applying
CO4	Design databases and normalize relations.	Applying
CO5	Apply indexing techniques on relations and store data as per some RAID levels.	Applying
CO6	Run transactions concurrently and recover data from crashes.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT4T07.1	3	3	3	3	-	-	-	-	-	-	-	2	3	3	2
16IT4T07.2	3	3	3	3	-	-	-	-	-	-	-	2	3	3	2
16IT4T07.3	3	3	3	3	2	-	-	-	2	-	-	3	3	3	2
16IT4T07.4	3	3	3	3	2	-	-	-	2	-	-	3	3	3	2
16IT4T07.5	3	3	3	3	2	-	-	-	-	-	-	2	3	3	2
16IT4T07.6	3	3	3	3	2	-	-	-	-	-	-	2	3	3	2



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	OVERVIEW: Managing data, File systems versus a DBMS, Advantages of a DBMS, describing and storing data in a DBMS, Database system structure
UNIT II	INTRODUCTION TO DATABASE DESIGN: Database Design and ER Diagrams, Introduction to relational model, Entities, Attributes, Entity sets, Relationship, Relationship sets, Additional features of the ER Model, conceptual Design with the ER Model 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. DATABASE APPLICATION DEVELOPMENT: Accessing databases from applications, an introduction to JDBC, JDBC classes and Interfaces.
UNIT IV	SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement, functional dependencies, normal forms, Properties of Decompositions, Normalizations.
UNIT V	OVERVIEW 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 VI	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.	Database Management Systems, Raghuram Krishnan, Johannes Gehrke, 3/e TMH
2.	Database System Concepts, Abraham Silberschatz, Henry F. Korth, Sudarshan, Sixth Edition.
3.	Database Management System, 6/e Ramez Elmasri, Shamkant B. Navathe, PEA
REFERENCE BOOKS	
1.	Introduction to Database Systems, 8/e, C.J. Date, PEA
2.	Database System Concepts, Peter ROB, Coronel, Cengage.
3.	Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.
WEB LINKS	
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 https://www.techopedia.com/definition/24361/database-management-systems-dbms



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN AND ANALYSIS OF ALGORITHMS (Information Technology)

Course Category	Professional Core	Course Code	16IT4T08
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	Analyze the asymptotic performance of algorithms.
2	Write rigorous correctness proofs for algorithms.
3	Demonstrate a familiarity with major algorithms and data structures.
4	Apply important algorithmic design paradigms and methods of analysis.
5	Synthesize efficient algorithms in common engineering design situations.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Understand asymptotic notation and perform algorithm complexity analysis	Understanding
CO2	Design algorithms using Divide and Conquer.	Applying
CO3	Design algorithms using Greedy.	Applying
CO4	Apply Dynamic Programming through examples.	Applying
CO5	Understand Back tracing and branching design mythologies.	Understanding
CO6	Define NP,NP-Hard ,NP-Complete and give examples	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT4T08.1	3	3	2	2	2	-	-	-	-	-	-	-	2	-	-
16IT4T08.2	3	3	3	1	-	-	-	-	-	-	-	1	2	-	-
16IT4T08.3	3	3	3	1	-	-	-	-	-	-	-	1	2	-	-
16IT4T08.4	3	3	3	1	-	-	-	-	-	-	-	1	2	-	-
16IT4T08.5	3	3	3	2	-	-	-	-	-	-	-	1	2	-	-
16IT4T08 .6	3	3	2	-	2	-	-	-	-	-	-	1	2	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	The Role of Algorithms in Computing: Algorithms, Algorithms as a technology, insertion sort, Analyzing Algorithms Designing Algorithms Growth of Functions: Asymptotic notation, Standard notations and common functions Algorithm specification, Performance analysis, Divide and Conquer- Finding Maximum and Minimum
UNIT II	Divide and Conquer: The substitution method for solving recurrences, The recursion-tree method for solving recurrences for solving recurrences, The master method for solving recurrence, General Method, Merge Sort, Quick Sort, Strassen's Matrix Multiplication
UNIT III	Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Tree vertex splitting ,job sequencing with deadlines, spanning trees, Minimum cost spanning trees, Single source shortest path problem.
UNIT IV	Dynamic Programming: General method, All pairs shortest path, Optimal binary search trees, 0/1 knapsack, Matrix chain multiplication, travelling sales person problem, flow shop scheduling.
UNIT V	Basic Traversal and Search Techniques: Connected components and spanning trees, Bi connected components and DFS Backtracking: General method, applications-8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.
UNIT VI	Branch and Bound: Least Cost (LC) search, The 15-puzzle problem, Control Abstractions for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch-and-Bound 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, The Classes NP-hard and NP Complete NP Hard Graph Problems: Clique Decision Problem (CDP), Node Cover Decision Problem (NCDP),Chromatic Number Decision Problem(CNDP),Directed Hamiltonian Cycle(DHC)
TEXT BOOKS	
1.	Introduction to Algorithms, Thomas Cormen, Charlese.Leiserson, Ronaldl.Rivest, Clifford Stein, 3rd Edition, [Unit 1 and 2]
2.	Fundamentals of Computer Algorithms, EllisHorowitz, SatrajSahni and S.Rajasekharam, Golgotha Publications Pvt. Ltd. [Units 3 to 6]
REFERENCE BOOKS	
1.	Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, Johnwiley and sons.
2.	Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
3.	Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4.	Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5.	Algorithms – Richard Johnson Baugh and Marcus Schaefer, Pearson Education
WEB LINKS	
1.	http://nptel.ac.in/courses/106101060/
2.	https://www.cs.cornell.edu/~kozen/papers/daa.pdf
3.	https://www.youtube.com/watch?v=Qe6PUzVu2pk



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS LAB

(Information Technology)

Course Category	Professional Core	Course Code	16IT4L03
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	To educate students on creation and querying on databases.
2	To educate students with fundamental concepts of Data Base Design, Data Models, Different Data Base Languages (SQL/Oracle).
3	To make students familiarize with the use triggers, cursors and procedures.

COURSE OUTCOMES

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

CO1	Create database tables and perform various operations
CO2	Implement PL/SQL programs
CO3	Create stored packages for variables and cursors

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT4L03.1	2	2	2	2	2	-	-	-	-	-	-	1	2	2	1
16IT4L03.2	3	2	2	2	2	-	-	-	-	-	-	1	2	2	1
16IT4L03.3	3	3	3	3	3	-	-	-	-	-	-	1	2	2	1

COURSE CONTENT

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



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	(Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date Functions (Sysdate, next_day, add months, last day, months between, least, greatest, trunc, Round, to char, to date)
5	i) Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found) ii) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block
6	Develop a program that includes the features NESTED IF, CASE and CASE expression. The Program can be extended using the NULLIF and COALESCE functions.
7	Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, raise-, application error
8	Programs development using creation of procedures, passing parameters IN and OUT of procedures
9	Program development using creation of stored functions, invoke functions in SQL Statements And write complex functions
10	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



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING LAB

(Common to CSE, IT)

Course Category	Professional Core	Course Code	16IT4L04
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	To make the students understand how to use Java to write applications.
2	To make the students implement object-oriented concepts, including classes, objects, methods, properties, abstraction, polymorphism, inheritance, encapsulation, and more.
3	To make the learners implement and use inheritance and polymorphism, including interfaces and abstract classes, Packages.
4	To make the learners proficient in designing appropriate Exception Handling using Java methods.
5	To make students understand Threads, Files and I/O Streams, Applets in java.

COURSE OUTCOMES

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

CO1	Implementing java programs using basic concepts, classes and objects.
CO2	Applying the concepts of Inheritance and Exceptions in java programs.
CO3	Develop java programs using Threads, applets and awt components.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT4L04.1	2	2	2	2	1	-	-	-	1	-	-	2	2	2	1
16IT4L04.2	2	3	3	2	1	-	-	-	1	-	-	2	2	2	2
16IT4L04.3	2	3	3	2	1	-	-	-	-	-	-	2	3	2	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 display the Fibonacci sequence
2	a) Write a JAVA program to check whether given string is palindrome or not. b) Write a JAVA program to sort given list of numbers.
3	a) Write a JAVA program give example for command line arguments. b) Write a JAVA program to sort an array of strings



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

4	<p>a) Write a JAVA program for the following</p> <ol style="list-style-type: none">1. Example for call by value.2. Example for call by reference. <p>b) Write a JAVA program to give the example for 'this' operator. And also use the 'this' keyword as return statement</p>
5	<p>a) Write a JAVA program to demonstrate static variables, methods and blocks,</p> <p>b) Write a JAVA program to give the example for 'super' keyword.</p> <p>c) Write a JAVA program demonstrating the difference between method overloading and method overriding.</p> <p>d) Write a JAVA program demonstrating the difference between method overloading and constructor overloading.</p>
6	<p>a) Write a JAVA program that illustrates multi-level inheritance</p> <p>b) Write a JAVA program illustrating multiple inheritance using interfaces.</p> <p>c) Write a JAVA program to give a simple example for abstract class.</p>
7	<p>a) Write a JAVA program to create a package named pl, and implements this package in ex 1 class.</p> <p>b) Write a JAVA program to create a package named my pack and import it in circle class.</p>
8	<p>a) Write a JAVA program to illustrate sub class exception precedence over base class.</p> <p>b) Write a JAVA program for example of try and catch block. In this check whether the given array size is negative or not.</p> <p>c) Write a JAVA program for creation of user defined exception</p>
9	<p>a) Write a JAVA program to illustrate creation of threads using Runnable interface. (Start method starts each of the newly created thread. Inside the run method there is sleep() for suspend the thread for 500milliseconds).</p> <p>b) Write a JAVA program to create a class My thread in this class a constructor, call the base class constructor, using super and starts the thread. The run method of the class starts after this. It can be observed that both main thread and created child thread are executed Concurrently.</p>
10	<p>Write a JAVA program that describes the life cycle of an applet</p> <p>Write a JAVA program to create a dialog box and menu.</p>
11	<p>a) Write a JAVA program to create a border layout control.</p> <p>b) Write a JAVA program to create a simple calculator.</p>
12	<p>a) Write a JAVA program that displays that x and y position of the cursor movement using Mouse.</p> <p>b) Write a JAVA program that displays number of characters, lines and words in a text file.</p>



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

III Year I Semester

ADVANCED JAVA PROGRAMMING

Course Category		Professional Core	Course Code	16IT5T09
Course Type		Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites			Internal Assessment Semester End Examination Total Marks	40 60 100
COURSE OBJECTIVES				
1	Getting the student to be well trained in Advanced Java Programming skills for an easy entry in the IT Industry.			
COURSE OUTCOMES				
Upon successful completion of the course, the student will be able to:				Blooms Taxonomy Level
CO1	Build Java Swing Applications.			Applying
CO2	Code Java Programs using classes and interfaces from Java Collections Framework.			Applying
CO3	Develop Web Applications using Servlets.			Applying
CO4	Create and execute Java Server Pages using Tomcat Web Server.			Applying
CO5	Execute database queries using JDBC.			Applying
CO6	Design a simple Web Application using MVC Architecture (Struts Framework).			Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT5T09.1	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT5T09.2	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT5T09.3	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT5T09.4	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT5T09.5	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT5T09.6	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Swings: Swings is built on AWT, Two key swing features, MVC connection, Components & Containers, The swing packages, A simple swing application, Event handling, Create swing Applet. Exploring Swings: J label & Image Icon, JTextField, The swing Buttons, JTabbedPane, JList, JComboBox, JTable.
UNIT II	Collection Framework: Collections overview, Collection interfaces: Collection, List, Set, and Queue. Collection Classes: Array List, Linked List, Hash Set, Priority Queue, TreeSet. Accessing a collection via an iterator, working with maps, Comparators, StingTokenizer, Random, Observable.
UNIT III	Introduction to Servelets: Lifecycle of a Servlet, Servlet development options, Simple Servlet, The Servlet API, The javax.servelet Package, Reading Servlet parameters, The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking.
UNIT IV	Introduction to JSP: The Problem with Servlet, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Installing the Tomcat Server & Testing Tomcat, Generating Dynamic Content, Using Scripting Elements, Error Handling and Debugging, Sharing Data between JSP pages, Requests, and Users.
UNIT V	JDBC: Database Drivers: Type1, Type2, Type3 and Type4. Javax.Sql package: Connection management, Database access, Data Types, Database Metadata, Exceptions and Warnings, Loading a database driver and opening connections, Establishing a connection, Creating and executing SQL statements, prepared statement, Scrollable & Updatable resultset, javax.sql.DataSource Interface.
UNIT VI	Struts Framework: Two development models, a closer look at Model-View-Controller architecture, Basic components of struts, Building a simple strut application. Controller Layer: Struts & Controller layer, Action Servlet class, Action Class.
TEXT BOOKS	
1.	The Complete Reference, Java, 9ed, Herbert Schildt. (Unit 1,2,3)
2.	Java Server Pages, Hans Bergstan, Oreilly. (Unit 4)
3.	Professional Java Server Programming, Subrahmanyam Allamaraju, Apress. (Unit 5)
4.	The Complete Reference Struts, James Holmes. (Unit 6)
REFERENCE BOOKS	
1.	Jakarta Struts Cook Book, Bill Siggelkow, SPD, Oreilly (Chapter 8)
2.	Murach's, Beginning Java JDK5, Murach, SPD.
3.	Programming World Wide Web, Sebesta, Pearson
4.	Building Web Applications, NIIT, PHI
5.	Beginning Web Programming, Jon Duckett, Wrox, Wiley
6.	Java server pages, Pekowsky, Pearson
WEB LINKS	
1.	http://java.cnam.fr/iagl/biblio/Serlvets%20&%20JSP%20-%20Falkner%20Jones.pdf
2.	https://struts.apache.org/maven/struts2-core/apidocs/index.html
3.	https://docs.oracle.com/javase/tutorial/jdbc/basics/index.html
4.	https://docs.oracle.com/javase/tutorial/collections/intro/index.html

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIX AND SHELL PROGRAMMING

Course Category	Professional Core	Course Code	16IT5T10
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Provides an introduction to the fundamentals of UNIX and Unix Utilities.
2	Expose students to Shell management, Programming and File Management.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Execute various Unix commands.	Applying
CO2	Manage various attributes of files like file type, ownership etc.	Understanding
CO3	Develop basic Unix shell programs.	Applying
CO4	Compare the usage of different filters.	Analyzing
CO5	Write shell programs using constructs like branching, looping etc.	Applying
CO6	Perform comparison between parent vs. child process and foreground vs. background processes.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

[illegible]



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction to Unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.
UNIT II	The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.
UNIT III	Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.
UNIT IV	Filters- The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language- Good Files and Good Filters.
UNIT V	Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The \$? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement
UNIT VI	The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs - The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes, Internal and External Commands-Process Creation-The Trap Command-The Stty Command-The Kill Command-Job Control.
TEXT BOOKS	
1.	The UNIX Programming Environment, Brain W. Kernighan & Rob Pike, Pearson.(Unit 2,3,4)
2.	Introduction to UNIX Shell Programming, M.G.Venkatesh Murthy, Pearson. (Unit 1,2,5&6)
REFERENCE BOOKS	
1.	UNIX and Shell Programming, B.M. Harwani, OXFORD university press.
2.	UNIX and Shell programming,N.B.Venkateswarulu, Reem Publications Pvt. Ltd.
WEB LINKS	
1.	https://www.tutorialspoint.com/unix/index.htm
2.	www.theunixschool.com/p/awk-sed.html
3.	https://nptel.ac.in/courses/106108101/pdf/PPTs/Mod_13.pdf
4.	https://nptel.ac.in/courses/106108101/pdf/Lecture_Notes/Mod%2013_LN.pdf
5.	http://nptel.ac.in/courses/117106113/



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Course Category	Professional Core	Course Code	16IT5T11
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	To provide knowledge of the underlying foundations on object-oriented design and analysis.
2	To apply various models for a software application using UML.
3	To depict various views used in analysis and design phases of a software project.
4	To discuss case studies and creation of respective models.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Relate various Object Models to problems	Understanding
CO2	Identify classes and responsibilities of the problem domain.	Understanding
CO3	Model classes, responsibilities and objects using UML notation	Applying
CO4	Model the behavior of the system using UML diagrams like Interaction, Use-case and Activity.	Applying
CO5	Construct UML diagrams to model reactive systems.	Applying
CO6	Perform architectural modeling using Deployment and Component Diagrams.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT5T11.1	3	3	3	3	2	3	-	-	-	-	3	3	2	3	-
16IT5T11.2	3	3	3	3	3	-	-	-	-	-	3	2	2	2	-
16IT5T11.3	3	3	3	3	3	-	-	-	-	-	3	3	3	2	-
16IT5T11.4	3	2	3	3	3	-	-	-	-	-	3	3	3	2	-
16IT5T11.5	3	3	2	3	3	-	-	-	-	-	3	3	3	2	-
16IT5T11.6	3	3	3	3	3	-	-	-	-	-	3	3	3	2	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model
UNIT II	Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms
UNIT III	Introduction to UML: The need for modelling, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.
UNIT IV	Basic Behavioural Modelling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams
UNIT V	Advanced Behavioural Modelling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
UNIT VI	Architectural Modelling: Component, Deployment, Component diagrams and Deployment diagrams. Case Study: The Unified Library application.
TEXT BOOKS	
1.	“Object- Oriented Analysis And Design with Applications”, Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, KelliaHouston, 3 rd edition, 2013, PEARSON.
2.	“The Unified Modelling Language User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 12 th Impression, 2012, PEARSON
REFERENCE BOOKS	
1.	Object-Oriented Analysis and Design using UML, Mahesh P. Matha, PHI
2.	Head First Object-Oriented Analysis and Design, Brett D. McLaughlin, Gary Pollice, Dave West, O'Reilly
3.	Object-Oriented Analysis and Design with the Unified Process, John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning
4.	The Unified ModelingLanguage Reference Manual, James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley
WEB LINKS	
1.	https://www.youtube.com/watch?v=UI6lqHOVHic
2.	https://www.tutorialspoint.com/uml/uml_object_diagram.htm
3.	https://www.uml-diagrams.org/component-diagrams.html
4.	https://www.uml-diagrams.org/deployment-diagrams-overview.html
5.	https://www.uml-diagrams.org/class-diagrams-overview.html

