

# **COURSE STRUCTURE AND SYLLABUS**

For

**B.Tech**

## **INFORMATION TECHNOLOGY**

*(Applicable for batches admitted from 2016-17)*



## **PRAGATI ENGINEERING COLLEGE (AUTONOMOUS)**

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



**PRAGATI ENGINEERING COLLEGE :: SURAMPALEM**  
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**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.

1.1 A Student shall be declared eligible for the award of the B.Tech Degree, if he pursues a course of study for not less than four and for not more than eight academic years.

1.2 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.

<i>S. No.</i>	<i>Branch / Course</i>
01.	Civil Engineering (CE)
02.	Electrical and Electronics Engineering (EEE)
03.	Mechanical Engineering (ME)
04.	Electronics and Communications Engineering (ECE)
05.	Computer Science and Engineering (CSE)
06.	Information Technology (IT)

**3. MINIMUM INSTRUCTIONS DAYS.**

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

**4. PROGRAMME/ COURSE CREDITS**

4.1. 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 :**

5.1. 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.



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- 5.2. 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.
- 5.3. Shortage of attendance below 65% in aggregate shall not be condoned.
- 5.4. A student who has shortage of attendance in a semester may seek readmission in to the course when offered next.
- 5.5. A fee stipulated by the college shall be paid along with the application for the Condonation of shortage of attendance.
- 5.6. 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:

**6.1. Theory Subjects**

**i. Internal assessment : 40 marks**

- a) 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.
- b) Students shall submit assignments at the end of each unit in the syllabus and the marks allotted for the assignments is 10.
- c) 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 :**

- a) 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.
- b) 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.



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- c) 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 x 12) = 48 marks.

## 6.2. 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
		-----
<b>Total</b>	-	<b>40 Marks</b>
		-----

- ii. External Assessment :

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.

## 6.3. 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 x higher marks scored between the two tests + 0.2 x marks scored in the other test.	-	20 marks
		-----
<b>Total</b>	-	<b>40 Marks</b>
		-----

- ii. External assessment :

Same as for theory subjects given in 6.1.ii.



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#### **6.4. 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.

#### **6.5. 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.

#### **6.6. 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.

- 7.1. 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.**
- 7.2. 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.**
- 7.3. 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.**
- 7.4. A student shall register and put in minimum attendance in all 180 credits and earn all 180 credits.**



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**8. COURSE PATTERN**

- 8.1. The entire course of study is for four academic years, all the years are on semester pattern.
- 8.2. A student eligible to appear for the end semester examination in a subject, but absent or failed in the end semester examination, may write the examination in that subject when conducted next.
- 8.3. 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**

- 9.1. A Student shall be promoted from 1<sup>st</sup> year to II year if he fulfills the minimum attendance requirement under rule 5.
- 9.2. 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.
- 9.3. 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
$\geq 90$	$\geq 90$	O	Outstandin g	10
$\geq 80$ to $< 90$	$\geq 80$ to $< 90$	S	Excellent	9
$\geq 70$ to $< 80$	$\geq 70$ to $< 80$	A	Very Good	8
$\geq 60$ to $< 70$	$\geq 60$ to $< 70$	B	Good	7
$\geq 50$ to $< 60$	$\geq 50$ to $< 60$	C	Fair	6
$\geq 40$ to $< 50$	--	D	Satisfactory	5
$< 40$	$< 50$	F	Fail	0
			Absent	0



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**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  $i^{\text{th}}$  course and  $G_i$  is the grade point scored by the student in the  $i^{\text{th}}$  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  $i^{\text{th}}$  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	<b>From the CGPA secured from 180 credits</b>
First Class with Distinction	$\geq 7.75$ ( Without any Supplementary Appearance)	
First Class	$\geq 6.75$ to $< 7.75$	
Second Class	$\geq 5.75$ to $< 6.75$	
Pass Class	$\geq 4.75$ to $< 5.75$	





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**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:**

**13.1. For Re-admitted Candidates:**

- i) 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.
- 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.





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**13.2. 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.

**13.3. 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 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.



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**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.

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

1.2 The candidate shall register for 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**

3.1. 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).

3.2. 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.

**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	$\geq 7.75$ (Without any Supplementary Appearance )	
First Class	$\geq 6.75$ to $< 7.75$	
Second Class	$\geq 5.75$ to $< 6.75$	
Pass Class	$\geq 4.75$ 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.

**GENERAL:**

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



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**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
<b>Total Credits</b>						<b>24</b>

**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
<b>Total Credits</b>						<b>24</b>



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**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
<b>Total Credits</b>						<b>22</b>

**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	-	-	-	-
<b>Total Credits</b>						<b>22</b>



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**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	-	-	-	-
<b>Total Credits</b>						<b>21</b>

**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	<b>Open Elective:</b> 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
<b>Total Credits</b>						<b>21</b>



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**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	<b>Elective-I:</b> i. Data Analytics	4	-	-	3
	16IT7D02	ii. Information Retrieval Systems				
	16IT7D03	iii. Distributed Systems				
	16IT7D04	iv. Design Patterns				
	16IT7D05	v. Software Quality Assurance				
	16IT7D06	vi. Computer Graphics				
6	16IT7D07	<b>Elective-II:</b> i. Image Processing	4	-	-	3
	16IT7D08	ii. Human Computer Interaction				
	16IT7D09	iii. Machine Learning				
	16IT7D10	iv. Decision Support System				
	16IT7D11	v. Artificial Neural Networks				
	16IT7D12	vi. E-Commerce				
7	16IT7L10	Mobile Computing Lab	-	-	3	2
8	16IT7L11	Open Source Software Lab	-	-	3	2
		<b>Total Credits</b>				<b>22</b>

**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	<b>Elective-III:</b> i. Agile Methodologies	4	-	-	3
	16IT8D14	ii. Internet Of Things				
	16IT8D15	iii. Computer Vision				
	16IT8D16	iv. Multimedia Programming				
	16IT8D17	v. Social Networking & Semantic Web				
	16IT8D18	vi. Concurrent & Parallel Programming				
5	16IT8S01	Seminar	-	3	-	2
6	16IT8P03	Project work	-	-	-	10
		<b>Total Credits</b>				<b>24</b>



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<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**I Year I Semester**

**Subject Code: 16BH1T01**

**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.

**Objectives:**

To improve the language proficiency of the students in English with emphasis on LSRW skills.

1. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
2. To develop the communication skills of the students in both formal and informal situations.

**LISTENING SKILLS:**

**Objectives:**

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:**

**Objectives:**

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.





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**READING SKILLS:**

**Objectives:**

1. To enable the students to comprehend a text through silent reading.
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:**

**Objectives:**

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-centred 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.



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**DETAILED TEXTBOOKS:**

- *ENGLISH FOR ENGINEERS AND TECHNOLOGISTS, Published by Orient Blackswan Pvt Ltd*
- *THE COP AND THE ANTHEM BY O.HENRY PUBLISHED BY PERFECTION LEARNING*

**NON-DETAILED TEXTBOOK:**

- *-PANORAMA: A COURSE ON READING, Published by Oxford University Press India*

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

**UNIT I:**

1. *'Human Resources' from English for Engineers and Technologists.*

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.

2. *'An Ideal Family' from Panorama: A Course on Reading*

Objective:

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

Outcome:

Acquisition of writing skills

**UNIT 2:**

1. *'Transport: Problems and Solutions' from English for Engineers and Technologists.*

Objective:

To highlight road safety measures whatever be the mode of transport.

Outcome:

The lesson motivates the public to adopt road safety measures.

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



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**UNIT 3:**

Unit 3 has two sections: Unit 3(A) and 3(B)

**3(A):**

1. *'Evaluating Technology' from English for Engineers and Technologists.*

Objective:

To highlight the advantages and disadvantages of technology.

Outcome:

The lesson creates an awareness in the readers that mass production is ultimately survival.

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

Objective:

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

Outcome:

Acquisition of writing skills

**Unit 3(B )**

- 1. *THE COP AND THE ANTHEM BY O.HENRY*

Objective:

To enable students to develop interest in reading and appreciating short stories of different genres.

Outcome:

This lesson motivates students to respond and express the ideas and feelings in the story through oral, written and per formative means.

**UNIT 4:**

1. *'Alternative Sources of Energy' from English for Engineers and Technologists.*

Objective:

To bring into focus different sources of energy as alternatives to the depleting sources.

Outcome:

The lesson helps to choose a source of energy suitable for rural India.

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

Objective:

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

Outcome:

Acquisition of writing skills.

**UNIT 5:**

1. *'Our Living Environment' from English for Engineers and Technologists.*

Objective:

To highlight the fact that animals must be preserved because animal life is precious.

Outcome:

The lesson creates an awareness in the reader as to the usefulness of animals for the human society.

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

Objective:

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

Outcome:

Acquisition of writing skills



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**UNIT 6:**

1. 'Safety and Training' from *English for Engineers and Technologists*.

Objective:

To highlight the possibility of accidents in laboratories, industries and other places and to follow safety measures.

Outcome:

The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace.

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

Objective:

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

Outcome:

Acquisition of writing skills

**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.

**COURSE OUTCOME:**

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



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**I Year I Semester**

**Subject Code: 16BH1T03**

**MATHEMATICS – I**

**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: At the end of the Course, Student will be able to:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Solve the linear system of equations by using different methods.	
<b>CO2</b>	Find the Eigen values and Eigen vectors and also finding inverse and power of a matrix by using Cayley - Hamilton theorem.	
<b>CO3</b>	Find rank, index, signature and nature of a Quadratic form.	
<b>CO4</b>	Solve first order differential equations and able to apply physical problems.	
<b>CO5</b>	Solve higher order linear differential equations with constant coefficients.	
<b>CO6</b>	Find partial derivate of different orders, finding maxima and minima of a function of two variable, three variables and functional dependence.	

**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.



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

**Reference Books:**

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



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I year - I semester

Subject Code: **16BH1T04**

**MATHEMATICS – II**  
**(METHAMETICAL METHODS)**

**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: At the end of the Course, Student will be able to:**

CO#	Statement	Cognitive Level
CO1	Solve the algebraic and transcendental equation by using numerical methods.	
CO2	Finding the required functional value using interpolation formulae with equal and unequal intervals.	
CO3	Evaluate the given integral using numerical methods by different formulae.	
CO4	Find Legendre polynomials of different orders and how to express the given polynomial into Legendre polynomials.	
CO5	Find the harmonic conjugate of an analytic function & Evaluate line integrals and contour integrals using Cauchy integral theorem and Cauchy integral formula.	
CO6	Express the given complex valued function into Taylor's series and Laurent series and calculation of residues and evaluation integrals using residue theorem.	

**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).





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**UNIT IV: Fourier Series**

Introduction- Periodic functions – Fourier series of  $\pi$ -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 twodimensional Laplace equations.

**Text Books:**

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

**Reference Books:**

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



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**I Year - I Semester**

**Subject Code: 16CS1T10**

**APPLIED PHYSICS**

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

- Impart Knowledge of Physical Optics phenomena like Interference, Diffraction and Polarization involving required to design instruments with higher resolution.
- Teach Concepts of coherent sources, its realization and utility optical instrumentation.
- 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.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.

**UNIT-I**

**Objective:** To impart knowledge on interference phenomenon and utilising it to design of instruments in Engineering applications.

**Outcome:** The students will learn to apply the concepts of interference undergo analysis of optical effects and contribute to engineering applications.