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OPERATING SYSTEMS

(Common to CSE and IT)

Course Category	Professional Core	Course Code	16CS5T13
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Understand the structure and functions of Operating Systems.
2	Learn process, disk and memory management
3	Learn basics of Linux and Android Operating Systems.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Survey the operating system services	Understanding
CO2	Evaluate Scheduling algorithms for process management	Analyzing
CO3	Compare various memory management schemes.	Analyzing
CO4	Evaluate process synchronization techniques to avoid deadlocks	Analyzing
CO5	Analyze the structure of file systems on secondary storage devices	Analyzing
CO6	Examine Operating System services in Linux and Android platforms.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS5T13.1	3	2	-	-	1	-	-	-	-	-	-	-	2	1	-
16CS5T13.2	3	3	3	2	1	-	-	-	-	-	-	2	3	1	1
16CS5T13.3	3	3	2	-	1	-	-	-	-	-	-	2	3	1	-
16CS5T13.4	3	3	3	3	1	-	-	-	-	-	-	2	3	1	3
16CS5T13.5	3	3	3	3	1	-	-	-	-	-	-	2	3	1	3
16CS5T13.6	3	3	-	2	2	-	-	-	-	-	-	-	2	2	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.
UNIT II	Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Interprocess Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms.
UNIT III	Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation Virtual Memory Management: Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing
UNIT IV	Concurrency: Process Synchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock
UNIT V	File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection. File System implementation- File system structure, allocation methods, free-space management Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers
UNIT VI	Linux System : Components of LINUX, Inter-process Communication, Synchronization, Interrupt, Exception and System Call. Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management
TEXT BOOKS	
1.	Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, John Wiley and Sons Inc., 9 th Edition, 2012.
2.	Operating Systems – Internals and Design Principles, William Stallings, Prentice Hall, 7 th Edition, 2011.
3.	Operating Systems, S Halder, Alex A Aravind, Pearson Education, Second Edition 2016.
REFERENCE BOOKS	
1.	Modern Operating Systems, Andrew S. Tanenbaum, Addison Wesley, Second Edition, 2001
2.	Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education, 1996.
3.	Operating Systems: A Concept-Based Approach, D M Dhamdhare, Tata Mc Graw-Hill Education, Second Edition, 2007.
WEB LINKS	
1.	http://nptel.ac.in/courses/106108101 (Prof. P.C.P. Bhatt, IISc Bangalore)



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE PROJECT MANAGEMENT

Course Category	Professional Core	Course Code	16IT5T12
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2	To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3	To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Classify the software project management activities	Understanding
CO2	Compare the iterative and incremental life cycle models.	Understanding
CO3	Estimate the effort required for a software project development.	Analyzing
CO4	Identify software risks.	Applying
CO5	Find out and schedule the required resources for the project execution.	Remembering
CO6	Enumerate the five different levels in Capability Maturity Model	Remembering

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT5T12.1	3	3	3	3	-	-	-	-	-	-	3	-	2	2	2
16IT5T12.2	3	3	3	3	-	-	-	-	-	-	3	-	2	3	2
16IT5T12.3	3	3	3	3	-	-	-	-	-	-	3	-	3	3	3
16IT5T12.4	3	3	3	3	-	-	-	-	-	-	3	-	3	3	3
16IT5T12.5	3	2	3	3	-	-	-	-	-	-	3	-	3	3	3
16IT5T12.6	3	3	3	2	-	-	-	-	-	-	3	-	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals. Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project Activities.
UNIT II	Project Approach Lifecycle models, Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows
UNIT III	Effort Estimation & Activity Planning Estimation techniques, Function Point analysis, SLOC, COCOMO, Activity Identification Approaches, Network planning models, Critical path analysis
UNIT IV	Risk Management Risk categories, Identification, Analysis, reducing risks, PERT technique, Monte Carlo approach.
UNIT V	Project Monitoring & Control, Resource Allocation Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling.
UNIT VI	Software Quality Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality.

TEXT BOOKS

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, Pankaj Jalote, Pearson.

REFERENCE BOOKS

1. Software Project Management, Joel Henry, Pearson Education.

WEB LINKS

1. <https://www.youtube.com/watch?v=5pwc2DYIKQU>
2. softwaretestingfundamentals.com/software-quality/
3. https://www.tutorialspoint.com/software_engineering/software_project_management.htm



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ADVANCED JAVA PROGRAMMING LAB

Course Category	Professional Core	Course Code	16IT5L05
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OUTCOMES

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

CO1	Build swing applications.
CO2	Use collection framework.
CO3	Develop web applications using JSP and Servlets.
CO4	Interact with database using JDBC.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT5L05.1	1	3	1	2	2	-	-	-	1	-	-	-	2	-	1
16IT5L05.2	2	2	2	2	3	-	-	-	2	-	-	-	2	1	-
16IT5L05.3	3	3	2	2	2	-	-	-	2	-	-	-	-	-	1
16IT5L05.4	3	3	2	2	2	-	-	-	2	-	-	-	2	-	3

COURSE CONTENT

1	Develop a simple swing application by using JLabel, JTextField, JButton.
2	Develop a swing application using JTable.
3	Write a java program to demonstrate the usage of ArrayList.
4	Write a java program to demonstrate the usage of HashMap.
5	Write a java program to illustrate the usage of StringTokenizer.
6	Write a java program to illustrate the usage of TreeSet.
7	Write a program to display a greeting message in the browser by using HttpServlet.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

8	Write a program to receive two numbers from a HTML form and display their sum in the browser by using HttpServlet.
9	Write a program to display a list of five websites in a HTML form and visit to the selected website by using Response redirection.
10	Write a JSP program to demonstrate the usage of implicit objects.
11	Write a JSP program on Scriptlets, Expression, and Declarations.
12	Write a program by using JDBC to execute a SQL query for a database and display the results.
13	Write a program by using JDBC to execute an update query without using Prepared Statement and display the results
14	Develop a mini HR application by using struts Framework.(2 Weeks)



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIX AND OPERATING SYSTEMS LAB

Course Category	Professional Core	Course Code	16IT5L06
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OUTCOMES

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

CO1	Stimulate CPU scheduling algorithms in OS
CO2	Implement page replacement algorithms in OS.
CO3	Implement File allocation strategies used OS.
CO4	Execute UNIX commands
CO5	Manage user accounts in UNIX.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT5L05.1	1	3	1	2	2	-	-	-	-	-	-	-	2	-	1
16IT5L05.2	2	2	2	2	3	-	-	-	-	-	-	-	2	1	2
16IT5L05.3	1	2	3	2	2	-	-	-	-	-	-	-	2	2	1
16IT5L05.4	2	2	2	2	2	-	-	-	-	-	-	-	2	2	1
16IT5L05.5	1	2	2	2	2	-	-	-	-	-	-	-	2	2	1

COURSE CONTENT

Operating Systems

1	Simulate the following CPU scheduling algorithms a) Round Robin b) SJF 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



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

5	Simulate Bankers Algorithm for Dead Lock Prevention.
6	Simulate the following page replacement algorithms. a) FIFO b) LRU
7	Simulate the following File allocation strategies a) Sequenced b) Indexed
UNIX and Shell Programming	
1	Basic Shell Commands
2	Shell Programs: Fibonacci Series
3	Designing Calculator
4	File Operations
5	Base conversion
6	Usage of cut and grep commands
7	Usage of user defined functions Administration
8	Managing User Accounts
9	User Quota Management
10	Installation of RPM software and Zipping, tar



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIFIED MODELING LANGUAGE LAB

Course Category	Professional Core	Course Code	16IT5L07
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100
COURSE OUTCOMES			
Upon successful completion of the course, the student will be able to:			
CO1	Design the UML models for the given applications.		
CO2	Represent solutions to the problems using UML.		

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT5L07.1	1	2	2	2	2	-	-	-	-	-	3	-	3	3	-
16IT5L07.2	3	3	2	2	2	-	-	-	-	-	3	-	3	3	-

LIST OF EXPERIMENTS:

Case Study 1: Customer Support System.

Case Study 2: Banking Application.

Case Study 3: Library Management System.

For the above Case Studies:

1	Identification of analysis classes, Identification of responsibilities of each class.
2	Identification of attributes of each class, Identification of relationships of classes.
3	Construction of UML class diagram.
4	Construction of sequence diagram. (2 Weeks)
5	Construction of collaboration diagram.
6	Identification of actors, identification of use cases, flow of events, construction of use case diagram.
7	Building a business process model using UML activity diagram. (2 Weeks)
8	Analyzing the object behavior by constructing the UML state chart diagram. (2 Weeks)
9	Model the component diagrams.
10	Model the deployment diagrams.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

PROFESSIONAL ETHICS AND HUMAN VALUES

Course Category	Humanities	Course Code	16BH5T17
Course Type	Theory	L-T-P-C	0 – 2 – 0 – 0
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE CONTENT

UNIT I	Professional Ethics and Human values: Ethics -History of Ethics-Types of Ethics, Professional Ethics and its forms -Significance-Personal ethics vs Professional Ethics, Morals, Values – Integrity – Work Place Ethics and Business Ethics –Ethics in HRM, Finance, Marketing Management – Civic Virtue –Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value time –Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.
UNIT II	Engineering Ethics: Engineering Ethics-Meaning & Purpose of Engineering Ethics- Consensus and Controversy –Profession, Professional and Professionalism –Key Characteristics of Engineering Professionals – Professional Roles to be played by an Engineer-Self Interest, Customs and Religion- Ethical Theories-Meaning & Uses of Ethical Theories-Types of Inquiry -Theories of moral Development-Kohlberg’s Theory – Gilligan’s Argument –Heinz’s Dilemma.
UNIT III	Engineering as Social Experimentation: Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Relevant Information – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Accountability – Role of Codes – Codes and Experimental Nature of Engineering- Ethical issues involved in Clinical Trials.
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	Engineers Responsibilities and Rights: Collegiality-Techniques for Achieving Collegiality – Loyalty -Two Senses of Loyalty-obligations of Loyalty-Misguided Loyalty – professionalism and Loyalty- Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems - Ethical egoism-Collective bargaining-Confidentiality-Acceptance of Bribes/Gifts when is a Gift and a Bribe-examples of Gifts v/s Bribes-problem solving-interests in other companies-Occupational Crimes-industrial espionage-price fixing-endangering lives- Whistle Blowing-types of whistle blowing-when should it be attempted-preventing whistle blowing.
UNIT VI	Global Issues: Globalization-Problems of globalization- Cross-culture Issues Environmental Ethics-Computer Ethics-computers as the instrument of Unethical behaviour-computers as the object of Unethical Acts-autonomous computers computer codes of Ethics-Weapons Development-Ethics and Research-Analyzing Ethical Problems in Research-Food and Drug Adulteration. Relevant case studies shall be dealt where ever necessary

REFERENCE BOOKS

1.	Engineering Ethics includes Human Values,M.Govindarajan, S.Natarajan and V.S.SenthilKumar, PHI Learning Pvt.Ltd., 2009.
2.	Professional Ethics and Morals, Prof.A.R.Aryasri, DharanikotaSuyodhana, Maruthi Publications.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

3.	Professional Ethics and Human Values,A.Alavudeen, R.Kalil Rahman and M.Jayakumaran, Laxmi Publications
4.	Professional Ethics and Human Values, Prof.D.R.Kiran.
5.	Indian Culture, Values and Professional Ethics, PSR Murthy, BS Publication.
6.	Ethics in Engineering, Mike W. Martin and Roland Schinzinger, Tata McGraw- Hill, 2003.
7.	Engineering Ethics, Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

III

Year II Semester

COMPUTER NETWORKS (Common to CSE and IT)

Course Category	Professional Core	Course Code	16CS6T15
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Understand the basic taxonomy, terminology and architectures of the computer networks.
2	Analyze the services, protocols and features of the various layers of computer networks.
3	Understand the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Conceptualize the data communication models using OSI/ISO and TCP/IP protocol architectures.	Analyzing
CO2	Analyze protocols implemented in data link layer for error and flow control.	Analyzing
CO3	Analyze the features and operations of different MAC mechanisms.	Analyzing
CO4	Build the skills of subnetting and routing mechanisms.	Applying
CO5	Choose network protocols by elucidate the way protocols currently in use in the Internet like IPv4, IPv6, ICMP, ARP, RARP, DHCP operate.	Applying
CO6	Develop client/server-based applications using TCP and UDP protocols.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS6T15.1	3	3	2	2	2	-	-	-	-	-	-	-	2	2	2
16CS6T15.2	3	3	2	3	3	-	-	-	-	-	-	-	3	3	2
16CS6T15.3	2	3	2	3	2	-	-	-	-	-	-	-	3	2	2
16CS6T15.4	3	3	3	3	2	-	-	-	-	-	-	2	3	2	3
16CS6T15.5	3	3	2	3	2	-	-	-	-	-	-	-	3	2	2
16CS6T15.6	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model. Physical Layer: Guided transmission media, wireless transmission media
UNIT II	Data Link Layer - design issues, Error Detection and error correction codes, CRC codes, Elementary Data Link Layer Protocols, Flow control -sliding window protocols: stop-and-wait ARQ, Go-back-n ARQ, Selective Repeat ARQ, HDLC
UNIT III	Multi Access Protocols - ALOHA, CSMA – CSMA/CD, CSMA/CA, Collision free protocols, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.
UNIT IV	Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection-oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count- to -Infinity Problem, Hierarchical Routing
UNIT V	Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, introduction to IPv6 Protocol, IP addresses, ICMP, ARP, RARP, DHCP
UNIT VI	Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery. The internet transport protocols – UDP, TCP. Application Layer- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH
TEXT BOOKS	
1.	Data Communications and Networking, Behrouz A.Forouzan, TMH, 5 th Edition, 2013
2.	Computer Networks, Andrew S Tanenbaum, Pearson Education, 4 th Edition, 2003.
REFERENCE BOOKS	
1.	An Engineering Approach to Computer Networks, S. Keshav, Pearson Education, 2 nd Edition, 1997.
2.	Understanding communications and Networks, W. A. Shay, Cengage Learning, 3 rd Edition, 2004.
WEB RESOURCES	
1.	http://nptel.ac.in/courses/106105081/1 (Prof. Sujoy Ghosh, IIT, Kharagpur)
2.	http://epgp.inflibnet.ac.in/view_f.php?category=1736
3.	http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e_videonotes/tanenbaum_videoNotes.html



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA MINING

Course Category	Professional Core	Course Code	16IT6T13
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

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

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Classify data mining system and its Functionalities.	Understanding
CO2	Categorize Data Preprocessing Activities.	Applying
CO3	Generate Association Rules by using Apriori and FP-Growth Algorithms.	Applying
CO4	Classify the given data using Bayesian Classification Algorithm.	Applying
CO5	Illustrate Alternative Techniques in classification.	Applying
CO6	Divide the given data into clusters using K-means, Hierarchical Clustering and DBSCAN Algorithms	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6T13.1	3	3	2	3	2	-	-	-	-	-	-	-	2	1	2
16IT6T13.2	3	3	2	3	3	-	-	-	-	-	-	-	2	2	2
16IT6T13.3	3	3	3	3	3	-	-	-	-	-	-	1	2	2	2
16IT6T13.4	3	3	3	3	2	-	-	-	-	-	-	1	2	2	2
16IT6T13.5	3	3	3	3	3	-	-	-	-	-	-	2	2	3	2
16IT6T13.6	3	3	3	3	3	-	-	-	-	-	-	2	2	2	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction: Importance and motivation for Data Mining; Data Mining- Kinds of data, Functionalities, Patterns and Interesting Patterns; Classification of Data Mining Systems, Data Mining Task Primitives, Major Issues in Data Mining, Measuring Data Similarity and Dissimilarity.
UNIT II	Data Pre-processing: Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.
UNIT III	Association Analysis: Basic Concepts and Algorithms: Introduction, Frequent Itemsets, closed Itemsets Association rules, Apriori Algorithm, Improvements to Apriori algorithm, FP-Growth Algorithm.
UNIT IV	Classification: Basic Concepts, General Approach to solving a classification problem. Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction, Bayes' Theorem, Naïve Bayesian Classification.
UNIT V	Classification-Alternative Techniques: Classification using ANN (BPA), Associative Classification, kNN Classifier, Bagging and Boosting.
UNIT VI	Cluster Analysis: Introduction to Cluster Analysis, Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Basic Agglomerative Hierarchical Clustering Algorithm, BIRCH algorithm, DBSCAN Algorithm.
TEXT BOOKS	
1.	Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.
2.	Introduction to Data Mining, Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
REFERENCE BOOKS	
1.	Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2.	Data Mining: Introductory and Advanced topics: Dunham, Pearson.
3.	Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
4.	Data Mining Techniques, Arun K Pujari, Universities Press.
5.	Data Mining, CharuC.Aggarwal, Springer.
WEB LINKS	
1.	http://www.saedsayad.com/data_mining_map.htm
2.	https://onlinecourses.nptel.ac.in/noc18_cs14/preview
3.	https://onlinecourses.nptel.ac.in/noc18-mg11/preview



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

WEB TECHNOLOGIES

Course Category	Professional Core	Course Code	16IT6T14
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web.
2	The course will introduce web-based media-rich programming tools for creating interactive web pages.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Identify elements and attributes of a web page	Applying
CO2	Develop client side manipulations in web pages using Java Script.	Applying
CO3	Write simple scripts using AJAX and compare DOM & SAX XML Parsers.	Understanding
CO4	Build web applications using PHP.	Applying
CO5	Implement programming through PERL	Applying
CO6	Create applications using Ruby.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6T14.1	3	3	3	3	2	-	-	-	-	-	-	2	3	3	3
16IT6T14.2	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT6T14.3	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT6T14.4	3	3	3	2	3	-	-	-	-	-	-	3	3	3	3
16IT6T14.5	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
16IT6T14.6	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONETET	
UNIT I	HTML, CSS Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5 CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model
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
UNIT III	XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches, AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX. Web Services: SOAP, WSDL
UNIT IV	PHP Programming: Introducing PHP: Creating PHP script, Running PHP script. Working with variables and constants: Using variables, Using constants, Data types, Operators Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases such as MySQL.
UNIT V	Introduction to PERL, Operators and if statements, Program design and control structures, Arrays, Hashes and File handling, Regular expressions, Subroutines, Retrieving documents from the web with Perl.
UNIT VI	Introduction to Ruby, Variables, types, simple I/O, Control, Arrays, Hashes, Methods, Classes, Iterators, Pattern Matching. Overview of Rails.
TEXT BOOKS	
1.	Programming the World Wide Web, Robert W Sebesta, 7ed, Pearson.
2.	Web Technologies, Uttam K Roy, Oxford.
3.	The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrell, Gosselin, Zak, Karparhi, MacIntyre, Morrissey, Cengage.
REFERENCE BOOKS	
1.	Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006).
2.	Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012).
3.	Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4.	An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning.
5.	http://www.upriss.org.uk/perl/PerlCourse.html
WEB LINKS	
1.	https://www.w3schools.com/html/html_lists.asp
2.	https://www.w3schools.com/xml/
3.	www.tutorialspoint.com/ajax/
4.	https://mva.microsoft.com/en-us/training-courses/getting-started-with-web-technologies-15937?l=5ovpdCq9B_2406218949



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE TESTING

Course Category	Professional Core	Course Code	16IT6T15
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	The need for testing, types of bugs and their consequences.
2	Path testing, system testing and Domain testing and its applications.
3	Paths of various flow graphs, their interpretations and applications.
4	Logic based testing and its implementation.
5	State graphs and transition testing, matrix of a graph and node reduction algorithms.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	List out various factors affecting the software testing process.	Remembering
CO2	Compare various Black Box Testing Techniques.	Understanding
CO3	Perform White Box Testing.	Applying
CO4	Differentiate between Progressive and Regressive Testing.	Analyzing
CO5	Prioritize Test Cases and Apply Software quality metrics.	Analyzing
CO6	Enumerate the Tools for Test Automation.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6T15.1	3	3	2	2	-	-	-	-	-	-	2	-	-	2	2
16IT6T15.2	3	3	3	2	2	-	-	-	-	-	2	-	-	3	2
16IT6T15.3	3	3	3	2	3	-	-	-	-	-	-	-	2	-	-
16IT6T15.4	3	3	-	2	3	-	-	-	-	-	-	-	2	-	-
16IT6T15.5	3	3	3	3	3	-	-	-	-	-	3	3	2	-	-
16IT6T15.6	3	3	2	2	3	-	-	-	-	-	2	3	2	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Software Testing: Introduction, Model for testing, Effective Vs Exhaustive Software Testing, Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to development life cycle, Software Testing Methodology.
UNIT II	Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation. Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing
UNIT III	Dynamic Testing II: White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing. Static Testing: inspections, Structured Walkthroughs, Technical reviews
UNIT IV	Validation activities: Unit testing, Integration Testing, Function testing, system testing, acceptance testing. Regression testing: Progressives Vs. regressive testing, Regression testability, Objectives of regression testing, Regression testing types, Regression testing techniques
UNIT V	Efficient Test Suite Management: Test case design, Need for the growth of test suite, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques
UNIT VI	Automation and Testing Tools: need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools. Testing Web based Systems: Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

TEXT BOOKS

1.	Software Testing, Principles and Practices, Naresh Chauhan, Oxford
2.	Foundations of Software testing, Aditya P Mathur, 2ed, Pearson
3.	Software Testing- Yogesh Singh, Cambridge.

REFERENCE BOOKS

1.	Software Testing Techniques,BarisBeizer, International Thomson computer press, second edition.
2.	Software Testing, Principles, Techniques and Tools, M G Limaye, TMH.
3.	Effective Methods for Software Testing, Willian E Perry, 3ed, Wiley.

WEB LINKS

1.	http://www.softwaretestingclass.com/what-is-black-box-testing/
2.	http://www.softwaretestingclass.com/white-box-testing/
3.	http://www.360logica.com/blog/what-are-different-regression-testing-tools-and-techniques/
4.	https://onlinecourses.nptel.ac.in/noc16_cs16/
5.	http://www.testingtools.com/test-automation/

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OPEN ELECTIVE

I. ARTIFICIAL INTELLIGENCE

Course Category	Open Elective	Course Code	16IT6E01
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Learn about basic AI fundamentals and AI problems
2	Students will gain an understanding about searching
3	Study about AI game playing concepts
4	Understand about AI knowledge
5	Students will know about AI order logic

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	State applications of Artificial Intelligence.	K1
CO2	Discuss problem solving strategies in AI.	K2
CO3	Illustrate problem reduction techniques.	K2
CO4	Explain logic concepts.	K2
CO5	Analyze the current knowledge representation techniques in AI.	K4
CO6	Investigate various expert systems.	K4

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6E01.1	2	2	1	1	-	-	-	-	-	-	-	-	2	1	-
16IT6E01.2	2	2	1	1	-	-	-	-	-	-	-	-	2	1	-
16IT6E01.3	2	2	1	1	-	-	-	-	-	-	-	-	2	1	-
16IT6E01.4	2	2	1	1	-	-	-	-	-	-	-	-	2	1	-
16IT6E01.5	2	2	1	1	-	-	-	-	-	-	-	-	2	1	-
16IT6E01.6	2	2	1	1	-	-	-	-	-	-	-	-	2	1	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to artificial intelligence: Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-toe game playing, current trends in AI.
UNIT II	Problem solving: state-space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative deepening a*, constraint satisfaction.
UNIT III	Problem reduction and game playing: Introduction, problem reduction, game playing, alpha beta pruning.
UNIT IV	Logic concepts: Introduction, propositional calculus, propositional logic, natural deduction system, axiomatic system.
UNIT V	Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, advanced knowledge representation techniques: Introduction, conceptual dependency theory, script structure.
UNIT VI	Expert system: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance system.

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB LINKS

1.	www.cs.jhu.edu/~phi/ai/slides/lecture-inference-in-first-order-logic.pdf
2.	https://en.wikipedia.org/wiki/History_of_artificial_intelligence
3.	www.imada.sdu.dk/~marco/DM828/Slides/dm828-lec18.pdf



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

II. MANAGEMENT INFORMATION SYSTEM

Course Category	Open Elective	Course Code	16IT6E02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Students are able to understand the usage of Information Systems in management. The students also would understand the activities that are undertaken in acquiring an Information System in an organization. Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organization.
----------	---

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Identify key organization objectives and processes of an information system.	Applying
CO2	Enumerate Mathematical, Graphical and Hierarchical for representing system.	Analyzing
CO3	Perform Classification and Compression of Information content.	Understanding
CO4	Identify information needed to Support Decision Making.	Applying
CO5	Analyze the Information System Application like Basic Accounting Budgeting and Planning.	Analyzing
CO6	Compare different methodologies for Maintenance of Information Systems.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6E02.1	3	3	1	2	-	-	-	-	-	-	-	-	-	-	2
16IT6E02.2	3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
16IT6E02.3	3	3	3	3	-	-	-	-	-	-	-	-	2	3	-
16IT6E02.4	3	3	3	2	-	-	-	-	-	-	-	-	3	-	-
16IT6E02.5	3	3	3	3	-	-	-	-	-	-	-	-	3	-	2
16IT6E02.6	3	3	3	3	-	-	-	-	3	-	-	-	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Information System and Organization Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development –User role in Systems Development Process – Maintainability and Recoverability in System Design.
UNIT II	Representation and Analysis of System Structure Models for Representing Systems: Mathematical, Graphical and Hierarchical organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture – Application of System Representation to Case Studies.
UNIT III	Systems, Information and Decision Theory Information Theory – Information Content and Redundancy – Classification and Compression –Summarizing and Filtering – Inferences and Uncertainty.
UNIT IV	Identifying Information needed to Support Decision Making – Human Factors – Problem Characteristics and Information System Capabilities in Decision Making.
UNIT V	Information System Application Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing– Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection –Cost Benefit – Centralized versus Decentralized Allocation Mechanism.
UNIT VI	Development and Maintenance of Information Systems Systems analysis and design – System development life cycle – Limitation – End user Development – Managing End Users – off– the shelf software packages – Outsourcing – Comparison of different methodologies.
TEXT BOOKS	
1.	Management Information Systems: Managing the Digital Firm, Ken Laudon, Jame Laudon, Rajanish Dass, 11 th edition, Pearson Education, 2010.
2.	Management Information Systems - Organization and Technology in the Networked Enterprise, K.C.Laudon, J.P.Laudon, Sixth Edition, Prentice Hall, 2000.
REFERENCE BOOKS	
1.	Introduction to Information Technology, E.F. Turban, R.K. Turban, R.E. Potter, John Wiley and Sons, 3 rd Edition, 2004.
2.	Management Information Systems: Managing the Digital Firm”, Wiley and M.E. Brabston Pearson Education, 2002.
3.	Modern Systems Analysis and Design, Jeffrey A. Hoffer, Joey F. George and Joseph S. Valachich Third Edition, Prentice Hall, 2002.
4.	Management Information System-The Manager’s View, Robert Schulthesis and Mary Sumner, Tata Mc Graw Hill New Delhi.
5.	Management Information Systems-Text and Cases, Waman S Jawadekar, Tata Mc Graw Hill New Delhi.
6.	Management Information Systems, O’Brien, 9e, Tata McGraw-Hill Education.
WEB LINKS	
1.	https://www.ccri.edu/it/mis/
2.	csb.uncw.edu/isom/mis.html
3.	https://www.inc.com/encyclopedia/management-information-systems-mis.html
4.	mbaexamnotes.com/management-information-system-notes.html
5.	https://www.slideshare.net/HarishChand5/management-information-system-full-notes



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

III. DIGITAL SIGNAL PROCESSING

Course Category	Open Elective	Course Code	16EC6E01
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OBJECTIVES

1	Representation of discrete time signals, systems and their solutions using Z transforms
2	Learn the concepts of DFS, DFT and FFT
3	Study and design of infinite impulse response (IIR) digital filters
4	Study the concepts and design of finite impulse response (FIR) digital filters
5	Learn about multi rate signal processing
6	Study of various Digital Signal Processors and Architectures

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Comprehend the representation of discrete time signals and systems.	Understanding
CO2	Show discrete time signals in frequency domain using DFS, DFT and FFT	Applying
CO3	Design of IIR filters with digitization techniques for the given specifications	Applying
CO4	Implement of FIR filters with windowing techniques for the given specifications	Understanding
CO5	Interpret sampling rate conversion like decimation and interpolation	Remembering
CO6	Know the architectures of DSP processors for signal processing applications	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16EC6E01.1	3	1	1	1	-	-	-	-	-	-	-	1	2	1	1
16EC6E01.2	3	3	1	2	-	-	-	-	-	-	-	1	2	1	1
16EC6E01.3	3	2	2	2	-	-	-	-	-	-	-	1	2	1	1
16EC6E01.4	3	2	1	2	-	-	-	-	-	-	-	1	2	1	1
16EC6E01.5	3	2	-	1	-	-	-	-	-	-	-	1	2	1	1
16EC6E01.6	1	2	-	1	-	-	-	-	-	-	-	1	1	1	0



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction: Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems. Review of Z-transforms: Applications of Z – transforms, solution of difference equations.
UNIT II	Discrete Fourier Series & Fourier Transforms: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT.
UNIT III	Realization of Digital Filters: - Digital Filters Basic structures of IIR systems, Transposed forms IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations.
UNIT IV	FIR Digital Filters: Basic structures of FIR systems, System function, Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters
UNIT V	Multirate Digital Signal Processing: Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.
UNIT VI	Introduction to DSP Processors: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Architecture of TMS 320C5X-Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Register, Index Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, Some flags in the status registers, On- chip registers, On-chip peripherals.
TEXT BOOKS	
1.	Digital Signal Processing, Principles, Algorithms, and Applications, John G. Proakis, Dimitris G. Manolakis, 4 th edition, Pearson Education, PHI, 2013.
2.	Discrete Time Signal Processing, A.V. Oppenheim and R.W. Schaffer, 4 th edition, PHI, 2007
3.	Digital Signal Processors, Architecture, Programming and Applications, B. Venkataramani, M. Bhaskar, Tata McGraw Hill, 2002.
4.	Digital Signal Processing Implementation using DSP microprocessors, Avtar Singh and S. Srinivasan, 2 nd edition, Thomson Brooks, 2004.
REFERENCE BOOKS	
1.	Digital signal Processing, A Anand Kumar, Eastern economy edition, PHI, 2013.
2.	Digital Signal Processing, MH Hayes, Schaum's Outlines, 2 nd edition, TATA Mc-Graw Hill, 2009.
3.	Digital Signal Processing, Tarun Kumar Rawat, First edition, Oxford, 2015
WEB LINKS	
1.	www.nptelvideos.in/2012/12/digital signal processing.html

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

IV. EMBEDDED SYSTEMS

Course Category	Open Elective	Course Code	16EC6E04
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	The basic concepts of an embedded system are introduced.
2	Basic working of a microcontroller system and its programming in assembly language are explained.
3	Different Real time operating systems and scheduling in embedded systems is elaborated.
4	Importance of inter task communication in Embedded systems were presented and explained.
5	Familiarize with fundamental problems in embedded systems when solving consumer-producer problem.
6	Develop familiarity with tools used to develop in an embedded environment.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Understand the basic concepts of an embedded system	Understanding
CO2	Know an embedded system design approach to perform a specific function with help of 8-bit microcontrollers.	Analyzing
CO3	Familiarize with Task scheduling in to control the functions of various Real time applications	Analyzing
CO4	Identify the unique approach of real-time operating systems through inter task communication	Analyzing
CO5	solve consumer –producer problem through a design approach which integrates embedded hardware and fire ware	Applying
CO6	Familiarize with different embedded system tools used for real time applications	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

[illegible]



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.
UNIT II	8-bit microcontrollers architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.
UNIT III	RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non-preemptive, preemptive scheduling.
UNIT IV	Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.
UNIT V	The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.
UNIT VI	Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trend in embedded Industry, Introduction to ARM family of processor.
TEXT BOOKS	
1.	Introduction to Embedded Systems, Shibu. K.V, TMH, 2009.
REFERENCE BOOKS	
1.	The 8051 Microcontroller & Embedded Systems using Assembly and C, Ayala andGadr, CENGAGE
2.	Embedded Systems, Rajkamal, TMH, 2009.
3.	Embedded Software Primer, David Simon, Pearson.
4.	The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

V. ROBOTICS

(Common for ME, ECE, EEE, CSE and IT)

Course Category	Open Elective	Course Code	16ME6E01
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	Robot applications, classifications, controlling systems and automation.
2	Robot components, their architecture, work envelope and types of drive systems.
3	Homogeneous transformations and Manipulator Kinematics of robots.
4	Robotic arm motion by using Mathematical approach.
5	Trajectory planning for a manipulator by avoiding obstacles and programming languages, software packages for path description to robots.
6	Functioning of sensors, actuators and Robot applications in manufacturing.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Classify the coordinate systems and control systems of a robot.	Understanding
CO2	Explain the architecture of a robot.	Understanding
CO3	Analyze kinematics of a serial manipulator.	Analyzing
CO4	Analyze dynamics of serial manipulator.	Analyzing
CO5	Develop the trajectory planning algorithms using programming languages.	Applying
CO6	Illustrate the applications of robots in manufacturing, select the actuators and feedback components for a given robot application	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16ME6E01.1	1	1	2	-	-	-	-	-	-	-	-	-	1	1	1
16ME6E01.2	1	1	3	-	-	-	-	-	-	-	-	-	-	1	1
16ME6E01.3	2	3	1	1	1	-	-	-	-	-	-	-	-	1	1
16ME6E01.4	2	3	1	1	1	-	-	-	-	-	-	-	-	1	1
16ME6E01.5	2	1	2	2	2	-	-	-	-	1	-	-	-	2	2
16ME6E01.6	1	1	-	2	2	1	2	1	1	-	2	2	2	1	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.
UNIT II	Components of the Industrial Robotics: Function line diagram representation of robot arms, common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.
UNIT III	Motion Analysis: Homogeneous transformations as applicable to rotation and translation – problems. Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.
UNIT IV	Differential transformations and manipulators, Jacobians–problems. Dynamics: Lagrange – Euler and Newton – Euler formulations – Problems.
UNIT V	General considerations in path description and generation Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages-description of paths with a robot programming languages.
UNIT VI	Robot actuators and Feedback components: Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors. Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading Processing - spot and continuous arc welding & spray painting - Assembly and Inspection
TEXT BOOKS	
1.	Industrial Robotics, Groover M P, Pearson Edu.
2.	Robotics and Control, Mittal R K &Nagrath, I J / TMH.
REFERENCE BOOKS	
1.	Robotics, Fu K S, McGraw Hill.
2.	Robotic Engineering, Richard D. Klafter, Prentice Hall.
3.	Robot Analysis and Intelligence, Asada and Slow time, Wiley Inter-Science.
4.	Introduction to Robotics, John J Craig, Pearson Edu.
WEB LINKS	
1.	http://www.nptel.ac.in/courses/112101099/1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

VI. OPERATIONS RESEARCH

(Only for IT)

Course Category	Open Elective	Course Code	16ME6E02
Course Type	Theory	L-T-P-C	4 – 0 – 0 – 3
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE OBJECTIVES