**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**

**Objective:** To impart knowledge on diffraction phenomenon to design optical instruments for Engineering applications.

**Outcome:** The students will learn to study diffraction pattern of light to utilize in the analysis of the materials and their properties.

**DIFFRACTION:** Introduction -Fraunhofer 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**

**Objective:**

- To impart knowledge on types of polarization, types of polarizing materials and their effects to study and design of optical instruments.
- To impart knowledge on the lasers & their working principle

**Outcome:** The students will learn polarization phenomenon, Lasers and their practical implications in engineering applications.



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**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**

##### **Objective:**

- An overview of the Maxwell's Electromagnetic Field Equations & study the concepts regarding the response of materials to EM fields.
- To impart knowledge on the Optical Fibers and transmission of signals through it.

##### **Outcomes:**

- The students will learn to study diffraction pattern of light to utilize in the analysis of the materials and their properties.
- The students will learn to analyze the applications of the Optical fibers in the field of communication.

**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**

##### **Objective:**

- To impart knowledge on the discrepancy of classical mechanics & role of quantum mechanics in explaining phenomenon related to sub-microscopic particles..

##### **Outcomes:**

- The students will learn the phenomenon of electrical & thermal conductivities related to sub-microscopic particles.

**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.



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**UNIT-VI**

**Objective:**

- To impart knowledge on the physics of semiconductors and their working principle for their utility in electronics.

**Outcomes:**

- The students will be empowered to apply the basics of electronics in engineering applications.

**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.

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

**Text Books:**

1. A Text book of Engineering Physics – by Dr. M.N.Avadhanulu and Dr.P.G.Kshira sagar, S.Chand & Company Ltd., (2014)
2. 'Solid State Physics' by A.J.Dekker, Mc Millan Publishers (2011)

**Reference Books :**

1. Physics by Resnick, Halliday & Krane, Volume I & II, John Wiley & sons (2002)
2. Engineering Physics by D.K. Bhattacharya and Poonam Tandon, Oxford press (2015)
3. Applied Physics by P.K. Palanisamy, Scitech publications (2014)
4. Lasers and Non-Linear optics by B.B. Laud, Newage international publishers (2008)



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**I year - I semester**

**Subject Code: 16CS1T01**

**COMPUTER PROGRAMMING USING C**

**Learning objectives:**

Formulating algorithmic solutions to problems and implementing algorithms in C.

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

**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.



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**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

**Outcomes:**

CO#	Statement	Cognitive Level
CO1	Understand the basic terminology used in computer programming	
CO2	Write, compile and debug programs in C language.	
CO3	Use different data types in a computer program.	
CO4	Design programs involving decision structures, loops and functions.	
CO5	Explain the difference between call by value and call by reference	
CO6	Understand the dynamics of memory by the use of pointers	
CO7	Use different data structures and create/update basic data files.	



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**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.
3. Programming in C, Reema Thareja, Oxford.
4. C by Example, Noel Kalicharan, Cambridge University Press.

**URLs**

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/>





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**I year - I semester**

**Subject Code: 16MEIT02**

**ENGINEERING DRAWING**

**Objective:** 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.

**UNIT I**

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

Polygons, Construction of regular polygons using given length of a side; Ellipse, arcs of circles and Oblong methods; Scales – Vernier and Diagonal scales.

**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.



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

**REFERENCE BOOKS:**

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by P I Varghese, McGrawHill Publishers
4. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
5. <http://nptel.ac.in/courses/112103019/>
6. <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
7. <http://www.engineeringdrawing.org>

**Course Outcomes:**

CO#	Statement	Cognitive Level
CO1	Provides the students with a background in descriptive geometry, orthographic & isometric projection, engineering drawing techniques. Points, lines and plane relationships in projection, multi-view engineering drawings, basic dimensioning, engineering applications.	
CO2	Student's ability to perform basic sketching techniques will improve. Students will be able to draw orthographic projections.	
CO3	Student's ability to convert sketches to engineered drawings will increase.	



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**I Year - I Semester**

**Subject Code:16BH1L01**

**ENGLISH - COMMUNICATION SKILLS LAB- I**

**PRESCRIBED LAB MANUAL FOR SEMESTER I:**

*'INTERACT: English Lab Manual for Undergraduate Students'*, Published by Orient Black swan Pvt Ltd.

**Objectives:**

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

**Outcome:**

A study of the communicative items in the laboratory will help the students become successful in the competitive world. The course content along with the study material is divided into six units.

**UNIT 1:**

1. WHY study Spoken English?
2. Making Inquiries on the phone, thanking and responding to Thanks -- Practice work.

**UNIT 2:**

1. Responding to Requests and asking for Directions -- Practice work.

**UNIT 3:**

1. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
2. Apologising, Advising, Suggesting, Agreeing and Disagreeing -- Practice work.

**UNIT 4:**

1. Letters and Sounds -- Practice work.

**UNIT 5:**

1. The Sounds of English -- Practice work.

**UNIT 6:**

1. Pronunciation
2. Stress and Intonation -- Practice wor



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**Reference Books:**

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by 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
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education



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**I Year - I Semester**

**Subject Code: 16BH1L03**

**ENGINEERING/APPLIED PHYSICS LAB**  
**(Common to ECE, CSE& IT)**

**(only 10 out of 14 Experiments prescribed)**

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
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 Thermistor
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:**

1. Engineering Physics Lab Manual by Dr.Y.Aparna & Dr.K.Venkatesswara Rao.(V.G.S. Book Links)
2. Physics Manual cum Observation book (College Designed Manual).



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<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>

**I Year - I Semester**

**Subject Code: 16BH1L04**

**APPLIED / ENGINEERING PHYSICS VIRTUAL LABS - ASSIGNMENTS**

(Constitutes 5 marks of 40 marks of Internal-component)

List of Experiments

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster's angle
5. Numerical Aperture of Optical fiber
6. Photoelectric Effect
7. Simple Harmonic Motion
8. LASER – Beam Divergence and Spot size
9. B-H curve
10. Michelson's interferometer

URL : [www.vlab.co.in](http://www.vlab.co.in)



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**I year - I semester**

**Subject Code: 16CS1L01**

**C PROGRAMMING LAB**

**OBJECTIVES:**

- 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.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.

**Programming**

**Exercise - 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.

**Exercise - 2**

a) MS-Office / Open Office

- i) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
- ii) Spread Sheet - organize data, usage of formula, graphs, charts.
- iii) Power point - features of power point, guidelines for preparing an effective presentation.

b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewall settings. Installing application software, system software & tools.

**Exercise - 3 Basics**

- a) What is an OS Command, Familiarization of Editors - vi, Emacs
- b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
- c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

**Exercise - 4 Basic Math**

- a) Write a C Program to Simulate 3 Laws at Motion
- b) Write a C Program to convert Celsius to Fahrenheit and vice versa

**Exercise - 5 Control Flow - I**

- a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
- b) Write a C Program to Add Digits & Multiplication of a number





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**Exercise – 6 Control Flow - II**

- a) Write a C Program to Find Whether the Given Number is
  - i) Prime Number
  - ii) Armstrong Number
- b) Write a C program to print Floyd Triangle
- c) Write a C Program to print Pascal Triangle

**Exercise – 7 Functions**

- a) Write a C Program demonstrating of parameter passing in Functions and returning values.
- b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

**Exercise – 8 Control Flow - III**

- a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch-case
- b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

**Exercise – 9 Functions - Continued**

Write a C Program to compute the values of  $\sin x$  and  $\cos x$  and  $e^x$  values using Series expansion. (use factorial function)

**Exercise – 10 Arrays**

Demonstration of arrays

- a) Search-Linear.
- b) Sorting-Bubble, Selection.
- c) Operations on Matrix.

**Exercises - 11 Structures**

- a) Write a C Program to Store Information of a Movie Using Structure
- b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
- c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

**Exercise – 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.

**Exercise – 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



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**Exercise – 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

**Exercise -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

**Exercise – 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.

**OUTCOMES:**

CO#	Statement	Cognitive Level
CO1	Apply and practice logical ability to solve the problems.	
CO2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment	
CO3	Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs	
CO4	Understand and apply the in-built functions and customized functions for solving the problems.	
CO5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.	
CO6	Document and present the algorithms, flowcharts and programs in form of user-manuals	
CO7	Identification of various computer components, Installation of software	

**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.



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**I year - II semester**

**Subject Code: 16BH2T02**

**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.

**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**

**Objectives:**

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**

**Objectives:**

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.



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**READING SKILLS**

**Objectives:**

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

**Objectives:**

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-centred 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.

The following text books are recommended for study in I B.Tech II Semester (Common for all branches) of Pragati Engineering College, Surampalem from the academic year 2016-17 (R-16 Regulations)



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**DETAILED TEXTBOOK:**

- *ENGLISH ENCOUNTERS* Published by Maruthi Publishers.
- A BETTER INDIA, A BETTER WORLD by N.R. Narayana Murthy, Published by: Penguin Books India Pvt. Ltd.

**DETAILED NON-DETAIL:**

- *THE GREAT INDIAN SCIENTISTS*, Published by Cengage learning

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

**UNIT 1:**

1. 'The Greatest Resource- Education' from *English Encounters*

Objective:

Schumacher describes the education system by saying that it was mere training, something more than mere knowledge of facts.

Outcome:

The lesson underscores that the ultimate aim of Education is to enhance wisdom.

2. 'A P J Abdul Kalam' from *The Great Indian Scientists*.

Objective:

The lesson highlights Abdul Kalam's contributions to Indian science and the awards he received.

Outcome:

Abdul Kalam's simple life and service to the nation inspires the readers to follow in his footsteps.

**UNIT 2:**

1. 'A Dilemma' from *English Encounters*

Objective:

The lesson centres on the pros and cons of the development of science and technology.

Outcome:

The lesson enables the students to promote peaceful co-existence and universal harmony among people and society.

2. 'C V Raman' from *The Great Indian Scientists*.

Objective:

The lesson highlights the dedicated research work of C V Raman and his achievements in Physics.

Outcome:

The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists.



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**UNIT 3:**

*Unit 3 has two sections: Unit 3(A) and 3(B)*

**3 (A)**

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

Objective:

The lesson depicts of the symptoms of Cultural Shock and the aftermath consequences

Outcome:

The lesson imparts the students to manage different cultural shocks due to globalization.

2. *'Homi Jehangir Bhabha' from The Great Indian Scientists.*

Objective:

The lesson highlights Homi Jehangir Bhabha's contributions to Indian nuclear program as architect.

Outcome:

The seminal contributions of HomiJehangirBhabha to Indian nuclear program provide an aspiration to the readers to serve the nation and strengthen it.

**Unit 3 (B)**

1. *'What can we learn from West?' from A Better India, A Better World*

Objective:

To enable students to appreciate the differences in cultural perspectives.

Outcome:

This lesson motivates students to develop a multicultural outlook and appreciate the diverse cultures.

**UNIT 4:**

1. *'The Lottery' from English Encounters.*

Objective:

The lesson highlights insightful commentary on cultural traditions.

Outcome:

The theme projects society's need to re examine its traditions when they are outdated.

2. *'Jagadish Chandra Bose' from The Great Indian Scientists.*

Objective:

The lesson gives an account of the unique discoveries and inventions of Jagadish Chandra Bose in Science.

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.



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**UNIT 5:**

1. '*The Health Threats of Climate Change*' from *English Encounters*.

Objective:

The essay presents several health disorders that spring out due to environmental changes

Outcome:

The lesson offers several inputs to protect environment for the sustainability of the future generations.