1	Types of principles to find solutions to linear programming and its importance.
2	Formulation of transportation problems and their applications and optimal solutions.
3	Sequence the jobs and machines while processing to find out the processing time and applications of assignment problems.
4	Calculate the optimal strategies of players by using various methods.
5	Replacement of machine/equipment and waiting line problems applications in industries.
6	Types of principals to find solutions to dynamic programming and its importance.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Formulate the objective function by linear programming problem and find solution to it	Remembering
CO2	Make use of transportation and assignment problems to find the optimal solutions to the objective function.	Understanding
CO3	Apply in sequencing the jobs on a machine and items replacements	Applying
CO4	Calculate the optimal strategies of players by using various methods.	Analyzing
CO5	Replacement of machine/equipment and waiting line problems applications in industries.	Applying
CO6	Make use of principle of dynamic programming in planning budget and shortest path problems.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16ME6E02.1	3	3	3	-	3	-	-	-	-	3	3	-	3	1	3
16ME6E02.2	3	3	3	1	3	-	-	-	-	3	3	-	3	1	3
16ME6E02.3	3	3	3	1	3	-	-	-	-	3	3	-	3	1	3
16ME6E02.4	3	3	3	2	3	-	-	-	-	3	3	-	3	2	3
16ME6E02.5	3	3	3	1	3	-	-	-	-	3	3	-	3	2	3
16ME6E02.6	3	3	3	2	3	-	-	-	-	3	3	-	3	1	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	INTRODUCTION TO OPERATION RESEARCH – definition, Scope, objectives, characteristics and phases – types of operation research models – Limitations and applications. ALLOCATION: Linear programming problem formulation – graphical solution – simplex method – artificial variables techniques -two-phase method, big-M method – duality principle. Degeneracy and unbound solutions.
UNIT II	TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem. –Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method, degeneracy. Optimality test: the stepping stone method and MODI method.
UNIT III	ASSIGNMENT PROBLEM – formulation – optimal solution - variants of assignment problem- traveling salesman problem. SEQUENCING – Introduction – flow –shop sequencing – n jobs through two machines – n jobs through three machines – job shop sequencing – two jobs through 'm' machines.
UNIT IV	THEORY OF GAMES: Introduction – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2×2 games – dominance principle – $m \times 2$ & $2 \times n$ games -graphical method.
UNIT V	REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement. WAITING LINES: Introduction – single channel – poisson arrivals –exponential service times – with infinite population and finite population models– multichannel – poisson arrivals – exponential service times with infinite population single channel poisson arrivals.
UNIT VI	DYNAMIC PROGRAMMING: Introduction – Bellman's principle of optimality – applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem. Sample computer programme for simplex method, travelling sales man problem and queing model.
TEXT BOOKS	
1.	Operations Research, S.D.Sharma, Kedarnath.
REFERENCE BOOKS	
1.	Operations Research,A.M.Natarajan, P. Balasubramani, A.Tamilarasi, Pearson Education.
2.	Operations Research,R.Pannerselvam,PHI Publications.
3.	Operations Research, Wagner, PHI Publications.
4.	Operations Research, S Kalavathy, Vikas Publishers
5.	Operations Research, DS Cheema, University Science Press.
6.	Operations Research, Ravindran, Philips, Solberg, Wiley publishers.
WEB LINKS	
1.	http://www.nptelvideos.in/2012/12/fundamentals-of-operations-research.html



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

WEB TECHNOLOGIES LAB

Course Category	Professional Core	Course Code	16IT6L08
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OUTCOMES

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

CO1	Build static web pages using HTML and CSS.
CO2	Develop Ruby Scripts
CO3	Build PHP applications.
CO4	Develop Perl Scripts.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6L08.1	2	3	3	3	3	-	-	-	-	-	-	2	2	3	3
16IT6L08.2	2	3	3	3	3	-	-	-	-	-	-	2	2	3	3
16IT6L08.3	2	3	3	3	3	-	-	-	-	-	-	2	2	3	3
16IT6L08.4	2	3	3	3	3	-	-	-	-	-	-	2	2	3	3

LIST OF EXPERIMENTS:

1	<p>HOME PAGE:</p> <p>The static home page must contain three frames.</p> <p>Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).</p> <p>Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link “MCA” the catalogue for MCA Books should be displayed in the Right frame.</p> <p>Right frame: The <i>pages to the links in the left frame must be loaded here</i>. Initially this page contains description of the web site.</p>
---	---



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
mca mba BCA	Description of the Web Site			













LOGIN PAGE

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA BCA	<p>Login : <input type="text" value="11a51f0003"/></p> <p>Password: <input type="password" value="*****"/></p> <p><input type="button" value="Submit"/> <input type="button" value="Reset"/></p>			

CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.
The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name																			
Home	Login	Registration	Catalogue	Cart																
MCA MBA BCA	<table border="1"> <tr> <td></td> <td>Book : XML Bible Author : Winston Publication : Wiley</td> <td>\$ 40.5</td> <td><input type="button" value="Add to cart"/></td> </tr> <tr> <td></td> <td>Book : AI Author : S.Russel Publication : Princeton hall</td> <td>\$ 63</td> <td><input type="button" value="Add to cart"/></td> </tr> <tr> <td></td> <td>Book : Java 2 Author : Watson Publication : BPB publications</td> <td>\$ 35.5</td> <td><input type="button" value="Add to cart"/></td> </tr> <tr> <td></td> <td>Book : HTML in 24 hours Author : Sam Peter Publication : Sam</td> <td>\$ 50</td> <td><input type="button" value="Add to cart"/></td> </tr> </table>					Book : XML Bible Author : Winston Publication : Wiley	\$ 40.5	<input type="button" value="Add to cart"/>		Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	<input type="button" value="Add to cart"/>		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	<input type="button" value="Add to cart"/>		Book : HTML in 24 hours Author : Sam Peter Publication : Sam	\$ 50	<input type="button" value="Add to cart"/>
	Book : XML Bible Author : Winston Publication : Wiley	\$ 40.5	<input type="button" value="Add to cart"/>																	
	Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	<input type="button" value="Add to cart"/>																	
	Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	<input type="button" value="Add to cart"/>																	
	Book : HTML in 24 hours Author : Sam Peter Publication : Sam	\$ 50	<input type="button" value="Add to cart"/>																	

REGISTRATION PAGE:

Create a "registration form" with the following fields
1) Name (Text field)



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	<ul style="list-style-type: none">2) Password (password field)3) E-mail id (text field)4) Phone number (text field)5) Sex (radio button)6) Date of birth (3 select boxes)7) Languages known (check boxes – English, Telugu, Hindi, Tamil)8) Address (text area)
5	<p>DESIGN A WEB PAGE USING CSS (Cascading Style Sheets) which includes the following:</p> <p>1) Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles</p>
6	<p>WRITE AN XML file which will display the Book information which includes the following:</p> <ul style="list-style-type: none">1) Title of the book2) Author Name3) ISBN number4) Publisher name5) Edition6) Price <p>Write a Document Type Definition (DTD) to validate the above XML file.</p>
7	Write Ruby program reads a number and calculates the factorial value of it and prints the same.
8	Write a Ruby program which counts number of lines in a text files using its regular Expressions facility.
9	Write a Ruby program that uses iterator to find out the length of a string.
10	Write simple Ruby programs that uses arrays in Ruby.
11	Write programs which uses associative arrays concept of Ruby.
12	Write Ruby program which uses Math module to find area of a triangle.
13	Write a program which illustrates the use of associative arrays in Perl.
14	Write Perl program takes set names along the command line and prints whether they are regular files or special files.
15	Example PHP program for contact us page.
16	<p>User Authentication: Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.</p> <ul style="list-style-type: none">1. Create a Cookie and add these four user id's and passwords to this Cookie.2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. <p>If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display “You are not an authenticated user”.</p> <p>Use init-parameters to do this.</p>
17	<p>Install a database (MySQL or Oracle).</p> <p>Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).</p> <p>Write a PHP program to connect to that database and extract data from the tables and display them.</p> <p>Experiment with various SQL queries.</p> <p>Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).</p>
18	Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	connect to the database and extract data from the tables and display them in the catalogue page using PHP.
19	Write a PHP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).
20	Example PHP program for registering users of a website and login.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE TESTING & DATA MINING LAB

Course Category	Professional Core	Course Code	16IT6L09
Course Type	Laboratory	L-T-P-C	0 – 0 – 3 – 2
Prerequisites		Internal Assessment Semester End Examination Total Marks	40 60 100

COURSE OUTCOMES

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

CO1	Write test cases by using Black-Box techniques.
CO2	Write test cases by using White-Box techniques.
CO3	Operate on WEKA tool.
CO4	Perform data preprocessing techniques.

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT6L09.1	1	2	-	2	-	-	-	-	-	-	1	-	-	1	2
16IT6L09.2	1	2	-	2	-	-	-	-	-	-	1	-	-	1	2
16IT6L09.3	1	2	-	3	3	-	-	-	-	-	-	-	-	2	2
16IT6L09.4	1	-	-	3	3	-	-	-	-	-	-	-	-	2	2

LIST OF EXPERIMENTS

1	Problem Statement 01	
	Consider an automated banking application. The user can dial the bank from a personal computer, provide a six-digit password, and follow with a series of keyword commands that activate the banking function. The software for the application accepts data in the following form:	
	Area Code	Blank or three-digit number
	Prefix	Three-digit number, not beginning with 0 or 1
	Suffix	Four-digit number
	Password	Six-character alphanumeric
2	Commands	"Check status", "Deposit", "Withdrawal"
	Design adhoc test cases to test the system.	
	Problem Statement 02	
	Consider an automated banking application. The user can dial the bank from a personal computer, provide a six-digit password, and follow with a series of keyword commands that activate the banking function. The software for the application accepts data in the following form:	
	Area Code	Blank or three-digit number
	Prefix	Three-digit number, not beginning with 0 or 1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	<table> <tr> <td>Suffix</td><td>Four-digit number</td></tr> <tr> <td>Password</td><td>Six-character alphanumeric</td></tr> <tr> <td>Commands</td><td>"Check status", "Deposit", "Withdrawal"</td></tr> </table> <p>Design the test cases to test the system using following Black Box testing technique: BVA, Worst BVA, Robust BVA, Robust Worst BVA Equivalence class testing (Input/output domain).</p>	Suffix	Four-digit number	Password	Six-character alphanumeric	Commands	"Check status", "Deposit", "Withdrawal"
Suffix	Four-digit number						
Password	Six-character alphanumeric						
Commands	"Check status", "Deposit", "Withdrawal"						
3	<p>Problem Statement 03</p> <p>Generate test cases using Black box testing technique to Calculate Standard Deduction on Taxable Income. The standard deduction is higher for tax payers who are 65 or older or blind. Use the method given below to calculate tax.</p> <p>1. The first factor that determines the standard deduction is the filing status. The basic standard deduction for the various filing status are:</p> <table> <tr> <td>Single</td><td>\$4,750</td></tr> <tr> <td>Married, filing a joint return</td><td>\$9,500</td></tr> <tr> <td>Married, filing a separate return</td><td>\$7,000</td></tr> </table> <p>2. If a married couple is filing separate returns and one spouse is not taking standard Deduction, the other spouse also is not eligible for standard deduction.</p> <p>3. An additional \$1,000 is allowed as standard deduction, if either the filer is 65 yrs or the spouse is 65 yrs or older (the latter case applicable when the filing status is "Married" and filing "joint").</p> <p>4. An additional \$1,000 is allowed as standard deduction, if either the filer is blind or the spouse is blind (the latter case applicable when the filing status is "married" and filing "joint").</p> <p>HINT: From the above description, it is clear that the calculation of standard deduction depends on the following 3 factors:</p> <ol style="list-style-type: none"> 1. Status of filing of the filer 2. Age of the filer 3. Whether the filer is blind or not <p>In addition, in certain cases, the following additional factors also come into play in calculating the standard deduction.</p> <ol style="list-style-type: none"> 1. Whether spouse has claimed standard deduction 2. Whether spouse is blind 3. Whether the spouse is more than 65 years old 	Single	\$4,750	Married, filing a joint return	\$9,500	Married, filing a separate return	\$7,000
Single	\$4,750						
Married, filing a joint return	\$9,500						
Married, filing a separate return	\$7,000						
4	<p>Problem Statement 04</p> <p>Consider the following program segment:</p> <pre> 1. int max (int i, int j, int k) 2. { 3. int max; 4. if (i>j) then 5. if (i>k) then max=i; 6. else max=k; 7. else if (j > k) max=j 8. else max=k 9. return (max); 10.} </pre> <ol style="list-style-type: none"> a) Draw the control flow graph for this program segment b) Determine the Cyclomatic complexity for this program c) Determine the independent paths 						
5	<p>Problem Statement 05</p> <p>Source code of simple insertion sort implementation using array in ascending order in c programming language</p> <pre>#include<stdio.h></pre>						



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

```
int main(){
int i,j,s,temp,a[20];
Printf ("Enter total elements: ");
Scanf ("%d",&s);
printf("Enter %d elements: ",s);
for(i=0;i<s;i++)
scanf("%d",&a[i]);
for(i=1;i<s;i++){
temp=a[i];j=i-1;
while((temp<a[j])&&(j>=0))
{
a[j+1]=a[j];
j=j-1;
}
a[j+1]=temp;
}
printf("After sorting: ");
for(i=0;i<s;i++)
printf(" %d",a[i]);
return 0;
}
```

HINT: for loop is represented as while loop

- Draw the program graph for given program segment
- Determine the DD path graph
- Determine the independent paths
- Generate the test cases for each independent path

6

Problem Statement 06

Consider a program to input two numbers and print them in ascending order given below. Find all du paths and identify those du-paths that are not feasible. Also find all dc paths and generate the test cases for all paths (dc paths and non dc paths).

```
#include<stdio.h>
#include<conio.h>
1. void main ()
2. {
3 int a, b, t;
4. Clrscr ();
5. Printf ("Enter first number");
6. scanf ("%d",&a);
7. printf ("Enter second number");
8. scanf ("%d",&b);
9. if (a<b){
10. t=a;
11 a=b;
12 b=t;
13}
14. printf ("%d %d", a, b);
15 getch ();
}
```



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

7	Problem Statement 07 Consider the above program and generate possible program slices for all variables. Design at least one test case from every slice.
8	Problem Statement 08 Consider the code to arrange the nos. in ascending order. Generate the test cases for relational coverage, loop coverage and path testing. Check the adequacy of the test cases through mutation testing and also compute the mutation score for each. i = 0; n=4; //N-Number of nodes present in the graph While (i<n-1) do j = i + 1; While (j<n) do if A[i]<A[j] then swap (A[i], A[j]); end do; i=i+1; end do
DATA MINING SYSTEM/SOFTWARE REQUIREMENTS: <ul style="list-style-type: none">• Intel based desktop PC• WEKA TOOL	
1	Demonstration of preprocessing on the given dataset.
2	Demonstration of Association rule mining.
3	Demonstration of classification using id3 algorithm.
4	Demonstration of classification using naïve bayes algorithm.
5	Demonstration of clustering using simple k-means.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Course Category	Humanities	Course Code	16BH6T16
Course Type	Theory	L-T-P-C	0 – 2 – 0 – 0
Prerequisites		Internal Assessment	40
		Semester End Examination	60
		Total Marks	100

COURSE CONTENT

UNIT I	Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics - Types of Intellectual Property - Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – WTO-WIPO- Regulatory – Over use or Misuse of Intellectual Property Rights - Compliance and Liability Issues.
UNIT II	Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.
UNIT III	Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Product Patent and Process Patent- Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – New developments in Patent Law
UNIT IV	Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.
UNIT V	Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation- Service Level Agreements – Breach of Contract – Applying State Law.
UNIT VI	Introduction to Cyber Law – Information Technology Act - Cyber Crime and Ecommerce – Security -Data Security – Confidentiality – Data Privacy in India Vs Rest of the World. Relevant Cases Shall be dealt where ever necessary.

REFERENCE BOOKS

1.	Intellectual Property, Deborah E.Bouchoux, Cengage learning, New Delhi.
2.	Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.
3.	Fundamentals of IPR for Engineers,Kompal Bansal and Parishit Bansal, BS Publications (Press).
4.	Cyber Law. Texts & Cases, South-Western's Special Topics Collections.
5.	Intellectual Property Rights, Prabhuddha Ganguli, Tata Mc-Graw – Hill, New Delhi.
6.	Intellectual Property, Richard Stim, Cengage Learning, New Delhi.
7.	Intellectual Property Rights, R. Radha Krishnan, S. Balasubramanian, Excel Books, New Delhi.
8.	Intellectual Property Right, M.Ashok Kumar and Mohd.Iqbal Ali, Serials Pub.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

IV Year I Semester

MANAGEMENT SCIENCE

Course Category:	Humanities	Course Code:	16BH7T15
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Recognize management thoughts, motivational theories and types of organizations		Understanding
CO2	Apply the concepts of operations Management, such as Control Charts, work study, materials management for smooth functioning of production units.		Applying
CO3	Appraise the role of functional management in maximizing profits.		Understanding
CO4	Apply techniques of Project Management in controlling cost.		Applying
CO5	Apply principles of Strategic Management for managerial decisions.		Remembering
CO6	Classify the management practices with reference to current business scenario.		Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16BH7T15.1	-	-	-	-	-	2	-	-	2	1	1	-	-	-	-
16BH7T15.2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	1
16BH7T15.3	-	1	-	-	-	1	-	1	3	-	-	-	-	-	1
16BH7T15.4	-	2	-	-	-	-	-	-	-	-	3	-	-	-	1
16BH7T15.5	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
16BH7T15.6	-	-	-	-	1	-	-	-	-	1	1	2	-	-	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to Management: Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making Process-Designing organization structure- Principles of organization - Types of organization structure.
UNIT II	Operations Management: Production Management-functions– Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart). Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).
UNIT III	Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Job Evaluation and Merit Rating, Balanced Score Card – Team Dynamics/Working in Teams - Marketing Management- Functions of Marketing – Marketing strategies based on Product Life Cycle.
UNIT IV	Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).
UNIT V	Entrepreneurship Management & Strategic Management: Entrepreneurship- features- Financial Institutions facilitating entrepreneurship – Startup culture. Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives.
UNIT VI	Introduction to Contemporary Management Practices: Basic concepts of MIS, Just In Time (JIT) system, Total Quality Management (TQM), Lean Six Sigma, People Capability Maturity Model, Supply Chain Management, Evolution of Enterprise Systems, Business Process Outsourcing (BPO), Business Process Re-Engineering.

TEXTBOOKS

1	Management Science, Dr. P. Vijaya Kumar and Dr. N. Appa Rao, Cengage, Delhi, 2012.
2	Management Science, Dr. A. R. Aryasri, TMH 2011.

REFERENCE BOOKS

1	Essentials of Management, Koontz and Weihrich, TMH 2011
2	Global Management Systems, Seth and Rastogi, Cengage Learning, Delhi, 2011.
3	Organizational Behaviors, Robbins, Pearson Publications, 2011
4	Production & Operational Management, Kanishka Bedi, Oxford Publications, 2011.
5	Management Science, Manjunath, Pearson Publications, 2013.
6	Human Resource Management, Biswajit Patnaik, PHI, 2011.
7	Strategic Management, Hitt and Vijaya Kumar, Cengage Learning.
8	Management Science, Dr. PG. Ramanujam, BVR Naidu, PV Rama Sastry, Himalaya Publishing House, 2013.
9	Management Shapers, Universities Press.
10	Principles of Marketing, Philip Kotler and Armstrong, Pearson publications.
11	Principles of Management and Administration, D. Chandra Bose, Prentice Hall of India Pvt. Ltd., New Delhi.
12	Patterns of Entrepreneurship Management, Jack M. Kaplan.

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

CRYPTOGRAPHY AND NETWORK SECURITY

Course Category:	Professional Core	Course Code:	16CS7T19
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	Understand symmetric block ciphers (DES, AES, other contemporary symmetric ciphers), public-key cryptography (RSA, discrete logarithms).
---	--

COURSE OUTCOMES

**Blooms
Taxonomy
Level**

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

CO1	Classify Security attacks, threats and its measures.	Applying
CO2	Evaluate security mechanisms with Symmetric Key cryptography.	Understanding
CO3	Evaluate Number theory and security mechanisms with Asymmetric Key cryptography.	Understanding
CO4	Analyze Data Integrity, Digital Signature Schemes & Key Management.	Analyzing
CO5	Analyze network security models for ensuring security at Application layer and Transport layer.	Analyzing
CO6	Analyze network security model at Network layer	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16CS7T19.1	3	2	3	1	2	-	-	-	-	-	-	-	3	3	3
16CS7T19.2	3	2	3	1	2	-	-	-	-	-	-	-	3	3	3
16CS7T19.3	3	2	3	1	2	-	-	-	-	-	-	-	3	3	3
16CS7T19.4	3	2	3	3	3	-	-	-	-	-	-	-	3	3	3
16CS7T19.5	3	2	3	3	3	-	-	-	-	-	-	-	3	3	3
16CS7T19.6	3	2	3	3	3	-	-	-	-	-	-	-	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Classical Encryption Techniques Security attacks, services & mechanisms, Network Security Model, Non-Cryptographic Protocol Vulnerabilities, Cryptography basics, Symmetric Cipher Model, Cryptanalysis and brute force attacks, Substitution and transposition techniques.
UNIT II	Block Ciphers & Symmetric Key Cryptography Stream ciphers & Block ciphers, Feistel Cipher, DES, Triple DES, AES.
UNIT III	Number Theory & Asymmetric Key Cryptography Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms. Public Key Cryptography: Principles, public key cryptosystems, RSA Algorithms, Diffie Hellman Key Exchange, Elgamal encryption & decryption, Elliptic Curve Cryptography.
UNIT IV	Cryptographic Hash Functions & Digital Signatures Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm(SHA-512), Message Authentication Functions, Requirements & Security, HMAC & CMAC. Digital Signatures, NIST Digital Signature Algorithm. Key management & distribution.
UNIT V	Network Security-I (Transport Layer Security & Email Security) Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell (SSH) Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.
UNIT VI	Network Security-II IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management. Intrusion detection: Overview, Approaches for IDS/IPS, Signature based IDS, Host based IDS/IPS.

TEXTBOOKS

1	Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition, 2006.
2	Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J. David Irwin, CRC press, 2016.

REFERENCE BOOKS

1	Network Security and Cryptography, Bernard Meneses, Cengage Learning, 2012.
2	Everyday Cryptography, Keith M. Martin, Oxford, 2 nd edition, 2017.
3	Cryptography and Network Security, Behrouz A. Forouzan, Debdeep Mukhopadhyay, McGraw Hill, 3 rd edition, 2008.

WEB RESOURCES

1	http://nptel.ac.in/courses/106105031 (Prof. D. Mukhopadhyay, IIT, Kharagpur)
2	http://williamstallings.com/Extras/Security-Notes/



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

MOBILE COMPUTING

Course Category:	Professional Core	Course Code:	16IT7T16
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2	Understand the issues and solutions of various layers of mobile network Layers.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Illustrate GSM architecture and data services in GSM.	Understanding
CO2	Summarize different Medium access control mechanisms	Understanding
CO3	Elaborate packet delivery and hand over management in mobile network layer.	Understanding
CO4	Analyze TCP/IP protocols in mobile transport layer.	Analyzing
CO5	Classify data delivery mechanisms.	Analyzing
CO6	Compare different routing algorithms in MANETs.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7T16.1	3	2	2	2	2	3	-	-	-	-	-	2	1	2	-
16IT7T16.2	3	3	2	2	2	3	-	-	-	-	-	1	1	2	-
16IT7T16.3	3	3	3	2	2	2	-	-	-	-	-	1	1	2	-
16IT7T16.4	2	3	3	3	2	2	-	-	-	-	-	1	2	2	-
16IT7T16.5	3	3	2	2	2	3	-	-	-	-	-	1	1	2	-
16IT7T16.6	3	3	3	3	2	2	-	-	-	-	-	1	3	3	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices, GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.
UNIT II	(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11).
UNIT III	Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.
UNIT IV	Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.
UNIT V	Data Dissemination: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods. Data Synchronization: Introduction, Software, and Protocols.
UNIT VI	Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, Mobile Agents, Service Discovery.

TEXTBOOKS

1	Mobile Communications, Jochen Schiller, Addison-Wesley, Second Edition, 2009. (Unit 2)
2	Mobile Computing, Raj Kamal, Oxford University Press, 2007, ISBN: 0195686772 (Unit 1,3,4,5,6)

REFERENCE BOOKS

1	Mobile Computing, Technology Applications and Service Creation, Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, Second Edition, Mc Graw Hill.
2	Principles of Mobile Computing, UWE Hansmann, Lothar Merk, Martin S. Nocklous, Thomas Stober, Second Edition, Springer.

WEB RESOURCES

1	http://www.tutorialspoint.com/mobile_computing/index.htm
2	http://en.wikipedia.org/wiki/Mobile_computing#Definitions
3	http://nptel.ac.in/courses/106106147/
4	https://onlinecourses.nptel.ac.in/noc16_cs13/preview



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OPEN SOURCE SOFTWARE

Course Category:	Professional Core	Course Code:	16IT7T17
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To provide a basic idea of Open source technology, their software development process so as to understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.
---	---

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Classify about Linux shell and its file structure.	Understanding
CO2	Build Angular JS web Application	Applying
CO3	Write Programs using jQuery.	Applying
CO4	Demonstrate Ruby on Rails applications.	Understanding
CO5	Create Nosql database programs using MongoDB	Applying
CO6	Classify about HBase.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7T17.1	2	3	2	3	2	-	-	2	-	-	3	3	3	2	2
16IT7T17.2	3	3	3	3	3	-	-	-	2	-	-	2	3	3	3
16IT7T17.3	3	3	3	3	3	-	-	-	2	-	-	2	3	3	3
16IT7T17.4	2	3	3	3	3	-	-	-	-	-	2	2	2	3	2
16IT7T17.5	3	3	3	3	3	-	-	-	-	-	2	3	3	3	2
16IT7T17.6	2	3	3	3	3	-	-	-	-	-	2	2	2	3	2



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Linux: Introduction to Linux ,Linux Distributions ,Operating Systems and Linux ,History of Linux and Unix ,Unix ,Linux ,Linux Overview, Open Source Software The Linux Shell and File Structure: The Shell, the Command Line, Filename Expansion, Standard Input/ Output and Redirection
UNIT II	Angular JS: What Is AngularJS, Data Binding and Your First Angular JS Web Application, Simple Data Binding, Best Data Binding Practices Modules, Scopes, Controllers, Expressions
UNIT III	j Query: Our First jQuery Document, Selectors -The Document Object Model ,The \$() Factory Function CSS Selectors, XPath Selectors, Custom Selectors ,DOM Traversal Methods ,Accessing DOM Element
UNIT IV	Ruby on rails: Ruby: Ruby, Ruby Gems, Rails, and Git, The First Application, rails server, Model-View-Controller (MVC) Installation and Setup, Planning the Application, A Demo App
UNIT V	Mongo DB: Getting and Starting MongoDB, Introduction to the MongoDB Shell, Running the Shell , A MongoDB Client, Basic Operations with the Shell ,Data Types , Basic Data Types ,Dates ,Arrays., Embedded Documents_id and Object Ids, Using the MongoDB Shell, Running Scripts with the Shell Creating a .mongorc.js, Customizing Your Prompt. Creating, Updating, and Deleting Documents Inserting and Saving Documents, Batch Insert, Insert Validation, Removing Documents, Remove Speed, Updating Documents
UNIT VI	HBase: Installation -Requirements, File systems for Hbase, Installation Choices, Run Modes, Configuration, Deployment, Operating a Cluster. Client API the Basics: CRUD Operations-Put Method, Get Method, Delete Method

TEXTBOOKS

1	Linux: The Complete Reference, Sixth Edition Richard Petersen, Mc GrawHill (Unit-1)
2	AngularJS: ng-book The Complete Book on AngularJS Ari Lerner(Unit-2)
3	jQuery: Learning jQuery Better Interaction Design and Web Development with Simple JavaScript Techniques, Jonathan Chaffer Karl Swedberg (Unit-3)
4	RUBY ON RAILS™ 3TUTORIAL Learn Rails™ by Example Michael Hart(Unit-4)
5	Mongo DB: MongoDB: The Definitive Guide, 2 nd Edition Powerful and Scalable Data Storage, Kristina Chodorow, O'Reilly Media.(Unit 5)
6	HBase: The Definitive Guide, Lars George O'Reilly Media(Unit-6)

REFERENCE BOOKS

1	Web Development with MongoDB and NodeJS, Second Edition.
2	AngularJS, 1 st Edition, Brad Green, Shyam Seshadri.

WEB RESOURCES

1	http://www.khuisf.ac.ir/prof/images/Uploaded_files/Linux%20The%20Complete%20Reference.6th.Edition(Nov.2007)[2842313].PDF
2	https://www.kopykitab.com/ebooks/2016/06/7677/sample/sample_7677.pdf
3	https://www.e-reading.club/bookreader.php/142087/Learning_jQuery.pdf
4	http://pepa.holla.cz/wp-content/uploads/2015/10/ng-book-The-Complete-Book-on-AngularJS.pdf
5	file:///H:/ruby_on_rails_3_tutorial.pdfhttp://usuaris.tinet.cat/bertolin/pdfs/mongodb_%20the%20defin



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

	itive%20_guide%20-%20kristina%20chodorow_1401.pdf
For AngularJS:	
1	file:///C:/Users/SivaBaba/Desktop/angularjs_tutorial.pdf
2	http://www.longevity.co.uk/media/1008/angularjs-novice-to-ninja.pdf
3	http://file.allitebooks.com/20150811/Professional%20AngularJS.pdf
For Mongo DB:	
1	https://www.coursera.org/learn/introduction-mongodb
2	https://the-eye.eu/public/Books/IT%20Various/mongodb_the_definitive_guide.pdf
3	http://usuaris.tinet.cat/bertolin/pdfs/mongodb_%20the%20definitive%20guide%20-%20kristina%20chodorow_1401.pdf
Hbase:	
1	http://www.mpam.mp.br/attachments/article/6214/HBase%EF%BC%9AThe%20Definitive%20Guide.pdf



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ELECTIVE-I

I. BIG DATA ANALYTICS

Course Category:	Professional Elective	Course Code:	16IT7D01
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	Students will know about Big data Platform and its evolution
2	Students will learn about Data analytics models
3	Students will know about stream models and architectures
4	Students will analyze about clustering
5	Students learn about different frameworks and new technologies

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Develop Java Programs using Generic classes and Type Parameters.	Understanding
CO2	Compare Google File System and Hadoop Distributed File Systems.	Understanding
CO3	Write programs based on map reduce framework.	Understanding
CO4	Build Hadoop I/O programs.	Applying
CO5	Interpret about pig architecture and its implementation.	Understanding
CO6	Design a data analytical system using HIVE.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D01.1	3	3	2	2	2	-	-	-	-	-	-	-	1	1	1
16IT7D01.2	3	2	2	2	2	-	-	-	-	-	-	-	2	2	1
16IT7D01.3	3	1	1	2	2	-	-	-	-	-	-	1	-	-	1
16IT7D01.4	3	3	3	2	2	-	-	-	-	-	-	1	2	2	1
16IT7D01.5	3	3	3	2	2	-	-	-	-	-	-	1	2	2	1
16IT7D01.6	3	3	3	2	2	-	-	-	-	-	-	1	2	2	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Data structures in Java: Linked List, Stacks, Queues, Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization.
UNIT II	Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.
UNIT III	Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner
UNIT IV	Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collection.
UNIT V	Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin.
UNIT VI	Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.
TEXTBOOKS	
1	Big Java, Cay Horstmann, 4 th Edition, Wiley John Wiley & Sons, INC
2	Hadoop: The Definitive Guide, Tom White, 3 rd Edition, O'reilly
3	Hadoop in Action, Chuck Lam, Manning Publications.
4	Hadoop for Dummies, Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk, Bruce Brown, Rafael Coss
REFERENCE BOOKS	
1	Hadoop in Practice, Alex Holmes, Manning Publ.
2	Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne.
WEB RESOURCES	
1	https://cognitiveclass.ai/courses/introduction
2	https://www.tutorialspoint.com/hadoop/index.htm
3	Hadoop: http://hadoop.apache.org/
4	Hive: https://cwiki.apache.org/confluence/display/Hive/Home
5	Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

II. INFORMATION RETRIEVAL SYSTEMS

Course Category:	Professional Elective	Course Code:	16IT7D02
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To provide the foundation knowledge in information retrieval.
2	To equip students with sound skills to solve computational search problems.
3	To appreciate how to evaluate search engines.
4	To appreciate the different applications of information retrieval techniques in the Internet or Web environment.
5	To provide hands-on experience in building search engines
6	To provide hands-on experience in evaluating search engines.

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Identify the terminology used in Information retrieval systems and basic data structures used.	Understanding
CO2	Use inverted files to build IR systems.	Understanding
CO3	Classify signature file usability in retrieving of information.	Understanding
CO4	Operate on IR system using PAT Trees and PAT arrays.	Analyzing
CO5	Use stemming algorithms for the search and retrieval of information.	Applying
CO6	Construct Thesauri from text that is used in information retrieval.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D02.1	3	3	-	-	-	-	-	-	-	-	-	-	2	3	2
16IT7D02.2	3	3	3	3	3	-	-	-	-	-	-	-	2	2	3
16IT7D02.3	3	3	3	3	3	-	-	-	-	-	-	-	2	3	3
16IT7D02.4	3	3	3	3	3	-	-	-	-	-	-	-	2	3	3
16IT7D02.5	3	3	3	3	3	-	-	-	-	-	-	-	2	2	3
16IT7D02.6	3	3	3	3	3	-	-	-	-	-	-	2	3	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms
UNIT II	Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.
UNIT III	Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.
UNIT IV	New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.
UNIT V	Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files.
UNIT VI	Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts.
TEXTBOOKS	
1	Information Retrieval Data Structures and Algorithms, Frakes, W.B., Ricardo Baeza, Yates, Prentice Hall, 1992.
2	Modern Information Retrieval, Yates, Pearson Education.
3	Information Storage & Retrieval, Robert Korfhage, John Wiley & Sons.
REFERENCE BOOKS	
1	Information Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Kluwer Academic Press, 1997.
2	Information Retrieval Algorithms and Heuristics, Grossman, David A., Frieder, Ophir 2ed, Springer.
WEB RESOURCES	
1	http://cse.iitkgp.ac.in/~pabitra/course/ir06/ir06.html
2	https://classes.soe.ucsc.edu/ism293/Spring09/material/Lecture%202.pdf
3	http://videlectures.net/Top/Computer_Science/Information_Retrieval/

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D03.1	3	1	2	2	-	-	-	-	-	-	-	-	3	2	-
16IT7D03.2	2	3	1	2	-	-	-	-	-	-	-	-	3	2	-
16IT7D03.3	2	3	1	2	-	-	-	-	-	-	-	-	3	2	-
16IT7D03.4	3	1	3	2	-	-	-	-	-	-	-	-	3	2	-
16IT7D03.5	2	1	2	2	-	-	-	-	-	-	-	-	3	2	-
16IT7D03.6	2	1	1	2	-	-	-	-	-	-	-	-	3	2	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges. System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.
UNIT II	Interprocess Communication: Introduction, The API for the Internet Protocols- The Characteristics of Interprocess communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.
UNIT III	Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Model, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI
UNIT IV	Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads.
UNIT V	Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays. Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication.
UNIT VI	Transactions & Replications: Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication- Introduction, Passive (Primary) Replication, Active Replication.

TEXTBOOKS

1	Distributed Systems- Concepts and Design, George Coulouris, Jean Dollimore, Tim Kindberg, Fourth Edition, Pearson Publication.
2	Distributed Computing, Principles, Algorithms and Systems, Ajay D Kshemkalyani, Mukesh Sigal, Cambridge.