2. '*Prafulla Chandra Ray*' from *The Great Indian Scientists*.

Objective:

The lesson given is an account of the experiments and discoveries in Pharmaceuticals of Prafulla Chandra Ray.

Outcome:

Prafulla Chandra Ray's scientific achievements and patriotic fervour provide inspiration to the reader.

**UNIT 6:**

1. '*The Chief Software Architect*' from *English Encounters*

Objective:

The lesson supports the developments of technology for the betterment of human life.

Outcome:

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

2. '*Srinivasa Ramanujan*' from *The Great Indian Scientists*.

Objective:

The lesson highlights the extraordinary achievements of Srinivasa Ramanujan, a great mathematician and the most romantic figure in mathematics.

Outcome:

The lesson provides inspiration to the readers to think and tap their innate talents



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**I year - II semester**

**Subject Code: 16BH2T06**

**MATHEMATICS – III**

**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: At the end of the Course, Student will be able to:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Find the Laplace transform of functions and evaluation of integrals.	
<b>CO2</b>	Find the inverse Laplace transform of different functions and solve the differential equations using Laplace transform.	
<b>CO3</b>	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.	
<b>CO4</b>	Evaluate the given integrals by using Beta and Gamma functions.	
<b>CO5</b>	Find the gradient of a scalar field, divergence and curl of vector field and vector identities.	
<b>CO6</b>	Evaluate the line, surface and volume integrals. Solve the problems using vector integral theorems.	

**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.





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

**Reference Books:**

1. **Greenberg**, Advanced Engineering Mathematics, 2nd edition, Pearson edn
2. **Peter O'Neil**, Advanced Engineering Mathematics, 7th edition, Cengage Learning.
3. **D.W. Jordan and T.Smith**, Mathematical Techniques, Oxford University Press.
4. **Srimanta Pal, Subodh C. Bhunia**, Engineering Mathematics, Oxford University Press.
5. **Dass H.K., Rajnish Verma. Er.**, Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.



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**I year - II semester**

**Subject Code: 16BH2T12**

**APPLIED CHEMISTRY**

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.

**UNIT I: HIGH POLYMERS AND PLASTICS**

Polymerisation:- 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 polyethene, 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.

Learning Objectives: Plastics are nowadays used in household appliances; They are also used as composites (FRP) in aerospace and automotive industries.

Outcomes: The advantages and limitations of plastic materials and their use in design would be understood.

**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

Learning Objectives: Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence are introduced to create awareness on the topics.

Outcomes: Fuels which are used commonly and their economics, advantages and limitations can be understood by the students and create awareness on the topics.

**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.



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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).

Learning Objectives: The basics for the construction of galvanic cells are introduced to have understanding on the concepts. Understanding on the concept of Corrosion and Mechanism of Corrosion with Theories like Electrochemical theory. .

Outcomes: Corrosion – its theories and controlling methods can create Understanding and awareness on the topic.

#### **UNIT IV: CHEMISTRY OF ADVANCED MATERIALS**

Nano materials:- Introduction - Sol-gel method & chemical reduction method of preparation- Characterization by Brauneier 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 -  $R_4M_4$  principles

Learning Objectives : With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced in Unit – IV.

Outcomes: The students will have awareness on now aware of materials like nano materials and fullerenes and their applications. Study on liquid crystals and superconductors can create Understanding for their applications in various fields. The importance of green synthesis create better Understanding for application and also can create better Understanding compared to conventional methods is also explained

**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 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.

Learning Objectives: Understanding of crystal structures will help to understand the conductivity, semiconductors and superconductors. Magnetic properties are also studied to have better Understanding.

Outcomes: Conductance phenomenon can be better understood



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**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

Learning Objectives: With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced and the study can create a better understanding on the Non –Conventional Energy Sources and Storage Devices.

Outcomes: The students are exposed to some of the alternative fuels and their advantages and imitations.

**Text Books:**

- 1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publishing Co.
- 2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

**Reference Books:**

- 1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
- 2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
- 3. A text book of engineering Chemistry by 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 by B.S. Murthy, P.Shankar and others, University Press, IIM



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**I year - II semester**

**Subject Code: 16IT2T01**

**OBJECT-ORIENTED PROGRAMMING THROUGH C++**

**OBJECTIVES:**

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

**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.



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**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.

**OUTCOMES:**

CO#	Statement	Cognitive Level
CO1	Understand the basic terminology used in computer programming	
CO2	Write, compile and debug programs in C language. Use different data types in a computer program.	
CO3	Design programs involving decision structures, loops and functions.	
CO4	Explain the difference between call by value and call by reference	

**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 Stroustup, 4<sup>th</sup> Edition.
2. Object oriented Programming in C++, Robert Lafore, 4<sup>th</sup> Edition.
3. Object Oriented Programming C++, Joyce Farrell, Cengage.
4. C++ Programming: From problem analysis to program design, DS Malik, Cengage Learning

**URL:**

1. <http://www.doc.ic.ac.uk/~wjk/c++Intro/>
2. [http://www.tutorialspoint.com/cplusplus/cpp\\_object\\_oriented.htm](http://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm)
3. <http://www.cis.upenn.edu/~cis190/fall2014/lectures.html>
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) by Scott Meyers, 2005
2. More Effective C++ by Scott Meyers, 2002
3. Modern C++ Design by Andrei Alexandrescu, 2004
4. Exceptional C++: 47 Engineering Puzzles, Programming Problems, and Solutions by Herb Sutter, 1999
5. C++ Templates: The Complete Guide by David Vandevoorde and Nicolai M. Josuttis, 2002
6. The C++ Standard Library: A Tutorial and Reference by Nicolai M. Josuttis, 2012
7. Effective STL: 50 Specific Ways to Improve Your Use of the Standard Template Library





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**I year - II semester**

**Subject Code: 16BH2T13**

**ENVIRONMENTAL STUDIES**

**UNIT – I**

Course Learning Objectives: Basic understanding of the environment, global problems and ecosystems.

Course Outcomes: 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.

**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.

**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

**UNIT – II**

Course Learning Objectives: Overall understanding of the natural resources

Course Outcomes: The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources.

**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.



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### **UNIT – III**

Course Learning Objectives: Basic understanding of Biodiversity.

Course Outcomes: The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity

**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.

### **UNIT – IV**

Course Learning Objectives: Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities

Course Outcomes: Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices

**Environmental Pollution:** Definition, Cause, effects and control measures of Air pollution, Water pollution, Heavy Metal pollution, Soil pollution, Noise pollution, Radioactive pollution: Sources and risks. Role of an individual in prevention of pollution. - Pollution case 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**

Course Learning Objectives: Awareness on the social issues, environmental legislation and global treaties

Course Outcomes: 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.

**Social Issues and the Environment:** Urban problems related to energy -Water conservation-Coastal Regulatory zone management, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

### **UNIT – VI**

Course Learning Objectives: An understanding of the environmental impact of developmental activities

Course Outcomes: 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.





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**Environmental Management:** Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Environmental Modeling: Definition (Box Model and Gaussian Plume Modeling), Ecotourism, Green Campus – Green business, Green politics and Green Building.

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<sup>nd</sup> Edition, 2011, Oxford University Press.
3. Environmental Studies, P.N. Palanisamy, P. Manikandan, A. Geetha, and K.Manjula Rani; Pearson Education, Chennai

**REFERENCE:**

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



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**I year - II semester**

**Subject Code: 16EC2T02**

**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

**Unit 1:**

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.

**Unit 2:**

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 3:**

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 4:**

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 5:**

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 6:**

Measuring Instruments: Moving Coil and Moving Iron Ammeters and Voltmeters, Dynamometer Type Wattmeter and Induction Type Energy Meter.



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**Text Books:**

1. Edward Hughes, Electrical Technology, 10<sup>th</sup> Edition, ELBS, 2010.
2. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd 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.



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**I year - II semester**

**Subject Code: 16BH2L05**

**ENGINEERING/APPLIED CHEMISTRY LAB**

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  $\text{Na}_2\text{CO}_3$  solutions
3. Estimation of  $\text{KMnO}_4$  using standard Oxalic acid solution.
4. Estimation of Ferric iron using standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution
5. Estimation of Copper using standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
6. Estimation of Total Hardness water using standard EDTA solution.
7. Estimation of Copper using standard EDTA solution.
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. Estimation of Zinc using standard potassium ferrocyanide solution
15. Estimation of Vitamin – C

**STANDARD 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



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**I year - II semester**

**Subject Code: 16BH2L02**

**ENGLISH - COMMUNICATION SKILLS LAB- II**

**PRESCRIBED LAB MANUAL FOR SEMESTER II:**

*'INTERACT: English Lab Manual for Undergraduate Students'* Published by Orient Blackswan Pvt Ltd.

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

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

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

**UNIT-1:**

1. Debating- Practice work

**UNIT-2:**

1. Group Discussion- Practice work

**UNIT-3:**

1. Presentation Skills- Practice work

**UNIT-4:**

1. Interview Skills- Practice work

**UNIT-5:**

1. Email
2. Curriculum Vitae- Practice work

**UNIT-6:**

1. Idiomatic Expressions
2. Common Errors in English- Practice work

**Reference Books:**

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by 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
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education



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**I year - II semester**

**Subject Code: 16IT2L01**

**OBJECT-ORIENTED PROGRAMMING LAB**

**OBJECTIVE:**

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

**Programming:**

**Exercise – 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)

**Exercise – 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 to following criteria.

**Exercise – 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

**Exercises –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.

**Exercise -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.



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**Exercise -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

**Exercise – 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

**Exercise -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)

**Exercise -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)

**Exercise-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 *show* how *constructors* are invoked in *derived class*



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**Exercise -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)

**Exercise -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

**Exercise -13 (Exception Handling)**

- a).Write a Program for Exception Handling Divide by zero
- b). Write a Program to re-throw an Exception

**Exercise -14 (STL)**

- a) Write a Program to implement List and List Operations
- b) Write a Program to implement Vector and Vector Operations

**Exercise -15 (STLContinued)**

- a) Write a Program to implement Dequeue and Dequeue Operations
- b) Write a Program to implement Map and Map Operations

**OUTCOMES:**

CO#	Statement	Cognitive Level
CO1	Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.	
CO2	Apply an object-oriented approach to developing applications of varying complexities	





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**II Year - I Semester**

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**STATISTICS WITH R PROGRAMMING**  
(Common to CSE & IT)

**Learning 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 analyze and make decision to the data.

**Course Outcomes: At the end of the Course, Student will be able to:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Install the R software and writing the R programming for given statistical data	
<b>CO2</b>	Interpret the statistical data analysis with R programming	

**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.



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**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. **Miller and John E. Freund**, Probability and Statistics for Engineers, Prentice Hall of India.
2. **G. Jay Kerns**, Introduction to Probability and Statistics Using R, First Edition ISBN: 978-0-557-24979-4. (Free e-book from R software website)

**Reference Books:**

1. **Robert I. Kabacoff**, R in Action, Second Edition, Data analysis and graphics with R ISBN: 9781617291388, Printed in the United States of America.
2. **Erwin Kreyszig**, Advanced Engineering Mathematics, 10th Edition, Wiley-India
3. **T.K.V. Iyengar et al.**, Probability and Statistics, S Chand Publications.
4. **Jay L. Devore**, Probability and Statistics for Engineering and Sciences, 8th Edition, Cengage Learning. ISBN 13: 978-81-315-1839-7.