REFERENCE BOOKS

1	Distributed Computing: Fundamentals, Simulations and Advanced Topics, HagitAttiya, Jennifer Welch.
2	Distributed Systems – Principles and Paradigms, Andrew S. Tanenbaum, Maaten Van Steen, 2 nd Edition, Pearson.

WEB RESOURCES

1	1. http://nptel.ac.in/courses/106106107/
2	2. http://www.hpcs.cs.tsukuba.ac.jp/~tatebe/lecture/h23/dsys/dsd-tutorial.html
3	3. https://www.techopedia.com/definition/18909/distributed-system



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

IV. DESIGN PATTERNS

Course Category:	Professional Elective	Course Code:	16IT7D04
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100
COURSE OBJECTIVES			
1	To introduce the fundamental concepts of design patterns.		
2	To explain principles, practices and approaches to make good designs using design patterns.		
3	To provide knowledge on various design patterns such as composite, iterator, observer, factory method and strategy.		
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Relate design Problems with Design Patterns.		Understanding
CO2	Analyze the application of design patterns in the context of the Design of a Document Editor.		Analyzing
CO3	Compare creational patterns like Abstract Factory, Singleton Design patterns etc.,		Understanding
CO4	Compare structural patterns like Adapter, Façade Design patterns etc.,		Understanding
CO5	Compare behavioral patterns like command, Template Method etc.,		Understanding
CO6	Decide the expectation from the usage of Design Patterns.		Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D04.1	2	2	2	1	-	-	-	-	-	-	-	1	1	-	1
16IT7D04.2	1	2	2	1	1	-	-	-	-	-	-	1	1	-	1
16IT7D04.3	1	2	2	2	1	-	-	-	-	-	-	-	1	-	-
16IT7D04.4	1	2	2	2	1	-	-	-	-	-	-	-	1	-	-
16IT7D04.5	1	2	2	2	1	-	-	-	-	-	-	-	1	-	-
16IT7D04.6	1	2	2	1	1	-	-	-	-	-	-	1	1	-	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction: Design Pattern, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.
UNIT II	A Case Study: Designing a Document Editor, Design Problems, and Document Structure, Formatting, Embellishing the User Interface, and Supporting Multiple Look and Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.
UNIT III	Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.
UNIT IV	Structural Patterns: Adapter, Bridge, and Composite, Decorator, Façade, Flyweight, Proxy.
UNIT V	Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.
UNIT VI	What to Expect from Design Patterns, A Brief History, The Pattern Community an Invitation, A Parting Thought. Case study: Document Editor
TEXTBOOKS	
1	Design Patterns, Erich Gamma, Pearson Education.
REFERENCE BOOKS	
1	Pattern's in JAVA, Mark Grand, Vol. I, WileyDreamTech.
2	Pattern's in JAVA, Mark Grand, Vol-II, WileyDreamTech.
3	JAVA Enterprise Design Patterns, Vol-III, Mark Grand, WileyDreamTech.
4	Head First Design Patterns, Eric Freeman-Oreilly, spd.
5	Design Patterns Explained, Alan Shalloway, Pearson Education.
WEB RESOURCES	
1	www.cse.wustl.edu/~cdgill/courses/cse432_sp06/CreationalPatterns.ppt
2	https://msdn.microsoft.com/en-us/library/orm-9780596527730-01-05.aspx
3	https://sourcemaking.com/design_patterns/structural_patterns
4	http://www.oodeesign.com/structural-patterns/
5	https://www.codeproject.com/Articles/455228/Design-Patterns-of-Behavioral-Design_Patterns



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

V. SOFTWARE QUALITY ASSURANCE

Course Category:	Professional Elective	Course Code:	16IT7D05
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100
COURSE OBJECTIVES			
1	Describe approaches to quality assurance		
2	Understand quality models		
3	Evaluate the system based on the chosen quality model		
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Enumerate the Components of the Software Quality Assurance System.		Remembering
CO2	Integrate Quality Activities in the Project Life Cycle		Understanding
CO3	Interpret procedures and work instructions.		Understanding
CO4	List out the Software Quality Metrics and Costs.		Remembering
CO5	Analyze the SQA Standards.		Understanding
CO6	Estimate the Role of Management in Quality Assurance.		Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D05.1	2	2	1	2	1	-	-	-	-	-	1	1	2	1	-
16IT7D05.2	1	1	1	1	1	-	-	-	-	-	1	1	1	-	-
16IT7D05.3	1	1	1	1	1	-	-	-	-	-	1	1	1	-	-
16IT7D05.4	2	2	2	2	2	-	-	-	1	-	2	1	1	-	-
16IT7D05.5	1	1	1	1	1	-	-	-	-	-	1	1	1	-	-
16IT7D05.6	1	1	1	1	1	-	-	-	-	-	2	1	1	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction: The Software Quality Challenge, Software Quality Software Quality Factors: The Components of the Software Quality Assurance System - Overview Pre-Project Software Quality Components.
UNIT II	SQA Components in the Project Life Cycle: Integrating Quality Activities in the Project Life Cycle, Reviews Software Testing – Strategies Software Testing –Implementation, Assuring the Quality of Software Maintenance.
UNIT III	Software Quality Infrastructure Components: Procedures and Work Instructions, Supporting Quality Devices Staff Training, Instructing and Certification. Preventive and Corrective Actions.
UNIT IV	Software Quality Management Components: Project Progress Control: Software Quality Metrics, Software Quality Costs.
UNIT V	Standards, Certification and Assessment: SQA Standards ISO 9001 Certification Software, Process Assessment.
UNIT VI	Organizing for Quality Assurance: Management and its Role in Quality Assurance, The Software Quality Assurance.

TEXTBOOKS

1	Software Quality Assurance, Theory of implementation, Daniel Galin, Pearson
2	Software Testing and Analysis. Process, Principles, and Techniques, MauroPezze and Michal Young, John Wiley 2008.

REFERENCE BOOKS

1	Software Testing Techniques, BorizBeizer, 2 nd Edition, DreamTech, 2009.
2	Foundations of Software Testing, Aditya P. Mathur, Pearson, 2008.
3	Software Testing and Analysis. Process, Principles, and Techniques, MauroPezze and Michal Young, John Wiley 2008
4	Metrics and Models in Software Quality Engineering, Stephen H. Kan, 2 nd Edition, Pearson, 2003
5	Software Testing and Quality Assurance: Theory and Practice, KshirasagarNaik and PriyadarshiTripathy (Eds), John Wiley, 2008

WEB RESOURCES

1	softwaretestingfundamentals.com/software-quality-assurance/
2	http://nptel.ac.in/courses/106101061/

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

VI. COMPUTER GRAPHICS

Course Category:	Professional Elective	Course Code:	16IT7D06
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To understand the basic principles of implementing computer graphics primitives.
2	To develop and design problem solving skills with application to computer graphics.

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Compare line drawing algorithms (Bresenham's and DDA Line Derivations and algorithms).	Understanding
CO2	Analyze different 2-D geometrical transforms for scaling, translation, rotation etc.	Analyzing
CO3	Compare line clipping and polygon clipping algorithms.	Understanding
CO4	Perform 3-D transformation.	Understanding
CO5	Build Graphics programs using OPENGL.	Applying
CO6	Intersect rays with primitives.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D06.1	1	2	2	1	-	-	-	-	-	-	-	1	1	-	-
16IT7D06.2	2	1	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT7D06.3	1	2	2	1	-	-	-	-	-	-	-	1	1	-	-
16IT7D06.4	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
16IT7D06.5	2	1	2	-	1	-	-	-	-	-	-	-	1	-	1
16IT7D06.6	3	2	1	1	-	-	-	-	-	-	-	-	1	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction: Application of Computer Graphics, raster scan systems, random scan systems, Raster scans display processors. Output primitives: Points and lines, line drawing algorithms(Bresenham's and DDA Line Derivations and algorithms), mid-point circle and ellipse algorithms.
UNIT II	Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms, inside and outside tests. 2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.
UNIT III	2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm. 3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.
UNIT IV	3-D Geometric transformations: Translation, rotation, scaling, reflection and shear Transformations, composite transformations, 3D Viewing pipeline, clipping, projections (Parallel and Perspective).
UNIT V	Graphics Programming Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Key frame - Graphics programming using OPENGL – Basic graphics primitives –Drawing three dimensional objects - Drawing three dimensional scenes
UNIT VI	Overview of Ray Tracing Intersecting rays with other primitives – Adding Surface texture – Reflections and Transparency – Boolean operations on Objects.

TEXTBOOKS

1	Computer Graphics – C Version, Donald Hearn, Pauline Baker, Second edition, Pearson Education, 2004.
2	Computer Graphics using OPENGL, F.S. Hill, Second edition, Pearson Education, 2003.

REFERENCE BOOKS

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

WEB RESOURCES

1	https://www.intechopen.com/books/computer-graphics
2	https://www.tutorialspoint.com/computer_graphics/index.htm
	www.cs.princeton.edu/courses/archive/spr02/cs217/lectures/graphics.pdf
	www.inf.ed.ac.uk/teaching/courses/cg/Web/intro_graphics.pdf



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ELECTIVE – II

I. IMAGE PROCESSING

Course Category:	Professional Elective	Course Code:	16IT7D07
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To introduce basic principles of digital image processing.
2	To provide knowledge on Image data structures
3	To demonstrate different image Compression techniques.
4	To explain segmentation techniques.

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Enumerate the fundamental steps in digital image processing.	Understanding
CO2	List image enhancement techniques in spatial domain.	Remembering
CO3	List image enhancement techniques in frequency domain.	Remembering
CO4	Compare different types of color image processing techniques and its operations.	Understanding
CO5	Analyze various image compression techniques.	Analyzing
CO6	Differentiate edge linking and boundary detection techniques.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D07.1	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
16IT7D07.2	1	1	1	-	1	-	-	-	-	-	-	-	1	-	-
16IT7D07.3	1	1	1	-	1	-	-	-	-	-	-	-	1	-	-
16IT7D07.4	1	2	1	1	2	-	-	-	-	-	-	1	1	-	1
16IT7D07.5	1	2	1	1	2	-	-	-	-	-	-	1	1	-	1
16IT7D07.6	1	2	1	1	2	-	-	-	-	-	-	1	1	-	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction: Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels.
UNIT II	Image enhancement in the spatial domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods.
UNIT III	Image enhancement in the frequency domain: Introduction to the Fourier Transform and the frequency, Smoothing Frequency-domain Filters: Ideal Lowpass Filters, Butterworth Lowpass Filters, Gaussian Lowpass Filters; Sharpening Frequency Domain Filters: Ideal Highpass Filters, Butterworth Highpass Filters, Gaussian Highpass Filters
UNIT IV	Color Image Processing: Color fundamentals, color models, pseudo color image processing, basics of full-color image processing, color transforms, smoothing and sharpening, color segmentation.
UNIT V	Image Compression: Fundamentals, image compression models, error-free compression, lossy predictive coding, image compression standards.
UNIT VI	Morphological Image Processing: Dilation and Erosion, Some Morphological Algorithms: Boundary Extraction, Region Filling, Convex Hull, Thinning and Thickening. Image Segmentation: Detection of discontinuous, edge linking and boundary detection, thresholding, region-based segmentation.

TEXTBOOKS

1	Digital Image Processing, Rafeal C. Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.
----------	---

REFERENCE BOOKS

1	Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2	Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology.
3	Digital Image Processing and Analysis, B. Chanda, D. Datta Majumder, Prentice Hall of India, 2003.
4	Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications.
5	Digital Image Processing using Matlab, Rafeal C. Gonzalez, Richard E.Woods, Steven L.Eddins, Pearson Education.

WEB RESOURCES

1	https://www.peterindia.net/ImageProcessing.html
2	http://www.imageprocessingplace.com/root_files_V3/image_databases.htm
3	https://www.tutorialspoint.com/dip/image_processing_introduction.htm

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

II. HUMAN COMPUTER INTERACTION

Course Category:	Professional Elective	Course Code:	16IT7D08
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: 40 Semester end Evaluation: 60 Total Marks: 100	

COURSE OBJECTIVES

1	The main objective is to get student to think constructively and analytically about how to design and evaluate interactive technologies.
---	--

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	List out the characteristics of Graphical and Web User Interface.	Remembering
CO2	Analyze the impact of Human Interaction Speeds, Performance versus Preference in the User Interface Design.	Analyzing
CO3	Determine Business Functions.	Understanding
CO4	Design User Interface Components like System Menu, Windows etc.	Understanding
CO5	Select proper device and screen based controls.	Understanding
CO6	Provide Proper Feedback, Guidance and Assistance for the User Interface Design.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D08.1	3	3	3	2	2	2	-	-	-	-	-	-	-	2	-
16IT7D08.2	3	3	2	2	2	1	-	-	-	-	-	-	-	2	-
16IT7D08.3	3	3	2	3	2	2	-	-	-	-	2	-	1	2	-
16IT7D08.4	3	3	3	2	2	2	-	-	-	-	-	2	1	2	3
16IT7D08.5	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-
16IT7D08.6	2	3	3	3	3	-	-	-	-	-	-	-	1	3	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	The User Interface: Introduction, Importance of the User Interface, Importance and benefits of Good Design History of Human Computer Interface. Characteristics of Graphical and Web User Interface: Graphical User Interface, popularity of graphics, concepts of Direct Manipulation, Graphical System advantage and disadvantage, Characteristics of GUI. Web User Interface, popularity of web, Characteristics of Web Interface.
UNIT II	The User Interface Design Process: Obstacles and Pitfall in the development Process, Usability, The Design Team, Human Interaction with Computers, Important Human Characteristics in Design, Human Consideration in Design, Human Interaction Speeds.
UNIT III	Understanding Business Functions: Business Definitions & Requirement analysis, Determining Business Functions, Design standards or Style Guides, System Training and Documentation.
UNIT IV	Principles of Good Screen Design: Human considerations in screen Design, interface design goals, test for a good design, screen meaning and purpose, Technological considerations in Interface Design System Menus and Navigation Schemes: Structure, Functions, Context, Formatting, Phrasing and Selecting, Navigating of Menus, Kinds of Graphical Menus Windows Interface: Windows characteristic, Components of Window, Windows Presentation Styles, Types of Windows.
UNIT V	Device and Screen-Based Control: Device based controls, Operable Controls, Text entry/read- Only Controls, Section Controls, Combining Entry/Selection Controls, Other Operable Controls and Presentation Controls, Selecting proper controls.
UNIT VI	Effective Feedback Guidance and Assistance: Providing the Proper Feedback, Guidance and Assistance Effective Internationalization and Accessibility- International consideration, Accessibility, Create meaningful Graphics, Icons and Images, Colors-uses, possible problems with colors, choosing colors.

TEXTBOOKS

1	The Essential Guide to User Interface Design, Wilbert O. Galitz, Wiley India Edition
2	Sharps Interaction Design, Prece, Rogers, Wiley India.
3	Designing the User Interfaces, Ben Shneidermann, 3 rd Edition, Pearson Education Asia.

REFERENCE BOOKS

1	User Interface Design, Soren Lauesen, Pearson Education
2	Essentials of Interaction Design, Alan Cooper, Robert Riemann, David Cronin, Wiley
3	HumanComputer Interaction, Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell, Bealg, Pearson Education.

WEB RESOURCES

1	https://onlinecourses.nptel.ac.in/noc18_cs23/preview
2	http://nptel.ac.in/courses/106103115/
3	https://www.interaction-design.org/courses/human-computer-interaction

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

III. MACHINE LEARNING

Course Category:	Professional Elective	Course Code:	16IT7D09
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100
COURSE OBJECTIVES			
1	To introduce machine learning problems corresponding to different applications.		
2	To learn concepts of Decision tree learning and artificial neural networks.		
3	To discuss Bayesian learning and computational learning theory.		
4	To provide basic Knowledge on Instance based learning.		
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Illustrate Decision Theory.		Understanding
CO2	Analyze Linear models for Regression		Analyzing
CO3	Analyze Linear models for Classification		Analyzing
CO4	Apply the concept of Feature Selection .		Applying
CO5	List the linear Transforms in Feature Generation I		Remembering
CO6	Implement the Feature Generation II		Applying

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D09.1	1	1	-	1	1	-	-	-	-	-	-	-	-	-	-
16IT7D09.2	1	2	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT7D09.3	1	2	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT7D09.4	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-
16IT7D09.5	1	2	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT7D09.6	1	2	1	1	1	-	-	-	-	-	-	-	1	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Decision Theory: Minimizing the misclassification rate, Minimizing the expected loss, The reject option, Inference and decision, Loss functions for regression. Information Theory: Relative entropy and mutual information
UNIT II	Linear Models for Regression: Linear Basis Function Models: Maximum likelihood and least squares, Geometry of least squares. The Bias-Variance Decomposition, Bayesian Linear Regression, Bayesian Model Comparison
UNIT III	Linear Models for Classification: Discriminant Functions: Two classes, Multiple classes, Least squares for classification. Probabilistic Generative Models, Probabilistic Discriminative Model: Fixed basis functions, Logistic regression, Iterative reweighted least square
UNIT IV	Feature Selection: Introduction, Preprocessing, Feature Selection Based on Statistical Hypothesis Testing, The Receiver Operating Characteristics CROC Curve, The Receiver Operating Characteristics CROC Curve, Class Separability Measures, Future subset selection.
UNIT V	Feature Generation I: Linear Transforms Introduction, Basis Vectors and Images, The Karhunen-Lohe Transform, The Singular Value Decomposition, Independent Component Analysis, The Discrete Fourier Transform (DFT), The Discrete Cosine and Sine Transforms, The Hadamard Transform, The Haar Transform.
UNIT VI	Feature Generation II: Introduction, Regional Features, Features for Shape and Size Characterization, A Glimpse at Fractals.