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**DIGITAL LOGIC DESIGN**  
**(Common to CSE & IT)**

**Learning 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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Classify different number systems and apply to generate various codes.	
<b>CO2</b>	Use the concept of Boolean algebra in minimization of switching functions	
<b>CO3</b>	Design different types of combinational logic circuits.	
<b>CO4</b>	Apply knowledge of flip-flops in designing of Registers and counters	
<b>CO5</b>	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.	
<b>CO6</b>	Produce innovative designs by modifying the traditional design techniques.	

**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



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**UNIT II: Logic Gates And Boolean Algebra**

Basic Gates NOT, AND, OR, Boolean Theorems, Complement And Dual of Logical Expressions, Universal Gates, Ex-Or and Ex-Nor Gates, SOP, POS, Minimizations of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates

**Gate Level Minimization:** Karnaugh Map Method (K-Map): Minimization of Boolean Functions maximum upto 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.

**TEXT BOOKS :**

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

**URLs**

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](https://www.youtube.com/watch?v=K73N9ES_8nI)
4. <https://www.youtube.com/watch?v=62WxkICo2Bc>



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**II Year - I Semester**

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**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**  
**(Common to CSE & IT)**

**Learning objectives:**

Students are expected to learn:

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 this course, students will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Learn the Difference between Propositional Logic and Predicate Logic.	
<b>CO2</b>	Solve the problems related to fundamental theorems.	
<b>CO3</b>	Paraphrase the properties of homomorphism and POSET and Lattices and Apply induction and other proof techniques towards solving recurrences and other problems in elementary algebra.	
<b>CO4</b>	Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.	
<b>CO5</b>	Ability to demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.	
<b>CO6</b>	Ability to represent and Apply Graph theory in solving computer science problems.	



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**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



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**Text Books**

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

**Reference Books**

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, (2002).
2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, (2006).
3. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2007, Second edition, Fifth reprint.

**URLs**

1. [https://www.cs.cmu.edu/~emc/15414-f12/lecture/propositional\\_logic.pdf](https://www.cs.cmu.edu/~emc/15414-f12/lecture/propositional_logic.pdf).
2. [https://www.tutorialspoint.com/discrete\\_mathematics/discrete\\_mathematics\\_propositional\\_logic.htm](https://www.tutorialspoint.com/discrete_mathematics/discrete_mathematics_propositional_logic.htm)
3. [https://www.tutorialspoint.com/discrete\\_mathematics/discrete\\_mathematics\\_functions.htm](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>



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**II Year - I Semester**

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**PYTHON PROGRAMMING**  
**(Common to CSE & IT)**

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Understand various data types, operators in Python.	
<b>CO2</b>	Write programs using loop and branch statements to manipulate data in files.	
<b>CO3</b>	Perform string manipulations.	
<b>CO4</b>	Perform list and dictionaries operations in python	
<b>CO5</b>	Understand the concept of modular programming using functions.	
<b>CO6</b>	Realize the ease of developing complex programs with smaller sized programs.	

**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).





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**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 by 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>



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**II Year - I Semester**

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

**Learning 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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Distinguish between procedures and object oriented programming.	
<b>CO2</b>	Apply advanced data structure strategies for exploring complex data structures.	
<b>CO3</b>	Compare and contrast various data structures and design techniques in the area of performance.	
<b>CO4</b>	Implement data structure algorithms through C++.	
<b>CO5</b>	Incorporate data structures into the applications such as binary search trees, AVL and B Trees	
<b>CO6</b>	Implement all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs	

**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. Sparse 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.



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### **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 Trees, 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, Galgotia Publications, 2006
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
3. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

### **REFERENCE BOOKS:**

1. Data structures and algorithms in C++, 3rd 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.

### **URLs**

1. [https://www.tutorialspoint.com/cplusplus/cpp\\_data\\_structures.htm](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>



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**II Year - I Semester**

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**SOFTWARE ENGINEERING**  
**(Information Technology)**

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Understand SW engineering methods and practices, and Software process models.	
<b>CO2</b>	Perform SR Analysis and Write SRS Document.	
<b>CO3</b>	Apply Design Methodologies to Develop Software	
<b>CO4</b>	List the Software Metrics	
<b>CO5</b>	Understand Testing Method Risk Assessment techniques	
<b>CO6</b>	Perform Reengineering, Reverse Engineering	

**Syllabus:**

**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.



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**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



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**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH
4. Fundamentals of Software Engineering by Rajib Mall, PHI Publications.

**WEB LINKS:**

1. [http://www.tutorialspoint.com/software\\_engineering/](http://www.tutorialspoint.com/software_engineering/)
2. <http://www.codesters.org/resource/topic/software-engineering/>



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**II Year - I Semester**

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

**Learning objectives:**

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:**

At the end of this lab session, the student will

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Be able to design and analyze the time and space efficiency of the data structure	
<b>CO2</b>	Be capable to identify the appropriate data structure for given problem	
<b>CO3</b>	Have practical knowledge on the application of data structures	

**List of Experiments**

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.
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.**



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**II Year - I Semester**

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**PYTHON PROGRAMMING LAB**  
**(Common to CSE& IT)**

**Learning 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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Use various data types, operators in Python.	
<b>CO2</b>	Write programs using loop and branch statements to manipulate data in files.	
<b>CO3</b>	Perform string manipulations.	
<b>CO4</b>	Perform list and dictionaries operations in python	
<b>CO5</b>	Use functions for modular programming.	

**Exercise 1 - Basics**

- a) Running instructions in Interactive interpreter and a Python Script
- b) Write a program to purposefully raise Indentation Error and Correct it

**Exercise 2 - Operations**

- c) 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

**Exercise - 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.

**Exercise - 4 - DS**

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





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**Exercise - 5 Files**

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

**Exercise -6 Functions**

- 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)

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

**Exercise -7 Functions - Continued**

- 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.
- Write a function dups to find all duplicates in the list.
- Write a function unique to find all the unique elements of a list.

**Exercise 8 - Multi-D Lists**

- Write a program that defines a matrix and prints
- Write a program to perform addition of two square matrices
- Write a program to perform multiplication of two square matrices

**Exercise - 9 - Modules**

- Install packages requests, flask and explore them. using (pip)
- Write a script that imports requests and fetch content from the page. Eg. (Wiki)
- Write a simple script that serves a simple HTTP Response and a simple HTML Page

**Exercise - 10 OOP**

- Class variables and instance variable and illustration of the self-variable for ATM Machine

**Exercise - 11 – Advanced**

Write a program (using threads) to allocate 100 students (each student modeled as a single thread) to 5 sections of a course.



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**II Year - II Semester**

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

**Unit – I**

**(\*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)**

**Introduction to Managerial Economics and demand Analysis:**

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

**(\*\*The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand)**

**Unit – II**

**(\*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)**

**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)

**(\*\*One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs).**

**Unit – III**

**(\*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)**

**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.

**(\*\* One has to understand the nature of different markets and Price Output determination under various market conditions)**



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**Unit – IV**

(\*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)

**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.

(\*\*One should be equipped with the knowledge of different Business Units)

**Unit – V**

(\*The Learning objective of this Unit is to understand the different Accounting Systems preparation of Financial Statements)

**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)

(\*\*The Learner is able to prepare Financial Statements)

**Unit – VI**

(\*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**

**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.

(\*\*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)

Note: \*Learning Objective

\*\* Learning Assessment

**TEXT BOOKS**

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



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**REFERENCES:**

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



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**II Year - II Semester**

**L T P C**  
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**COMPUTER ORGANIZATION**  
**(Common for CSE & IT)**

**Course objectives**

Comprehensive knowledge of computer system including the analysis and design of components of the system-

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**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Students can understand the architecture of modern computer.	
<b>CO2</b>	Students should be able to demonstrate the programming proficiency using the various addressing modes and data transfer instructions of the target computer.	
<b>CO3</b>	Understand different instruction types.	
<b>CO4</b>	Understand how a computer performs arithmetic operation of positive and negative numbers.	
<b>CO5</b>	Students can understand how cache mapping occurs in a computer and can solve various problems related to this.	
<b>CO6</b>	Students should be able to know the circuitry to the processor I/O ports in order to interface the processor to the external devices.	



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**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.



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**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 of multiprocessors, interconnection structures, inter processor arbitration.

**Text Books**

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

**References**

1. Computer Organization and Architecture – William Stallings, 6/e, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4/e, PHI/Pearson
3. Fundamentals of Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 4/e, Elsevier

**URLs**

1. <http://nptel.iitm.ac.in/video.php?subjectId=106106092>
2. [https://www.tutorialspoint.com/videos/computer\\_organization/index.htm](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=PLhwVAYxlh5dvB1MkZrcRZy6x\\_a2yORNAu](https://www.youtube.com/watch?v=CDO28Esqmcg&list=PLhwVAYxlh5dvB1MkZrcRZy6x_a2yORNAu)



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**II Year - II Semester**

**L T P C**  
**4 1 0 3**

**LANGUAGE PROCESSORS**  
**(Information Technology)**

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Design DFA and NFA to accept given languages	
<b>CO2</b>	Understand Laws, Properties of Regular Expression	
<b>CO3</b>	Explain Structure of Compiler and Building it	
<b>CO4</b>	Perform Lexical Analysis	
<b>CO5</b>	Perform Top-Down, Bottom Up, LR Parsing for Syntax Analysis.	
<b>CO6</b>	Explain Syntax-directed translation schemes and translates expressions.	

**UNIT I:**

**Finite Automata:**

An Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic 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.





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**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 3<sup>rd</sup> Edition  
JOHNE.HOPCROFT, RAJEEV MOTWANI, JEFFREY D.ULLMAN
2. Compilers Principles, Techniques, & Tools, 2<sup>nd</sup> Edition, Alfred V.Aho, Monica S. Lam, Ravi Sethi, Jeffrey D.Ullman

**Reference Books:**

1. Theory of Computer Science, Automata languages and computation, 3/e, Mishra, Chandra Shekaran, PHI
2. Theory of Computation, a problem solving approach, kavi Mahesh, Wiley

**WEB LINKS:**

5. <http://www.nptelvideos.in/2012/11/compiler-design.html>
6. [https://www.tutorialspoint.com/compiler\\_design/index.htm](https://www.tutorialspoint.com/compiler_design/index.htm)
7. [http://www.diku.dk/~torbenm/Basics/basics\\_lulu2.pdf](http://www.diku.dk/~torbenm/Basics/basics_lulu2.pdf)
8. <http://www.cse.iitd.ernet.in/~sak/courses/cdp/slides.pdf>



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**II Year - II Semester**

**L T P C**  
**4 1 0 3**

**JAVA PROGRAMMING**  
**(Common to CSE, IT)**

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	It is expected that the students are competent enough to write, debug, and document well-structured Java applications.	
<b>CO2</b>	It is expected that the learners implement Java classes from specifications.	
<b>CO3</b>	It is expected that the learners effectively create and use objects from predefined class libraries.	
<b>CO4</b>	It is expected that the students would apply decision and iteration control structures to implement algorithms.	
<b>CO5</b>	It is expected that the students have proficient knowledge in handling of interfaces, inheritance, and polymorphism as programming techniques, Exceptions and Threads	
<b>CO6</b>	It is expected that the students would work with Files & I/O Streams and Applets.	