TEXTBOOKS

1	Pattern Recognition and Machine Learning, Christopher Bishop[1,2,3]
2	Pattern Recognition, Sergios Theodoridis & Konstantinos Koutroumbas, Second Edition.[4,5,6]

REFERENCE BOOKS

1	Understanding Machine Learning from Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.
---	---

WEB RESOURCES

1	www.site.uottawa.ca/~nat/Courses/CSI5387/ML_Lecture_9.ppt
2	http://artint.info/html/ArtInt_177.html
3	http://fastml.com/bayesian-machine-learning/
4	https://link.springer.com/content/pdf/10.1023%2FA%3A1022689900470.pdf
5	http://ai.stanford.edu/people/nilsson/MLBOOK.pdf

IV. DECISION SUPPORT SYSTEM

Course Category:	Professional Elective	Course Code:	16IT7D10
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To understand the basic concepts of Decision making systems
2	To develop and learn various applications of Decision support system

COURSE OUTCOMES

COURSE OUTCOMES		Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:		
CO1	Evaluate the benefits of Decision support systems	Understanding
CO2	Analyze the factors that impart decision making.	Analyzing
CO3	Differentiate between information and information quality models.	Analyzing
CO4	Categorize different types of decision support system.	Analyzing
CO5	Analyze architectural aspects of decision support system.	Analyzing
CO6	Compare different types of models in Decision support systems.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

[illegible]



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to Decision Support Systems, How Decision Support Systems Evolved, What is a DSS? Why decision Support Systems Matter, DSS Benefits – Why Study DSS?
UNIT II	Human Decision –Making Processes what is a Decision? –The Decision Process, Types of Decision, How Business People make Decision, The Impact of culture on Decision Making.
UNIT III	Systems, Information Quality. And Models- About Systems- Information Systems Data Flow Diagrams – DSS as Information Systems- Information and Information Quality-Models.
UNIT IV	Types of Decision Support Systems – the DSS Hierarchy – Generalizing the DSS Categories – Matching DSS to the Decision Type.
UNIT V	DSS Architecture, Hardware and Operating Systems platform, defining the DSS Architecture-The Major Options- DSS on the Central Corporate System, DSS and Client/Server Computing.
UNIT VI	DSS Software Tools, DSS Software Categories, Standard Packages, Programming Languages DSS, Models in Decision Support Systems.

TEXTBOOKS

1	Decision Support and Data Warehouse Systems, Efram G. Mallach, Mc Graw Hill.
2	Decision Support Systems for Business Intelligence, Vicki L. Sauter

REFERENCE BOOKS

1	Decision Support Systems (2 nd Edition) George M. Marakas, Prentice Hall
----------	---

WEB RESOURCES

1	https://www.informationbuilders.com/decision-support-systems-dss
2	http://nptel.ac.in/courses/105108081/39
3	http://nptel.ac.in/syllabus/110104021/
4	https://nptel.ac.in/courses/106108102/6

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

V. ARTIFICIAL NEURAL NETWORKS

Course Category:	Professional Elective	Course Code:	16IT7D11
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To understand the role of artificial intelligence in engineering.
2	To understand the differences between networks for supervised and unsupervised learning

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Compare different classes of network architectures.	Understanding
CO2	Differentiate various learning mechanisms like Memory-based learning, Hebbian learning, Competitive learning.	Understanding
CO3	Design a pattern classifier using a Single layer perceptron.	Applying
CO4	Analyze issues of back propagation leaning in multi layer feed forward networks.	Analyzing
CO5	Analyze Radial Basis Function Networks.	Analyzing
CO6	Demonstrate Self Organizing Maps.	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D11.1	1	2	1	1	1	-	-	-	-	-	-	-	1	-	1
16IT7D11.2	2	2	2	2	2	-	-	-	-	-	-	-	1	-	1
16IT7D11.3	1	1	2	1	1	-	-	-	-	-	-	-	-	-	-
16IT7D11.4	1	2	1	1	1	-	-	-	-	-	-	-	1	-	1
16IT7D11.5	1	2	1	1	1	-	-	-	-	-	-	-	1	-	1
16IT7D11.6	1	2	1	1	1	-	-	-	-	-	-	-	1	-	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT	
UNIT I	Introduction and ANN Structure: Biological neurons and artificial neurons, Model of an ANN. Activation functions used in ANNs, Typical classes of network architectures.
UNIT II	Mathematical Foundations and Learning mechanisms, Re-visiting vector and matrix algebra, State-space concepts, Concepts of optimization, Error-correction learning, Memory-based learning, Hebbian learning, Competitive learning.
UNIT III	Single layer perceptrons. Structure and learning of perceptrons. Pattern classifier – introduction and Bayes' classifiers. Perceptron as a pattern classifier. Perceptron convergence. Limitations of a perceptrons.
UNIT IV	Feed forward ANN: Structures of Multi-layer feed forward networks. Back propagation algorithm. Back propagation - training and convergence.
UNIT V	Radial Basis Function Networks: Pattern separability and interpolation. Regularization Theory. Regularization and RBF networks. RBF network design and training. Approximation properties of RBF.
UNIT VI	Self Organizing Maps: Introduction, Two basic Feature-Mapping Models, Self-Organizing Map, Summary of the SOM Algorithm, Properties of the Feature Map, Computer Simulations, Learning Vector Quantization.
TEXTBOOKS	
1	Neural Networks: A comprehensive foundation, Simon Haykin, Second Edition, Pearson Education Asia.
2	Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw Hill, 2004.
REFERENCE BOOKS	
1	Artificial Neural Networks, Robert J. Schalkoff, McGraw-Hill International Editions, 1997.
WEB RESOURCES	
1	https://en.wikibooks.org/wiki/Artificial_Neural_Networks
2	http://www.dkriesel.com/_media/science/neuronaleetze-en-zeta2-1col-dkrieselcom.pdf

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

VI. E-COMMERCE

Course Category:	Professional Elective	Course Code:	16IT7D12
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	This module is an introduction to the basic concepts of e-business and e-commerce, including presentation and discussion of the strategies and technologies involved.
---	---

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Compare different types of E-Commerce Applications.	Understanding
CO2	Differentiate between different Electronic Payment Systems.	Understanding
CO3	Compare and contrast between Inter and Intra Organizational Commerce.	Understanding
CO4	Perform online marketing process.	Applying
CO5	Perform information search and retrieval.	Applying
CO6	Analyze different multimedia concepts.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7D12.1	1	2	1	1	-	-	-	-	-	-	-	-	1	-	1
16IT7D12.2	1	2	1	1	-	-	-	-	-	-	-	-	1	-	-
16IT7D12.3	1	2	1	1	-	-	-	-	-	-	-	-	1	-	1
16IT7D12.4	1	2	1	1	-	-	-	-	-	-	-	-	1	-	1
16IT7D12.5	1	2	1	-	1	-	-	-	-	-	-	1	1	-	-
16IT7D12.6	1	2	1	-	-	-	-	-	-	-	-	-	1	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications, Consumer Oriented Electronic commerce - Mercantile Process models.
UNIT II	Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.
UNIT III	Inter Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.
UNIT IV	Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.
UNIT V	Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.
UNIT VI	Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

TEXTBOOKS

1	Frontiers of Electronic Commerce – Kalakata, Whinston, Pearson.
2	E-Commerce, Strategy, Technology, and Implementation, Gary P. Schneider, 1 st Ed, Cengage Learning.

REFERENCE BOOKS

1	E-Commerce Fundamentals and Applications, Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2	E-Commerce, S.Jaiswal, Galgotia.
3	E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4	Electronic Commerce, Gary P.Schneider, Thomson.
5	E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

WEB RESOURCES

1	https://onlinecourses.nptel.ac.in/noc17_mg22/preview
2	http://nptel.ac.in/courses/106108103/pdf/Lecture_Notes/LNm13.pdf
3	http://nptel.ac.in/courses/110105083/



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

MOBILE COMPUTING LAB

Course Category:	Professional Elective	Course Code:	16IT7L10
Course Type:	Laboratory	L-T-P-C:	0-0-3-2
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100
COURSE OUTCOMES			
Upon successful completion of the course, the student will be able to:			
CO1	Develop J2ME applications.		
CO2	Develop mobile applications using android		

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7L10.1	2	2	2	3	2	1	-	-	1	-	1	1	2	2	2
16IT7L10.2	2	2	2	3	2	1	-	-	1	-	1	1	2	2	2

LIST OF EXPERIMENTS	
1	Write a J2ME program to show how to change the font size and color.
2	Write a J2ME program which creates the following kind of menu. <ul style="list-style-type: none"> • cut • copy • past • delete • select all • unselect all
3	Create a J2ME menu which has the following options (Event Handling): <ul style="list-style-type: none"> • cut - can be on/off • copy - can be on/off • paste - can be on/off • delete - can be on/off • select all - put all 4 options on • unselect all - put all
4	Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

5	Create an MIDP application which examines, that a phone number, which a user has entered is in the given format (Input checking): <ul style="list-style-type: none">• Area code should be one of the following: 040, 041, 050, 0400, 044• There should 6-8 numbers in telephone number (+ area code)
6	Write an Android application program that displays Hello World using an IDE.
7	Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using an IDE.
8	Write an Android application program that demonstrates the following: <ul style="list-style-type: none">(i) Linear Layout(ii) Relative Layout(iii) Table Layout(iv) Grid View layout
9	Write an Android application program that converts the temperature in Celsius to Fahrenheit.
10	Write an Android application program that demonstrates intent in mobile application development.



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

OPEN SOURCE SOFTWARE LAB

Course Category:	Professional Elective	Course Code:	16IT7L11
Course Type:	Laboratory	L-T-P-C:	0-0-3-2
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100
COURSE OUTCOMES			
Upon successful completion of the course, the student will be able to:			
CO1	Build programs using angular JS.		
CO2	Create programs based on jquery.		
CO3	Implement programming with Ruby on Rails.		
CO4	Develop nosql programs using MongoDB and HBase.		

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT7L11.1	2	2	2	3	2	-	-	-	-	-	-	2	2	1	1
16IT7L11.2	2	2	2	3	2	-	-	-	-	-	-	2	2	1	1
16IT7L11.3	1	1	2	3	2	-	-	-	-	-	1	1	1	2	1
16IT7L11.4	1	1	1	3	1	-	-	-	-	-	-	1	1	2	1

LIST OF EXPERIMENTS	
1	Display "Hello World" message using Angular js
2	Write a Angular js Program for Controllers.
3	Write a Angular js Program for Expression, using a variable.
4	Display "Hello World" message using jQuery.
5	Write a JQuery to Change text color of the elements
6	Selecting elements by element name in jQuery
7	Display "Hello World" message using Ruby on Rails
8	Create A Demo App using Ruby on Rails



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

9	Do four basic operations, create, read, update, and delete (CRUD) Using Mongo shell
10	Manipulate and view data in the Mongo shell
11	Adding new documents to a collection Using MongoDB
12	Removing documents from a collection Using MongoDB
13	Updating existing documents Using MongoDB
14	Installation of Hbase
15	Application inserting data into HBase



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

IV Year II Semester

CLOUD COMPUTING

Course Category:	Professional Core	Course Code:	16IT8T18
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms
2	To choose the appropriate data structure and algorithm design method for a specified application.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Compare system model for cloud computing.	Understanding
CO2	Identify the levels of virtualization.	Understanding
CO3	Differentiate various cloud platform architectures.	Understanding
CO4	Classify about cloud software environments.	Understanding
CO5	Outline about scheduling and resource management in cloud.	Understanding
CO6	Compare different cloud storage systems.	Analyzing

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8T18.1	3	3	2	3	2	-	-	-	-	-	-	2	3	2	2
16IT8T18.2	3	3	3	3	2	-	-	-	-	-	-	3	3	2	2
16IT8T18.3	3	3	3	3	2	-	-	-	-	-	-	3	2	2	3
16IT8T18.4	3	3	2	3	3	-	-	-	-	-	-	3	2	-	2
16IT8T18.5	3	3	3	3	2	-	-	-	-	-	-	3	3	2	2
16IT8T18.6	3	3	2	3	2	-	-	-	-	-	-	3	2	2	2



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Systems modeling, Clustering and virtualization: Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency.
UNIT II	Virtual Machines and Virtualization of Clusters: Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management.
UNIT III	Cloud Platform Architecture: Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Services and Service Oriented Architecture, Message Oriented Middleware.
UNIT IV	Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.
UNIT V	Cloud Resource Management and Scheduling: Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds, Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines.
UNIT VI	Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system, Apache Hadoop, BigTable, Megastore, Amazon Simple Storage Service (S3)

TEXTBOOKS

1	Distributed and Cloud Computing, Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra MK Elsevier. (Unit- 1 to 4)
2	Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier. (Unit- 5 & 6)

REFERENCE BOOKS

1	Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2	Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH.
3	Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madiseti, University Press

WEB RESOURCES

1	https://onlinecourses.nptel.ac.in/noc17_cs23/preview
2	https://www.smartzworld.com/notes/cloud-computing-complete-notes-pdf/
3	https://www.tutorialspoint.com/e_commerce/e_commerce_tutorial.pdf



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

CYBER SECURITY

Course Category:	Professional Core	Course Code:	16IT8T19
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
2	Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Realize the differences between Indian Perspective on Cyber Crimes and Global Perspective on Cyber Crimes.	Understanding
CO2	Analyze how criminals plan attacks and the fuel for cybercrimes.	Analyzing
CO3	Identify different classes of attacks and frauds.	Understanding
CO4	Enumerate the tools and methods used in Cybercrime.	Understanding
CO5	Elaborate the legal implications of Cybercrimes and Cyber security.	Understanding
CO6	Perform digital forensic analysis.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8T19.1	2	2	1	1	1	-	-	-	-	1	-	-	-	-	-
16IT8T19.2	2	2	1	1	1	-	-	-	-	1	-	-	-	-	-
16IT8T19.3	2	2	1	1	1	-	-	-	-	1	-	-	-	-	-
16IT8T19.4	2	2	2	1	1	-	-	-	-	1	-	-	2	1	1
16IT8T19.5	2	2	1	1	1	-	-	-	-	1	-	-	-	-	-
16IT8T19.6	2	2	1	1	1	-	-	-	-	1	-	-	-	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals?, Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.
UNIT II	Cyber offenses: How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.
UNIT III	Cybercrime Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.
UNIT IV	Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).
UNIT V	Cybercrimes and Cyber security: Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.
UNIT VI	Understanding Computer Forensics: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics.

TEXTBOOKS

1	Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley.
2	Principles of Information Security, Micheal E. Whitman and Herbert J. Mattord, Cengage Learning.

REFERENCE BOOKS

1	Information Security, Mark Rhodes, Ousley, MGH.
---	---

WEB RESOURCES

1	https://www.dhs.gov/topic/cybersecurity http://libguides.armstrong.edu/cyber
2	https://www.coursera.org/courses?languages=en&query=cybersecurity
3	http://fau.edu/security/links/

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA WAREHOUSING AND BUSINESS INTELLIGENCE

Course Category:	Professional Core	Course Code:	16IT8T20
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: 40 Semester end Evaluation: 60 Total Marks: 100	

COURSE OBJECTIVES

1	Students will be enabled to understand and implement classical models and algorithms in data warehousing and business intelligence.
2	They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.

COURSE OUTCOMES

**Blooms
Taxonomy
Level**

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

CO1	Classify the Data Warehouse Design & concepts	Understanding
CO2	Demonstrate Data Cube Technology	Understanding
CO3	Classify about Business intelligence models.	Understanding
CO4	Roll out various Data Provisioning.	Understanding
CO5	Differentiate Data Description & Visualization	Understanding
CO6	Analyze the process stages in BI	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8T20.1	3	3	3	2	1	-	-	-	-	-	-	-	3	1	3
16IT8T20.2	3	3	3	2	2	-	-	-	-	-	-	-	3	2	3
16IT8T20.3	3	3	3	1	2	-	-	-	-	-	-	2	3	2	3
16IT8T20.4	3	2	2	2	1	-	-	-	-	-	-	-	1	1	1
16IT8T20.5	3	3	3	1	2	-	-	-	-	-	-	-	3	2	3
16IT8T20.6	3	3	3	2	2	-	-	-	-	-	-	-	3	2	3



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Data Warehousing and Online Analytical Processing: Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.
UNIT II	Data Cube Technology: Data Cube Computation: Preliminary Concepts, Data Cube Computation Methods, Processing Advanced Kinds of Queries by Exploring Cube Technology,
UNIT III	Modeling in Business Intelligence: Models and Modeling in Business Intelligence, Logical and Algebraic Structures, Graph Structures, Analytical Structures, Models and Data, Multidimensional Data Analysis in Cube Space,
UNIT IV	Data Provisioning: Introduction and Goals, Data Collection and Description, Data Extraction, From Transactional Data Towards Analytical Data, Schema and Data Integration, Conclusion and Lessons Learned.
UNIT V	Data Description and Visualization: Introduction, Description and Visualization of Business Processes, Description and Visualization of Data in the Customer, Basic Visualization Techniques, Reporting.
UNIT VI	Process Analysis: Introduction and Terminology, Business Process Analysis and Simulation, Process Performance Management and Warehousing, Process Mining, Business Process Compliance, Evaluation and Assessment.