**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 JDK1.6 Variables, 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.,



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**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



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**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.Raj kumar. 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 by N.B.Venkateswarlu

**WEB LINKS:**

1. [https://www.tutorialspoint.com/java/java\\_object\\_classes.htm](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/and words in a text file.](http://beginnersbook.com/2013/04/java-exception-handling/and%20words%20in%20a%20text%20file.)



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**II Year - II Semester**

**L T P C**  
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**DATABASE MANAGEMENT SYSTEMS**  
(Information Technology)

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Understand database system architecture and data models.	
<b>CO2</b>	Write queries using Relational algebra.	
<b>CO3</b>	Use SQL, JDBC to answer queries on databases	
<b>CO4</b>	Design databases and normalize relations	
<b>CO5</b>	Apply indexing techniques on relations and store data as per some RAID levels.	
<b>CO6</b>	Run transactions concurrently and recover data from crashes	

**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



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**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



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## **CONCURRENY 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, 3/e Raghuram Krishnan, Johannes Gehrke, TMH
2. DATABASE. SYSTEM CONCEPTS. SIXTH EDITION. Abraham Silberschatz. Yale University. Henry F. Korth. Lehigh University. S. Sudarshan.
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](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>



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**II Year - II Semester**

**L T P C**  
**4 1 0 3**

**DESIGN AND ANALYSIS OF ALGORITHMS**  
**(Information Technology)**

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Understand asymptotic notation and perform algorithm complexity analysis	
<b>CO2</b>	Design algorithms using Divide and Conquer.	
<b>CO3</b>	Design algorithms using Greedy.	
<b>CO4</b>	Apply Dynamic Programming through examples.	
<b>CO5</b>	Understand Back tracing and branching design methodologies.	
<b>CO6</b>	Define NP, NP-Hard, NP-Complete and give examples	

**UNIT-I**

**Introduction-**

**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





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**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)



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**TEXT BOOKS:**

1. Introduction to Algorithms 3rd Edition, Thomas Cormen, Charles. Leiserson, Ronald L. Rivest, Clifford Stein [Unit 1 and 2]
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and S. Rajasekharam, Golgotha publications pvt. Ltd [Units 3 to 6]

**REFERENCES:**

1. Algorithm Design: Foundations, Analysis and Internet examples, M.T. Goodrich and R. Tomassia, John Wiley 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 Johnsonbaugh 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>



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**II Year - II Semester**

**L T P C**  
**0 0 3 3**

**DATABASE MANAGEMENT SYSTEMS LAB**  
**(Information Technology)**

**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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Brief knowledge about SQL Fundamentals.	
<b>CO2</b>	Introduction to different Database packages (Oracle/ MySQL/ DB2/ etc.)	
<b>CO3</b>	Commit & Rollback	
<b>CO4</b>	Database connectivity with front-end.	
<b>CO5</b>	Embedded and Nested Queries.	

- 1) Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
- 2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT, Constraints. Example: Select the roll number and name of the student who secured fourth rank in the class.
- 3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
- 4) Queries using Conversion functions (to char, to number and to date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), 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.



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- 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.



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**II Year - II Semester**

**L T P C**  
**0 0 3 3**

**JAVA PROGRAMMING LAB**  
**(Common to CSE, IT)**

**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**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	It is expected that the learners write, debug, and document well-structured Java applications effectively.	
<b>CO2</b>	It is expected that students implement Java classes from specifications effectively.	
<b>CO3</b>	It is expected that the learners effectively create and use objects from predefined class libraries.	
<b>CO4</b>	It is expected that the students apply decision and iteration control structures to implement algorithms effectively.	
<b>CO5</b>	It is expected that the learners are proficient in Handling of interfaces, inheritance, and polymorphism as programming techniques, Exceptions and Threads	
<b>CO6</b>	It is expected that the students write and work with Files & I/O Streams and Applets.	

**Week-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

**Week-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.

**Week-3:**

- a) Write a JAVA program give example for command line arguments.
- b) Write a JAVA program to sort an array of strings



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**Week-4**

- a) Write a JAVA program for the following
  - 1. Example for call by value.
  - 2. Example for call by reference.
- b) Write a JAVA program to give the example for 'this' operator. And also use the 'this' keyword as return statement

**Week-5**

- a) Write a JAVA program to demonstrate static variables, methods and blocks,
- b) Write a JAVA program to give the example for 'super' keyword.
- c) Write a JAVA program demonstrating the difference between method overloading and method overriding.
- d) Write a JAVA program demonstrating the difference between method overloading and constructor overloading.

**Week-6**

- a) Write a JAVA program that illustrates multi-level inheritance
- b) Write a JAVA program illustrating multiple inheritance using interfaces.
- c) Write a JAVA program to give a simple example for abstract class.

**Week-7:**

- a) Write a JAVA program to create a package named pl, and implements this package in ex 1 class.
- b) Write a JAVA program to create a package named my pack and import it in circle class.

**Week-8:**

- a) Write a JAVA program to illustrate sub class exception precedence over base class.
- b) Write a JAVA program for example of try and catch block. In this check whether the given array size is negative or not.
- c) Write a JAVA program for creation of user defined exception

**Week-9:**

- 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).
- 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.



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**Week-10:**

Write a JAVA program that describes the life cycle of an applet  
- Write a JAVA program to create a dialog box and menu.

**Week-11:**

- a) Write a JAVA program to create a border layout control.
- b) Write a JAVA program to create a simple calculator.

**Week-12:**

- a) Write a JAVA program that displays that x and y position of the cursor movement using Mouse.
- b) Write a JAVA program that displays number of characters, lines and words in a text file.



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**16IT5T09**

**ADVANCED JAVA PROGRAMMING**

**COURSE OBJECTIVES:**

- Getting the student to be well trained in Advanced Java Programming skills for an easy entry in the IT Industry.

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Build Java Swing Applications.	
CO2	Code Java Programs using classes and interfaces from Java Collections Framework.	
CO3	Develop Web Applications using Servlets.	
CO4	Create and execute Java Server Pages using Tomcat Web Server.	
CO5	Execute database queries using JDBC.	
CO6	Design a simple Web Application using MVC Architecture (Struts Framework).	

**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 Servlets:** 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.





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**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>



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**16IT5T10**

**UNIX AND SHELL PROGRAMMING**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Execute various Unix commands.	
CO2	Manage various attributes of files like file type, ownership etc.	
CO3	Develop basic Unix shell programs.	
CO4	Compare the usage of different filters.	
CO5	Write shell programs using constructs like branching, looping etc.	
CO6	Perform comparison between parent vs. child process and foreground vs. background processes.	

**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.



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**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 by Brain W. Kernighan & Rob Pike, Pearson. (Unit 2, 3, 4)
2. Introduction to UNIX Shell Programming by M.G.Venkateshmurthy, Pearson. (Unit 1, 2, 5 & 6)

**REFERENCE BOOKS:**

1. UNIX and shell programming by 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](http://www.theunixschool.com/p/awk-sed.html)
3. [https://nptel.ac.in/courses/106108101/pdf/PPTs/Mod\\_13.pdf](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](https://nptel.ac.in/courses/106108101/pdf/Lecture_Notes/Mod%2013_LN.pdf)
5. <http://nptel.ac.in/courses/117106113/>



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**OBJECT ORIENTED ANALYSIS AND DESIGN USING UML**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Relate various Object Models to problems.	
<b>CO2</b>	Identify classes and responsibilities of the problem domain.	
<b>CO3</b>	Model classes, responsibilities and objects using UML notation.	
<b>CO4</b>	Model the behavior of the system using UML diagrams like Interaction, Use-case and Activity.	
<b>CO5</b>	Construct UML diagrams to model reactive systems.	
<b>CO6</b>	Perform architectural modeling using Deployment and Component Diagrams.	

**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.



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**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, 3rd edition, 2013, PEARSON.
2. “The Unified Modelling Language User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.

**REFERENCE BOOKS:**

1. “Object-oriented analysis and design using UML”, Mahesh P. Matha, PHI
2. “Head first object-oriented analysis and design”, Brett D. McLaughlin, Gary Pollice, Dave West, O’Reilly
3. “Object-oriented analysis and design with the Unified process”, John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning “The Unified modeling language 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](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>



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**OPERATING SYSTEMS**  
(Common to CSE and IT)

**Learning 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:**

At the end of this course student will be able to-

CO#	Statement	Cognitive Level
CO1	Survey the operating system services (Apply).	
CO2	Evaluate Scheduling algorithms for process management(Evaluate).	
CO3	Compare various memory management schemes. (Analyze)	
CO4	Evaluate process synchronization techniques to avoid deadlocks. (Evaluate)	
CO5	Analyze the structure of file systems on secondary storage devices. (Analyze)	
CO6	Examine Operating System services in Linux and Android platforms. (Analyze)	

**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: ProcessSynchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples



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Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form 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., 9th Edition, 2012.
2. “Operating Systems – Internals and Design Principles,” William Stallings, Prentice Hall, 7th 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 Resources**

1. <http://nptel.ac.in/courses/106108101> (Prof. P.C.P. Bhatt, IISc Bangalore)



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**16IT5T12**

**SOFTWARE PROJECT MANAGEMENT**

**COURSE OBJECTIVES:**

- To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
- 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.
- To understand successful software projects that support organization's strategic goals

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Classify the software project management activities.	
<b>CO2</b>	Compare the iterative and incremental life cycle models.	
<b>CO3</b>	Estimate the effort required for a software project development.	
<b>CO4</b>	Identify software risks.	
<b>CO5</b>	Find out and schedule the required resources for the project execution.	
<b>CO6</b>	Enumerate the five different levels in Capability Maturity Model	

**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.





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**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/](https://softwaretestingfundamentals.com/software-quality/)
3. [https://www.tutorialspoint.com/software\\_engineering/software\\_project\\_management.htm](https://www.tutorialspoint.com/software_engineering/software_project_management.htm)



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**16IT5L05**

**ADVANCED JAVA PROGRAMMING LAB**

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Build swing applications.	
<b>CO2</b>	Use collection framework.	
<b>CO3</b>	Develop web applications using JSP and Servlets.	
<b>CO4</b>	Interact with database using JDBC.	

**LIST OF EXPERIMENTS:**

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.
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)



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**16IT5L06**

**UNIX AND OPERATING SYSTEMS LAB**

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Stimulate CPU scheduling algorithms in OS	
<b>CO2</b>	Implement page replacement algorithms in OS.	
<b>CO3</b>	Implement File allocation strategies used OS.	
<b>CO4</b>	Execute UNIX commands.	
<b>CO5</b>	Manage user accounts in UNIX.	

**OPERATING SYSTEMS**

**LIST OF EXPERIMENTS:**

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
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



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**UNIX AND SHELL PROGRAMMING**

**LIST OF EXPERIMENTS:**

1. Basic Shell Commands Shell Programs:
2. 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



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**16IT5L07**

**UNIFIED MODELING LANGUAGE LAB**

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Design the UML models for the given applications.	
<b>CO2</b>	Represent solutions to the problems using UML.	
<b>CO3</b>	Develop design solutions using creational patterns.	

**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.



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**16BH5T17**

**PROFESSIONAL ETHICS AND HUMAN VALUES**

**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.



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**Unit VI**

Global Issues: Globalization-Problems of globalization- Cross-culture Issues Environmental Ethics-Computer Ethics-computers as the instrument of Unethical behavior-computers as the object of Unethical Acts-autonomous computerscomputer 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" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
2. "Professional Ethics and Morals" by Prof.A.R.Aryasri, Dharanikota Suyodhana- Maruthi Publications.
3. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications
4. "Professional Ethics and Human Values" by Prof.D.R.Kiran-
5. "Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication
6. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger -Tata McGraw- Hill -2003
7. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.



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**16CS6T15**

**COMPUTER NETWORKS**  
**(Common to CSE and IT)**

**Learning 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:**

At the end of this course student will be able to-

CO#	Statement	Cognitive Level
CO1	Conceptualize the data communication models using OSI/ISO and TCP/IP protocol architectures. (Evaluate)	
CO2	Analyze protocols implemented in data link layer for error and flow control. (Analyze)	
CO3	Analyze the features and operations of different MAC mechanisms. (Analyze)	
CO4	Build the skills of subnetting and routing mechanisms. (Apply)	
CO5	Choose network protocols by elucidate the way protocols currently in use in the Internet like IPv4, IPv6, ICMP, ARP, RARP, DHCP operate. (Apply)	
CO6	Develop client/server-based applications using TCP and UDP protocols. (Apply)	

**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.





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**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, Fifth Edition, 2013.
2. “Computer Networks,” Andrew S Tanenbaum, Pearson Education, 4th Edition, 2003.

**REFERENCE BOOKS:**

1. “An Engineering Approach to Computer Networks,” S. Keshav, Pearson Education, 2nd Edition, 1997.
2. “Understanding communications and Networks,” W. A. Shay, Cengage Learning, 3rd 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](http://epgp.inflibnet.ac.in/view_f.php?category=1736)
3. [http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e\\_videonotes/tanenbaum\\_videonotes.html](http://media.pearsoncmg.com/ph/streaming/esm/tanenbaum5e_videonotes/tanenbaum_videonotes.html)



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**16IT6T13**

**DATA MINING**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Classify data mining system and its Functionalities.	
CO2	Categorize Data Preprocessing Activities.	
CO3	Generate Association Rules by using Apriori and FP-Growth Algorithms.	
CO4	Classify the given data using Bayesian Classification Algorithm.	
CO5	Illustrate Alternative Techniques in classification.	
CO6	Divide the given data into clusters using K-means, Hierarchical Clustering and DBSCAN Algorithms.	

**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.



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**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, Charu C. Aggarwal, Springer.

**WEB LINKS:**

1. [http://www.saedsayad.com/data\\_mining\\_map.htm](http://www.saedsayad.com/data_mining_map.htm)
2. [https://onlinecourses.nptel.ac.in/noc18\\_cs14/preview](https://onlinecourses.nptel.ac.in/noc18_cs14/preview)
3. <https://onlinecourses.nptel.ac.in/noc18-mg11/preview>



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**16IT6T14**

**WEB TECHNOLOGIES**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Identify elements and attributes of a web page.	
CO2	Develop client side manipulations in web pages using Java Script.	
CO3	Write simple scripts using AJAX and compare DOM & SAX XML Parsers.	
CO4	Build web applications using PHP.	
CO5	Implement programming through PERL.	
CO6	Create applications using Ruby.	

**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.



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**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, Farrelly, 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](https://www.w3schools.com/html/html_lists.asp)
2. <https://www.w3schools.com/xml/>
3. [www.tutorialspoint.com/ajax/](http://www.tutorialspoint.com/ajax/)
4. [https://mva.microsoft.com/en-us/training-courses/getting-started-with-web-technologies-15937?l=5ovpdCq9B\\_2406218949](https://mva.microsoft.com/en-us/training-courses/getting-started-with-web-technologies-15937?l=5ovpdCq9B_2406218949)



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**16IT6T15**

**SOFTWARE TESTING**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	List out various factors affecting the software testing process.	
CO2	Compare various Black Box Testing Techniques.	
CO3	Perform White Box Testing.	
CO4	Differentiate between Progressive and Regressive Testing.	
CO5	Prioritize Test Cases and Apply Software quality metrics.	
CO6	Enumerate the Tools for Test Automation.	

**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

**UNITIV:**

**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:**



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**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/](https://onlinecourses.nptel.ac.in/noc16_cs16/)
5. <http://www.testingtools.com/test-automation/>



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**16IT6E01**

**I. ARTIFICIAL INTELLIGENCE**

**COURSE OBJECTIVES:**

- Learn about basic AI fundamentals and AI problems
- Students will gain an understanding about searching
- Study about AI game playing concepts
- Understand about AI knowledge
- Students will know about AI order logic

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	State applications of Artificial Intelligence.	
<b>CO2</b>	Discuss problem solving strategies in AI.	
<b>CO3</b>	Illustrate problem reduction techniques.	
<b>CO4</b>	Explain logic concepts.	
<b>CO5</b>	Analyze the current knowledge representation techniques in AI.	
<b>CO6</b>	Investigate various expert systems.	

**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:**





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**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 , 2nd ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

**REFERENCES:**

1. Artificial intelligence, structures and Strategies for Complex problem solving, -George F Luger, 5th 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](http://www.cs.jhu.edu/~phi/ai/slides/lecture-inference-in-first-order-logic.pdf)
2. [https://en.wikipedia.org/wiki/History\\_of\\_artificial\\_intelligence](https://en.wikipedia.org/wiki/History_of_artificial_intelligence)
3. [www.imada.sdu.dk/~marco/DM828/Slides/dm828-lec18.pdf](http://www.imada.sdu.dk/~marco/DM828/Slides/dm828-lec18.pdf)



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**II. MANAGEMENT INFORMATION SYSTEM**

**COURSE OBJECTIVES:**

- 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:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Identify key organization objectives and processes of an information system.	
CO2	Enumerate Mathematical, Graphical and Hierarchical for representing system.	
CO3	Perform Classification and Compression of Information content.	
CO4	Identify information needed to Support Decision Making.	
CO5	Analyze the Information System Application like Basic Accounting Budgeting and Planning.	
CO6	Compare different methodologies for Maintenance of Information Systems.	

**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.



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**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. Ken Laudon, Jame Laudon, Rajanish Dass, “Management Information Systems: Managing the digital firm”, 11<sup>th</sup> edition, Pearson Education, 2010.
2. K.C.Laudon J.P.Laudon, “Management Information Systems - Organization and Technology in the Networked Enterprise”, Sixth Edition, Prentice Hall, 2000.

**REFERENCES:**

1. E.F. Turban, R.K. Turban, R.E. Potter, “Introduction to Information Technology”, John Wiley and Sons, 3<sup>rd</sup> Edition, 2004.
2. Wiley and M.E. Brabston, “Management Information Systems: Managing the digital firm”, Pearson Education, 2002.
3. Jeffrey A. Hoffer, Joey F. George and Joseph S. Valachich, “Modern Systems Analysis and Design”, Third Edition, Prentice Hall, 2002.
4. Robert Schulthesis and Mary Sumner, ” Management Information System-The Manager’s View, Tata Mc Graw Hill New Delhi.
5. Waman S Jawadekar, “Management Information Systems-Text and Cases”, Tata Mc Graw Hill New Delhi.
6. O’Brien, Management Information Systems, 9e, Tata McGraw-Hill Education

**WEB LINKS:**

1. <https://www.ccri.edu/it/mis/>
2. [csb.uncw.edu/isom/mis.html](http://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](http://mbaexamnotes.com/management-information-system-notes.html)
5. <https://www.slideshare.net/HarishChand5/management-information-system-full-notes>



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**III. DIGITAL SIGNAL PROCESSING**

**Course objectives:** the student will

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 multirate signal processing
6. Study of various Digital Signal Processors and Architectures

**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



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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<sup>th</sup> edition, Pearson Education, PHI, 2013.
2. Discrete Time Signal Processing – A.V. Oppenheim and R.W. Schaffer, 4<sup>th</sup> 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 & S. Srinivasan, 2<sup>nd</sup> edition, Thomson Brooks, , 2004.

**References**

1. Digital signal Processing --A Anand Kumar, eastern economy edition, PHI, 2013.
2. Digital Signal Processing--MH Hayes, Schaum's Outlines, 2<sup>nd</sup> edition, TATA McGraw Hill, 2009.
3. Digital Signal Processing-- Tarunkumar Rawat, First edition, Oxford, 2015

**Web links**

1. [www.nptelvideos.in/2012/12/digital signal processing.html](http://www.nptelvideos.in/2012/12/digital%20signal%20processing.html)

**Course outcomes:**

On successful completion of the course, students will be able to

CO#	Statement	Cognitive Level
CO1	Comprehend the representation of discrete time signals and systems.	
CO2	Show discrete time signals in frequency domain using DFS, DFT and FFT	
CO3	Design of IIR filters with digitization techniques for the given specifications	
CO4	Implement of FIR filters with windowing techniques for the given specifications	
CO5	Interpret sampling rate conversion like decimation and interpolation	
CO6	Know the architectures of DSP processors for signal processing applications	



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**IV. EMBEDDED SYSTEMS**

**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.

**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 waker, 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), Trends in embedded Industry, Introduction to ARM family of processor.

**Text book**



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1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

**Reference books**

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,

**Course outcomes:**

At the end of this course the student can able to:

CO#	Statement	Cognitive Level
CO1	Understand the basic concepts of an embedded system	
CO2	Know an embedded system design approach to perform a specific function with help of 8-bit microcontrollers.	
CO3	Familiarize with Task scheduling in to control the functions of various Real time applications	
CO4	Identify the unique approach of real-time operating systems through inter task communication	
CO5	solve consumer –producer problem through a design approach which integrates embedded hardware and fire ware	
CO6	Familiarize with different embedded system tools used for real time applications	





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**V. ROBOTICS**  
**(Common for ME, ECE, EEE, CSE and IT)**

***Course Objectives:***

*To make the students aware of:*

- 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.*

**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.





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**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.

**REFERENCES:**

1. Robotics / Fu K S/ McGraw Hill.
2. Robotic Engineering / Richard D. Klafter, Prentice Hall.
3. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
4. Introduction to Robotics / John J Craig / Pearson Edu.
5. <http://www.nptel.ac.in/courses/112101099/1#>

**Course outcomes:**

*Students will be able to:*

CO#	Statement	Cognitive Level
CO1	<i>classify the coordinate systems and control systems of a robot.</i>	
CO2	<i>explain the architecture of a robot.</i>	
CO3	<i>analyze kinematics of a serial manipulator.</i>	
CO4	<i>analyze dynamics of serial manipulator.</i>	
CO5	<i>develop the trajectory planning algorithms using programming languages.</i>	
CO6	<i>illustrate the applications of robots in manufacturing, select the actuators and feedback components for a given robot application.</i>	



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**16ME6E02**

**VI. OPERATIONS RESEARCH**  
(Only for IT)

***Course Objectives:***

*To make the students learn about*

- 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.*

**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 –  $2 \times 2$  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.



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**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 queuing model.

**TEXT BOOKS:**

1. Operations Research / S.D.Sharma-Kedarnath

**REFERENCES:**

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.
7. <http://www.nptelvideos.in/2012/12/fundamentals-of-operations-research.html>

**Course Outcomes:**

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

CO#	Statement	Cognitive Level
CO1	<i>formulate the objective function by linear programming problem and find solution to it</i>	
CO2	<i>make use of transportation and assignment problems to find the optimal solutions to the objective function.</i>	
CO3	<i>apply in sequencing the jobs on a machine and items replacements</i>	
CO4	<i>calculate the optimal strategies of players by using various methods.</i>	
CO5	<i>replacement of machine/equipment and waiting line problems applications in industries.</i>	
CO6	<i>make use of principle of dynamic programming in planning budget and shortest path problems.</i>	



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**16IT6L08**

**WEB TECHNOLOGIES LAB**

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Build static web pages using HTML and CSS.	
CO2	Develop Ruby Scripts	
CO3	Build PHP applications.	
CO4	Develop Perl Scripts.	