TEXTBOOKS

1	Data Mining Concepts and Techniques, Jiawei Han, Micheline Kamber, Jian Pei Simon Fraser, Third Edition. (Unit-I,II)
2	Fundamentals of Business Intelligence, Grossmann, Wilfried, Rinderle-ma, Stefanie(Unit-III,IV,V,VI)

REFERENCE BOOKS

1	Data Warehousing Fundamentals: A comprehensive guide for IT, PaulrajPunniah, John Wiley Publications, 2001.
2	Decision Support and Business Intelligence Systems, Efraim Turban, Ramesh Sharda, Jay Aronson, David King, 9 th Edition, Pearson Education, 2009

WEB RESOURCES

1	http://nptel.ac.in/courses/110106064/
2	http://nptel.ac.in/courses/110107092/
3	http://nptel.ac.in/courses/110104086/
4	http://datawarehouse4u.info/What-is-Business-Intelligence.html



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

ELECTIVE-III

I. AGILE METHODOLOGIES

Course Category:	Professional Elective	Course Code:	16IT8D13
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	Know about software and its development
2	Gain knowledge in agile development
3	Study the agile methods
4	Student will know about lifecycle of agile methods
5	Student will have an appreciation of the necessity and difficulty in case study.
6	Student will know about Agile Practice and Testing

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	List out various software development techniques.	Remembering
CO2	Outline about Agile method and its tools.	Understanding
CO3	Identify software motivation techniques.	Understanding
CO4	Classify about need of Evidence in agile.	Understanding
CO5	Implement Scrum model.	Applying
CO6	Design and test project using agile methodology.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8D13.1	2	2	2	1	1	-	-	-	1	-	1	1	2	-	1
16IT8D13.2	2	2	2	1	1	-	-	-	1	-	1	1	2	-	1
16IT8D13.3	2	2	2	1	1	-	-	-	1	-	1	1	2	-	1
16IT8D13.4	2	2	2	1	1	-	-	-	1	-	1	1	2	-	1
16IT8D13.5	2	2	3	1	1	-	-	-	1	-	1	1	2	-	1
16IT8D13.6	2	2	3	1	1	-	-	-	1	-	1	1	2	-	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction: Software Is New Product Development, Web Resources. Iterative Evolutionary: Iterative Development, Risk-Driven and Client-Driven Iterative Planning, Time boxed Iterative Development, Evolutionary and Adaptive Development, Evolutionary Requirements Analysis, Evolutionary and Adaptive Planning, Incremental Delivery, Evolutionary Delivery, The Most Common Mistake, Specific Iterative Evolutionary Methods.
UNIT II	Agile: Agile Development, Classification of Methods, the Agile Manifesto and Principles, Agile Project Management, Embrace Communication and Feedback, Empirical vs. Defined & Prescriptive Process, Principle-Based versus Rule-Based, Sustainable Discipline: The Human Touch, Team as a Complex Adaptive System, Agile Hype.
UNIT III	Motivation: The Facts of Change on Software Projects, Key Motivations for Iterative Development, Meeting the Requirements Challenge Iteratively, Problems with the Waterfall.
UNIT IV	Evidence: Research Evidence, Early Historical Project Evidence, Standards-Body Evidence, Expert and Thought Leader Evidence, A Business Case for Iterative Development, The Historical Accident of Waterfall Validity.
UNIT V	Scrum: Method Overview: Lifecycle, Work products, Roles, and Practices, Values, Common Mistakes and Misunderstandings, Sample Projects, Process Mixtures, Adoption Strategies, Fact versus Fantasy, Strengths versus Other, History.
UNIT VI	Agile Practicing and Testing: Project management – Environment – Requirements – Test – The agile alliances – The manifesto – Supporting the values – Agile testing – Nine principles and six concrete practices for testing on agile teams.

TEXTBOOKS

1	Agile and Iterative Development – A Manager's Guide, Craig Larman, Pearson Education – 2004.
2	Agile Testing, Elisabeth Hendrickson, Quality Tree Software Inc, 2008.

REFERENCE BOOKS

1	Agile Software Development, Wikipedia.
2	Agile Software Development Series, Cockburn, Alistair, 2001.

WEB RESOURCES

1	www.agileintro.wordpress.com/2008
2	http://nptel.ac.in/courses/106101061/26
3	https://www.versionone.com/agile-101/agile-methodologies/
4	https://www.codeproject.com/Articles/604417/Agile-software-development-methodologies-and-how-t
5	https://www.coursera.org/learn/agile-software-development
6	https://www.smartsheet.com/understanding-agile-software-development-lifecycle-and-process-workflow



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to Internet of Things, Definition & Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates Domain Specific IoT: Home, Cities, Environment, Energy systems, Logistics, Agriculture, Health & Lifestyle.
UNIT II	IOT & M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, 1 Need for IoT Systems Management, Simple Network Management Protocol (SNMP), Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG, NETOPEER
UNIT III	IoT Platforms Design Methodology IoT Design Methodology, Case Study on IoT System for Weather Monitoring , Motivation for Using Python , IoT Systems - Logical Design using Python , Packages , Date/Time Operations , Python Packages of Interest for IoT.
UNIT IV	IoT Physical Devices & Endpoints, Raspberry Pi , About the Board , Linux on Raspberry Pi , Raspberry Pi Interfaces , Programming Raspberry Pi with Python , Other IoT Devices, IoT Physical Servers & Cloud Offerings , Introduction to Cloud Storage Models & Communication APIs , WAMP - Autobahn for IoT , Xively Cloud for IoT , Python Web Application Framework - Django
UNIT V	Case Studies Illustrating IoT Design, Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.
UNIT VI	Data Analytics for IoT , Introduction , Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis , Apache Oozie , Apache Spark , Apache Storm , Using Apache Storm for Real time Data Analysis , Structural Health Monitoring Case Study , Tools for IOT.

TEXTBOOKS

1	Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015
----------	---

REFERENCE BOOKS

1	Fundamentals of Python, K.A.Lambert and B.L.Juneja, Cengage Learning, 2012.
----------	---

WEB RESOURCES

1	https://onlinecourses.nptel.ac.in/noc17_cs22/preview
2	http://nptel.ac.in/courses/106105166/
3	https://onlinecourses.nptel.ac.in/noc18_cs08/preview
4	https://onlinecourses.nptel.ac.in/noc17_ee20/preview

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

III. COMPUTER VISION

Course Category:	Professional Elective	Course Code:	16IT8D15
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100
COURSE OBJECTIVES			
1	The fundamentals of Computer Graphics and Image Processing		
2	The concepts related edge detection, segmentation, morphology and image compression methods.		
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Compare different image formation methods.		Understanding
CO2	Elaborate various image processing transformations.		Understanding
CO3	Perform feature detection and matching.		Understanding
CO4	Implement image segmentation.		Understanding
CO5	Compare 2-D and 3-D feature based alignment.		Understanding
CO6	Explain about Two-frame structure from motion.		Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8D15.1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
16IT8D15.2	1	1	1	-	-	-	-	-	-	-	-	1	1	-	-
16IT8D15.3	1	1	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT8D15.4	1	1	2	1	1	-	-	-	-	-	-	1	1	-	1
16IT8D15.5	2	1	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT8D15.6	1	2	2	1	1	-	-	-	-	-	-	-	1	-	-



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction: computer vision, A brief history, Book overview, Sample syllabus, Notation Image formation: Geometric primitives and transformations, Photometric image formation, The digital camera.
UNIT II	Image processing: Point operators, Linear filtering, More neighborhood operators, Fourier transforms, Pyramids and wavelets, Geometric transformations, Global optimization.
UNIT III	Feature detection and matching: Points and patches, Edges, Lines
UNIT IV	Segmentation: Active contours, Split and merge, Mean shift and mode finding, Normalized cuts, Graph cuts and energy-based methods.
UNIT V	Feature-based alignment: 2D and 3D feature-based alignment, Pose estimation, Geometric intrinsic calibration.
UNIT VI	Structure from motion: Triangulation, Two-frame structure from motion, Factorization, Bundle adjustment, constrained structure and motion.

TEXTBOOKS

1	Computer Vision: Algorithms and Applications, Richard Szeliski, Springer-Verlag London Limited 2011.
---	--

REFERENCE BOOKS

1	Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, 2003.
2	Multiple View Geometry in Computer Vision, Second Edition, Richard Hartley and Andrew Zisserman, Cambridge University Press, March 2004.
3	Introduction to Statistical Pattern Recognition, K. Fukunaga, Second Edition, Academic Press, Morgan Kaufmann, 1990.

WEB RESOURCES

1	https://onlinecourses.nptel.ac.in/noc18_ee08/preview
2	http://nptel.ac.in/courses/106105032/
3	http://nptel.ac.in/courses/112101098/25
4	http://www.cse.iitd.ernet.in/~suban/vision/index.html



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

IV. MULTIMEDIA PROGRAMMING

Course Category:	Professional Elective	Course Code:	16IT8D16
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100
COURSE OBJECTIVES			
1	To provide the foundation knowledge of multimedia computing, e.g. media characteristics, compression standards, multimedia representation, data formats, multimedia technology development.		
COURSE OUTCOMES			Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to:			
CO1	Illustrate the characteristics of Text, Images, Audio and Video (Multimedia Information Representations).		Understanding
CO2	Differentiate between Lossy and Lossless Compression techniques.		Understanding
CO3	Compare and Contrast GIF, TIFF and JPEG Image Compression Techniques		Understanding
CO4	Compare and Contrast DPCM, ADPCM, MPEG Audio Compression Techniques.		Understanding
CO5	Enumerate Basic video Compression Techniques.		Understanding
CO6	Design Interactive Applications over the Internet.		Applying

Contribution of Course Outcomes towards achievement of Program Outcomes															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8D16.1	2	2	-	1	1	-	-	-	-	-	-	-	-	-	-
16IT8D16.2	2	2	1	2	1	-	-	-	-	-	-	-	1	-	1
16IT8D16.3	2	2	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT8D16.4	2	2	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT8D16.5	2	2	1	1	1	-	-	-	-	-	-	-	1	-	-
16IT8D16.6	2	2	3	2	1	-	-	-	-	-	-	1	2	1	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Multimedia Information Representation: Introduction, Digitization Principles – Analog Signals, Encoder Design, Decoder Design. Text –Unformatted Text, Formatted Text, Hyper Text. Images- Graphics, Digitized Documents, Digitized Pictures. Audio – PCM Speech, CD – Quality Audio, Synthesized Audio. Video –Broadcast Television, Digital Video, PC Video, Video Content.
UNIT II	Text Compression: Compression Principles – Source Encoder and Destination Decoder, Lossless and Lossy Compression, Entropy Encoding, Source Encoding. Text Compression – Static and Dynamic Huffman Coding, Arithmetic Coding
UNIT III	Image Compression: Graphics Interchange Format (GIF), Tagged Image File Format (TIFF), Digitized Documents, JPEG.
UNIT IV	Audio Compression: Differential Pulse Coded Modulation (DPCM), Adaptive Differential PCM (ADPCM), Adaptive Predictive Coding and Linear Predictive Coding, MPEG Audio Coding.
UNIT V	Video Compression: Principles, H.261 Video Compression, MPEG 1, MPEG 2 and MPEG 4.
UNIT VI	Multimedia Applications: Inter- personnel Communication, Interactive Applications over the Internet, Entertainment Applications and Multimedia Conferencing.
TEXTBOOKS	
1	Multimedia Communications – Applications, Networks, Protocols and Standards, Halshall, Fred, Pearson Education, 2001.
REFERENCE BOOKS	
1	Digital Multimedia, Chapman, Nigel and Chapman, Jenny, John Wily & Sons, 2000.
2	Communications and Applications, Steinmaetz, Ralf and Nahrstedt, Klara, Multimedia, Pearson Education, 2003.
WEB RESOURCES	
1	www.lit.ie/Courses/LC234
2	https://www.youtube.com/watch?v=U7Iso9GW158
3	http://www.bmcc.cuny.edu/media-arts/mmp_program.jsp
4	https://www.youtube.com/watch?v=s_EQcpN00mg



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

V. SOCIAL NETWORKING & SEMANTIC WEB

Course Category:	Professional Elective	Course Code:	16IT8D17
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation:	40
		Semester end Evaluation:	60
		Total Marks:	100

COURSE OBJECTIVES

1	To explain the analysis of the social Web and the design of a new class of applications that combine human intelligence with machine processing.
2	To describe how the Semantic Web provides the key in aggregating information across heterogeneous sources.
3	To understand the benefits of Semantic Web by incorporating user-generated metadata and other clues left behind by users.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:		Blooms Taxonomy Level
CO1	Enumerate the measures of social network analysis.	Understanding
CO2	Illustrate Electronic sources for network analysis and different Ontology languages	Understanding
CO3	Model and aggregate social network data	Applying
CO4	Develop social-semantic applications	Applying
CO5	Evaluate Web- based social network	Understanding
CO6	Demonstrate model of ontologies	Understanding

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8D17.1	2	3	2	3	1	-	-	-	-	1	-	-	2	-	2
16IT8D17.2	2	3	2	3	2	-	-	-	-	1	-	-	2	2	2
16IT8D17.3	3	3	3	3	2	-	-	-	-	1	-	-	2	2	2
16IT8D17.4	3	3	3	3	3	-	-	-	-	1	-	-	3	3	3
16IT8D17.5	3	3	2	3	2	-	-	-	-	1	-	-	1	-	2
16IT8D17.6	2	3	3	2	2	-	-	-	-	1	-	-	1	1	2



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Introduction to the Semantic Web and Social Networks: The Semantic Web- Limitations of the current Web, The semantic solution, Development of the Semantic Web, The emergence of the social web. Social Network Analysis- What is network analysis, Development of Social Network Analysis, Key concepts and measures in network analysis.
UNIT II	Web data, Semantics and Knowledge Representation on the Semantic Web: Electronic sources for network analysis- Electronic discussion networks, Blogs and online communities, Web-based networks. Knowledge Representation on the Semantic Web - Ontologies and their role in the Semantic Web, Ontology languages for the Semantic Web (RDF, OWL).
UNIT III	Modeling and aggregating social network data: State-of-the-art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.
UNIT IV	Developing social-semantic applications: Building Semantic Web applications with social network features, Flink: the social networks of the Semantic Web community, open academia: distributed, semantic-based publication management.
UNIT V	Evaluation of web-based social network extraction: Differences between survey methods and electronic data extraction, Context of the empirical study, Data collection, Preparing the data, Optimizing goodness of fit, Comparison across methods and networks, Predicting the goodness of fit, Evaluation through analysis.
UNIT VI	Ontologies are us: emergent semantics in folksonomy systems: A tripartite model of ontologies, Case studies, Evaluation

TEXTBOOKS

1	Social Networks and the Semantic Web, Peter Mika, Springer, 2007.
---	---

REFERENCE BOOKS

1	Semantic Web Technologies
2	Semantic Web and Semantic Web Services, Liyang Lu Chapman and Hall, CRC Publishers
3	Information sharing on the semantic Web, Heiner Stuckenschmidt, Frank Van Harmelen
4	Programming the Semantic Web

WEB RESOURCES

1	https://link.springer.com/content/pdf/10.1007%2F978-0-387-71001-3.pdf
2	www.springer.com/in/book/9780387710006
3	https://en.wikipedia.org/wiki/Social_Semantic_Web

PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

VI. CONCURRENT & PARALLEL PROGRAMMING

Course Category:	Professional Elective	Course Code:	16IT8D18
Course Type:	Theory	L-T-P-C:	4-0-0-3
Prerequisites:		Internal Evaluation: Semester end Evaluation: Total Marks:	40 60 100

COURSE OBJECTIVES

1	To study fundamental concepts of concurrency: non-determinism, race conditions, atomicity, synchronization, safety, liveness, fairness, deadlock
2	To learn multithreaded programming using Java threads, Java concurrency constructs, Intel Threading Blocks, Open MPI
3	To know message passing model and programming with MPI
4	To learn basic parallel algorithm design 5. To teach performance analysis of parallel program

COURSE OUTCOMES

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

**Blooms
Taxonomy
Level**

CO1	Compare parallel programs and sequential programs.	Understanding
CO2	Classify parallel computing platforms.	Understanding
CO3	List the parallel algorithm models.	Remembering
CO4	Write shared memory parallel programs with openMP.	Understanding
CO5	Develop distributed memory parallel programs using MPI.	Applying
CO6	Design the parallel algorithm for Matrix and Graph related problems.	Applying

Contribution of Course Outcomes towards achievement of Program Outcomes

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
16IT8D18.1	2	2	2	1	1	-	-	-	-	-	-	-	2	1	1
16IT8D18.2	2	2	2	1	1	-	-	-	-	-	-	-	2	1	1
16IT8D18.3	2	2	2	1	1	-	-	-	-	-	-	-	2	1	1
16IT8D18.4	2	2	2	1	1	-	-	-	-	-	-	-	2	1	1
16IT8D18.5	2	2	2	1	1	-	-	-	-	-	-	-	2	1	1
16IT8D18.6	2	2	2	1	1	-	-	-	-	-	-	-	2	1	1



PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CONTENT

UNIT I	Why Parallel Computing Why We Need Ever-Increasing Performance, Why We're Building Parallel Systems, Why We Need to Write Parallel Programs, How Do We Write Parallel Programs, and Concurrent Vs Parallel Vs Distributed Computing.
UNIT II	Parallel Programming Platforms Implicit Parallelism: Trends in Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines; GPGPU.
UNIT III	Principles of Parallel Algorithm Design Preliminaries, Decomposition Techniques, Characteristics of Tasks and Interactions, Parallel Algorithm Models.
UNIT IV	Shared-Memory Programming with OpenMP Getting Started, The Trapezoidal Rule, Scope of Variables, The Reduction Clause, The parallel for Directive, More about Loops in OpenMP: Sorting, Scheduling Loops, Producers and Consumers
UNIT V	Distributed-Memory Programming with MPI Getting started, the Trapezoidal Rule in MPI, Dealing with I/O, Collective Communication, MPI Derived Data types, Performance Evaluation of MPI Programs
UNIT VI	Dense Matrix and Graph Algorithms Matrix-Vector Multiplication, Matrix-Matrix Multiplication, Solving a System of Linear Equations, Minimum Spanning Tree: Prim's Algorithm, Single-Source Shortest Paths: Dijkstra's Algorithm

TEXTBOOKS

1	An Introduction to Parallel Programming, Peter S. Pacheco, University of San Francisco, Morgan Kaufmann, Publishers (Units 1,4 & 5)
2	Introduction to Parallel Computing, Second Edition, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Addison Wesley (Units 2,3 & 6)

REFERENCE BOOKS

1	Parallel Programming in C with MPI and OpenMP, M J Quinn
2	Programming Massively Parallel Processors, D.Kirk, W. Hwu

WEB RESOURCES

1	http://nptel.ac.in/syllabus/syllabus_pdf/106102114.pdf
2	http://nptel.ac.in/courses/106102114/23
3	http://nptel.ac.in/courses/106102163/