**LIST OF EXPERIMENTS:**

1. Design the following static web pages required for an online book store web site.

**1) HOME PAGE:**

The static home page must contain three frames.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link “MCA” the catalogue for MCA Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

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



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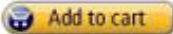
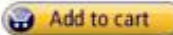
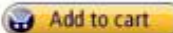
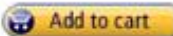
### 2) LOGIN PAGE

Logo	Web Site Name			
Home	<b>Login</b>	Registration	Catalogue	Cart
MCA MBA BCA	<div style="display: flex; justify-content: space-between;"> <div> Login :  Password: </div> <div> <input style="width: 100px;" type="text" value="11a51f0003"/>  <input style="width: 100px;" type="password" value="*****"/> </div> </div> <div style="display: flex; justify-content: center; margin-top: 10px;"> <input style="margin: 0 10px;" type="button" value="Submit"/> <input style="margin: 0 10px;" type="button" value="Reset"/> </div>			

### 3) CATALOGUE PAGE:

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

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

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

### 4. REGISTRATION PAGE:

Create a “registration form “with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)



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- 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. DESIGN A WEB PAGE USING CSS (Cascading Style Sheets) which includes the following:

- 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

6. WRITE AN XML file which will display the Book information which includes the following:

- 1) Title of the book
- 2) Author Name
- 3) ISBN number
- 4) Publisher name
- 5) Edition
- 6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

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. User Authentication: Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.
  1. Create a Cookie and add these four user id's and passwords to this Cookie.
  2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.



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If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display “You are not an authenticated user”.  
Use init-parameters to do this.

17. Install a database (My SQL or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

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 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.



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**16IT6L09**

**SOFTWARE TESTING & DATA MINING LAB**

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
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.	

**SOFTWARE TESTING**

**LIST OF EXPERIMENTS:**

**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
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
Suffix	Four-digit number
Password	Six-character alphanumeric
Commands	"Check status", "Deposit", "Withdrawal"

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).

**Problem Statement 03**

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.





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1. The first factor that determines the standard deduction is the filing status. The basic standard deduction for the various filing status are:

Single	\$4,750
Married, filing a joint return	\$9,500
Married, filing a separate return	\$7,000

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.

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”).

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”).

**HINT:** From the above description, it is clear that the calculation of standard deduction depends on the following 3 factors:

1. Status of filing of the filer
2. Age of the filer
3. Whether the filer is blind or not

In addition, in certain cases, the following additional factors also come into play in calculating the standard deduction.

1. Whether spouse has claimed standard deduction
2. Whether spouse is blind
3. Whether the spouse is more than 65 years old

**Problem Statement 04**

Consider the following program segment:

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. `}`
- a) Draw the control flow graph for this program segment
  - b) Determine the Cyclomatic complexity for this program
  - c) Determine the independent paths

**Problem Statement 05**

Source code of simple insertion sort implementation using array in ascending order in c programming language

```
#include<stdio.h>
int main(){
int i,j,s,temp,a[20];
```



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```
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

- a) Draw the program graph for given program segment
- b) Determine the DD path graph
- c) Determine the independent paths
- d) Generate the test cases for each independent path

**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}
```



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```
14. printf ("%d %d", a, b);  
15 getch ();  
}
```

**Problem Statement 07**

Consider the above program and generate possible program slices for all variables. Design at least one test case from every slice.

**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:**

- Intel based desktop PC
- WEKA TOOL

**LIST OF EXPERIMENTS:**

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.



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**16BH6T16**

**INTELLECTUAL PROPERTY RIGHTS AND PATENTS**

**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.



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**REFERENCE BOOKS:**

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



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**COURSE STRUCTURE FOR IV Year I Semester**

**16BH7T15**

**MANAGEMENT SCIENCE**  
(Common to Civil, ECE, EEE, CSE, IT)

**Course Outcomes:**

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

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	(Comprehension): Recognize management thoughts, motivational theories and types of organizations	
<b>CO2</b>	(Application): Apply the concepts of operations Management, such as Control Charts, work study, materials management for smooth functioning of production units.	
<b>CO3</b>	(Evaluation): Appraise the role of functional management in maximizing profits.	
<b>CO4</b>	(Application): Apply techniques of Project Management in controlling cost.	
<b>CO5</b>	(Application): Apply principles of Strategic Management for managerial decisions.	
<b>CO6</b>	(Comprehension): Classify the management practices with reference to current business scenario.	

**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.



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**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.

**Text Books**

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

**REFERENCES**

1. Koontz & Weihrich: 'Essentials of Management' TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage Learning, Delhi, 2011.
3. Robbins: Organizational Behaviors, Pearson Publications, 2011
4. Kanishka Bedi: Production & Operational Management, Oxford Publications, 2011.
5. Manjunath: Management Science, Pearson Publications, 2013.
6. Biswajit Patnaik: Human Resource Management, PHI, 2011.
7. Hitt and Vijaya Kumar: Strategic Management, Cengage Learning.
8. Dr. PG. Ramanujam, BVR Naidu, PV Rama Sastry : Management Science Himalaya Publishing House, 2013.
9. Management Shapers, Universities Press.
10. Philip Kotler & Armstrong: Principles of Marketing, 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.



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**16CS7T19**

**CRYPTOGRAPHY AND NETWORK SECURITY**  
**(Common to CSE and IT)**

**Learning Objectives:**

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

**Course Outcomes:**

At the end of this course student will be able to-

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Analyze the functional units of security model.(Analyze)	
<b>CO2</b>	Evaluate security mechanisms with Symmetric Key cryptography. (Evaluate)	
<b>CO3</b>	Evaluate security mechanisms with Asymmetric Key cryptography. (Evaluate)	
<b>CO4</b>	Analyze Data Integrity, Digital Signature Schemes & Key Management. (Analyze)	
<b>CO5</b>	Analyze network security models for ensuring security at Application layer and Transport layer. (Analyze)	
<b>CO6</b>	Analyze network security model at Network layer (Analyze)	

**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.





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**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.

**TEXT BOOKS:**

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 Meneges, Cengage Learning, 2012.
2. "Everyday Cryptography," Keith M. Martin, Oxford, 2<sup>nd</sup> edition, 2017.
3. "Cryptography and Network Security," Behrouz A. Forouzan, Debdeep Mukhopadhyay, McGraw Hill, 3<sup>rd</sup> edition, 2008.

**Web Resources**

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



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**16IT7T16**

**MOBILE COMPUTING**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Compare and contrast GSM and GPRS services.	
<b>CO2</b>	Analyze various protocols like SDMA, FDMA, CDMA, etc.	
<b>CO3</b>	Distinguish between IP and mobile IP Network layer.	
<b>CO4</b>	Differentiate various transport layer protocols for mobile networks.	
<b>CO5</b>	Analyze Data Dissemination and Synchronization.	
<b>CO6</b>	Examine various MANET routing algorithms.	

**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.



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**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.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
2. UWE Hansmann, Lothar Merk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer.

**WEB LINKS:**

1. [http://www.tutorialspoint.com/mobile\\_computing/index.htm](http://www.tutorialspoint.com/mobile_computing/index.htm)
2. [http://en.wikipedia.org/wiki/Mobile\\_computing#Definitions](http://en.wikipedia.org/wiki/Mobile_computing#Definitions)
3. <http://nptel.ac.in/courses/106106147/>
4. [https://onlinecourses.nptel.ac.in/noc16\\_cs13/preview](https://onlinecourses.nptel.ac.in/noc16_cs13/preview)

**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.



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**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, “Mobile Computing, Technology Applications and Service Creation” Second Edition, Mc Graw Hill.
2. UWE Hansmann, Lothar Merk, Martin S. Nocklous, Thomas Stober, “Principles of Mobile Computing,” Second Edition, Springer.

**WEB LINKS:**

1. [http://www.tutorialspoint.com/mobile\\_computing/index.htm](http://www.tutorialspoint.com/mobile_computing/index.htm)
2. [http://en.wikipedia.org/wiki/Mobile\\_computing#Definitions](http://en.wikipedia.org/wiki/Mobile_computing#Definitions)
3. <http://nptel.ac.in/courses/106106147/>
4. [https://onlinecourses.nptel.ac.in/noc16\\_cs13/preview](https://onlinecourses.nptel.ac.in/noc16_cs13/preview)



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**16IT7T17**

**OPEN SOURCE SOFTWARE**

**COURSE OBJECTIVES:**

- 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:**

The Student will be able to:

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

**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



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,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

**TEXT BOOKS:**

1. Linux: The Complete Reference, Sixth Edition Richard Petersen by 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 by 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, 2nd Edition Powerful and Scalable Data Storage by Kristina Chodorow, O'Reilly Media.( Unit 5)
6. HBase: The Definitive Guide by Lars George O'Reilly Media(Unit-6)

**REFERENCES:**

1. Web Development with MongoDB and NodeJS - Second Edition
2. AngularJS 1st Edition by Brad Green (Author), Shyam Seshadri (Author)

**WEB LINKS:**

1. [http://www.khuisf.ac.ir/prof/images/Uploaded\\_files/Linux%20The%20Complete%20Reference.6th.Edition\(Nov.2007\)\[2842313\].PDF](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](https://www.kopykitab.com/ebooks/2016/06/7677/sample/sample_7677.pdf)
3. [https://www.e-reading.club/bookreader.php/142087/Learning\\_jQuery.pdf](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.pdf](file:///H:/ruby_on_rails_3_tutorial.pdf)  
[http://usuaris.tinet.cat/bertolin/pdfs/mongodb\\_%20the%20definitive%20guide%20-%20kristina%20chodorow\\_1401.pdf](http://usuaris.tinet.cat/bertolin/pdfs/mongodb_%20the%20definitive%20guide%20-%20kristina%20chodorow_1401.pdf)

**For AngularJS:**

1. [file:///C:/Users/SivaBaba/Desktop/angularjs\\_tutorial.pdf](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](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](http://usuaris.tinet.cat/bertolin/pdfs/mongodb_%20the%20definitive%20guide%20-%20kristina%20chodorow_1401.pdf)

**Hbase:**

<http://www.mpam.mp.br/attachments/article/6214/HBase%EF%BC%9AThe%20Definitive%20Guide.pdf>



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**ELECTIVE-I**

**16IT7D01**

**I.DATA ANALYTICS**

**COURSE OBJECTIVES:**

- Students will know about Big data Platform and its evolution
- Students will learn about Data analytics models
- Students will know about stream models and architectures
- Students will analyze about clustering
- Students learn about different frameworks and new technologies

**COURSE OUTCOMES:**

The Student will be able to:

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

**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





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**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.

**TEXT BOOKS:**

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk, Bruce Brown, Rafael Coss

**REFERENCES:**

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne.

**WEB LINKS:**

1. <https://cognitiveclass.ai/courses/introduction>
2. <https://www.tutorialspoint.com/hadoop/index.htm>
3. [Hadoop: http://hadoop.apache.org/](http://hadoop.apache.org/)
4. [Hive: https://cwiki.apache.org/confluence/display/Hive/Home](https://cwiki.apache.org/confluence/display/Hive/Home)
5. [Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html](http://pig.apache.org/docs/r0.7.0/tutorial.html)





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**16IT7D02**

**II. INFORMATION RETRIEVAL SYSTEMS**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

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

**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.



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**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.

**TEXT BOOKS:**

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrieval- Yates, Pearson Education.
3. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.

**REFERENCE BOOKS:**

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Information retrieval Algorithms and Heuristics, Grossman, David A., Frieder, Ophir 2ed, Springer

**WEB LINKS:**

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/](http://videlectures.net/Top/Computer_Science/Information_Retrieval/)



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**16IT7D03**

**III. DISTRIBUTED SYSTEMS**

**COURSE OBJECTIVES:**

- Provides an introduction to the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission, IPC mechanisms in distributed systems, Remote procedure calls.
- Expose students to current technology used to build architectures to enhance distributed computing infrastructures with various computing principles

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Compare various System Models.	
CO2	Differentiate between TCP and UDP communication.	
CO3	Analyze the process of Remote Method Invocation.	
CO4	Compare and Contrast between Processes and Threads.	
CO5	Analyze the difference between Napster and Peer-to-Peer distributed file systems.	
CO6	Analyze Concurrency control and Deadlocks in Distributed transactions.	

**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.



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**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.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1. “Distributed Computing: Fundamentals, Simulations and Advanced Topics” by Hagit Attiya, Jennifer Welch
2. “Distributed Systems – Principles and Paradigms” by Andrew S. Tanenbaum, Maaten Van Steen, 2<sup>nd</sup> Edition, Pearson.

**WEB LINKS:**

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



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**16IT7D04**

**IV. DESIGN PATTERNS**

**COURSE OBJECTIVES:**

- To introduce the fundamental concepts of design patterns.
- To explain principles, practices and approaches to make good designs using design patterns.
- To provide knowledge on various design patterns such as composite, iterator, observer, factory method and strategy.

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Relate design Problems with Design Patterns.	
CO2	Analyze the application of design patterns in the context of the Design of a Document Editor.	
CO3	Compare creational patterns like Abstract Factory, Singleton Design patterns etc.,	
CO4	Compare structural patterns like Adapter, Façade Design patterns etc.,	
CO5	Compare behavioral patterns like command, Template Method etc.,	
CO6	Decide the expectation from the usage of Design Patterns.	

**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.



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**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

**TEXT BOOK:**

1. Design Patterns, Erich Gamma, Pearson Education.

**REFERENCE BOOKS:**

1. Pattern's in JAVA Vol-I By Mark Grand ,WileyDreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand ,WileyDreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,WileyDreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd.
5. Design Patterns Explained By Alan Shalloway, Pearson Education.

**WEB LINKS:**

1. [www.cse.wustl.edu/~cdgill/courses/cse432\\_sp06/CreationalPatterns.ppt](http://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](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>



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**16IT7D05**

**V. SOFTWARE QUALITY ASSURANCE**

**COURSE OBJECTIVES:**

- Describe approaches to quality assurance
- Understand quality models
- Evaluate the system based on the chosen quality model

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Enumerate the Components of the Software Quality Assurance System.	
CO2	Integrate Quality Activities in the Project Life Cycle	
CO3	Interpret procedures and work instructions.	
CO4	List out the Software Quality Metrics and Costs.	
CO5	Analyze the SQA Standards.	
CO6	Estimate the Role of Management in Quality Assurance.	

**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.



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**UNIT VI:**

**Organizing for Quality Assurance:**

Management and its Role in Quality Assurance, The Software Quality Assurance.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

**WEB LINKS:**

1. [softwaretestingfundamentals.com/software-quality-assurance/](http://softwaretestingfundamentals.com/software-quality-assurance/)
2. <http://nptel.ac.in/courses/106101061/>





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**16IT7D06**

**VI. COMPUTER GRAPHICS**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

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

**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.



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**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.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

**WEB LINKS:**

1. <https://www.intechopen.com/books/computer-graphics>
2. [https://www.tutorialspoint.com/computer\\_graphics/index.htm](https://www.tutorialspoint.com/computer_graphics/index.htm)
3. [www.cs.princeton.edu/courses/archive/spr02/cs217/lectures/graphics.pdf](http://www.cs.princeton.edu/courses/archive/spr02/cs217/lectures/graphics.pdf)
4. [www.inf.ed.ac.uk/teaching/courses/cg/Web/intro\\_graphics.pdf](http://www.inf.ed.ac.uk/teaching/courses/cg/Web/intro_graphics.pdf)



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**ELECTIVE-II**

**16IT7D07**

**I. IMAGE PROCESSING**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Enumerate the fundamental steps in digital image processing.	
<b>CO2</b>	List image enhancement techniques in spatial domain.	
<b>CO3</b>	List image enhancement techniques in frequency domain.	
<b>CO4</b>	Compare different types of color image processing techniques and its operations.	
<b>CO5</b>	Analyze various image compression techniques.	
<b>CO6</b>	Differentiate edge linking and boundary detection techniques.	

**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



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**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.

**TEXT BOOKS:**

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 LINKS:**

1. <https://www.peterindia.net/ImageProcessing.html>
2. [http://www.imageprocessingplace.com/root\\_files\\_V3/image\\_databases.htm](http://www.imageprocessingplace.com/root_files_V3/image_databases.htm)
3. [https://www.tutorialspoint.com/dip/image\\_processing\\_introduction.htm](https://www.tutorialspoint.com/dip/image_processing_introduction.htm)



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**16IT7D08**

**II. HUMAN COMPUTER INTERACTION**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

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

**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,



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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.

**TEXT BOOKS:**

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

**REFERENCES BOOKS:**

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

**WEB LINKS:**

1. [https://onlinecourses.nptel.ac.in/noc18\\_cs23/preview](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>



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**16IT7D09**

**III.MACHINE LEARNING**

**COURSE OBJECTIVES:**

- To introduce machine learning problems corresponding to different applications.
- To learn concepts of Decision tree learning and artificial neural networks.
- To discuss Bayesian learning and computational learning theory.
- To provide basic Knowledge on Instance based learning.

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Illustrate Decision Theory.	
CO2	Analyze Linear models for Regression	
CO3	Analyze Linear models for Classification	
CO4	Apply the concept of Feature Selection .	
CO5	List the linear Transforms in Feature Generation I	
CO6	Implement the Feature Generation II	

**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, Feature subset selection.



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**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.

**TEXT BOOK:**

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:**

4. Understanding Machine Learning from theory to algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.

**WEB LINKS:**

1. [www.site.uottawa.ca/~nat/Courses/CSI5387/ML\\_Lecture\\_9.ppt](http://www.site.uottawa.ca/~nat/Courses/CSI5387/ML_Lecture_9.ppt)
2. [http://artint.info/html/ArtInt\\_177.html](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>





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**16IT7D10**

**IV. DECISION SUPPORT SYSTEM**

**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:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Evaluate the benefits of Decision support systems	
<b>CO2</b>	Analyze the factors that impart decision making.	
<b>CO3</b>	Differentiate between information and information quality models.	
<b>CO4</b>	Categorize different types of decision support system.	
<b>CO5</b>	Analyze architectural aspects of decision support system.	
<b>CO6</b>	Compare different types of models in Decision support systems.	

**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 Clint/Server Computing.

**UNIT VI:**

DSS Software Tools, DSS Software Categories, Standard Packages, Programming Languages DSS, Models in Decision Support Systems.



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**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

**WEB LINKS:**

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>



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**16IT7D11**

**V. ARTIFICIAL NEURAL NETWORKS**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Compare different classes of network architectures.	
<b>CO2</b>	Differentiate various learning mechanisms like Memory-based learning, Hebbian learning, Competitive learning.	
<b>CO3</b>	Design a pattern classifier using a Single layer perceptron.	
<b>CO4</b>	Analyze issues of back propagation learning in multi layer feed forward networks.	
<b>CO5</b>	Analyze Radial Basis Function Networks.	
<b>CO6</b>	Demonstrate Self Organizing Maps.	

**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.



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**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.

**TEXT BOOKS:**

1. Simon Haykin, "Neural Networks: A comprehensive foundation", Second Edition, Pearson Education Asia.
2. Satish Kumar, "Neural Networks: A classroom approach", Tata McGraw Hill, 2004.

**REFERENCE BOOKS:**

1. Robert J. Schalkoff, "Artificial Neural Networks", McGraw-Hill International Editions, 1997.

**WEBLINKS:**

1. [https://en.wikibooks.org/wiki/Artificial\\_Neural\\_Networks](https://en.wikibooks.org/wiki/Artificial_Neural_Networks)
2. [http://www.dkriesel.com/\\_media/science/neuronalenetze-en-zeta2-1col-dkrieselcom.pdf](http://www.dkriesel.com/_media/science/neuronalenetze-en-zeta2-1col-dkrieselcom.pdf)



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**16IT7D12**

**VI. E-COMMERCE**

**COURSE OBJECTIVES:**

- 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:**

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Compare different types of E-Commerce Applications.	
<b>CO2</b>	Differentiate between different Electronic Payment Systems.	
<b>CO3</b>	Compare and contrast between Inter and Intra Organizational Commerce.	
<b>CO4</b>	Perform online marketing process.	
<b>CO5</b>	Perform information search and retrieval.	
<b>CO6</b>	Analyze different multimedia concepts.	

**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.



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**UNIT VI:**

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

**TEXT BOOKS:**

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.
2. E-Commerce, strategy, Technology, and Implementation, Gary P. Schneider, 1<sup>st</sup> Ed, Cengage Learning.

**REFERENCES:**

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth 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 LINKS:**

1. [https://onlinecourses.nptel.ac.in/noc17\\_mg22/preview](https://onlinecourses.nptel.ac.in/noc17_mg22/preview)
2. [http://nptel.ac.in/courses/106108103/pdf/Lecture\\_Notes/LNm13.pdf](http://nptel.ac.in/courses/106108103/pdf/Lecture_Notes/LNm13.pdf)
3. <http://nptel.ac.in/courses/110105083/>



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**16IT7L10**

**MOBILE COMPUTING LAB**

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Develop J2ME applications.	
CO2	Develop mobile applications using android	

**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.
  - cut
  - copy
  - past
  - delete
  - select all
  - unselect all
3. Create a J2ME menu which has the following options (Event Handling):
  - 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.
5. Create an MIDP application which examines, that a phone number, which a user has entered is in the given format (Input checking):
  - 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:
  - (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.



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**16IT7L11**

**OPEN SOURCE SOFTWARE LAB**

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Build programs using angular JS.	
<b>CO2</b>	Create programs based on jquery.	
<b>CO3</b>	Implement programming with Ruby on Rails.	
<b>CO4</b>	Develop nosql programs using MongoDB and HBase.	

**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
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





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**16IT8T18**

**CLOUD COMPUTING**

**COURSE OBJECTIVES:**

- 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

**COURSE OUTCOMES:**

CO#	Statement	Cognitive Level
CO1	Compare system model for cloud computing.	
CO2	Identify the levels of virtualization.	
CO3	Differentiate various cloud platform architectures.	
CO4	Classify about cloud software environments.	
CO5	Outline about scheduling and resource management in cloud.	
CO6	Compare different cloud storage systems.	

**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.



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**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)

**TEXT BOOKS**

1. Distributed and Cloud Computing, Kai Hwang, Geoffry 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 BOOK**

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 Tammarai selvi, TMH.
3. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press

**WEB LINKS:**

1. [https://onlinecourses.nptel.ac.in/noc17\\_cs23/preview](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](https://www.tutorialspoint.com/e_commerce/e_commerce_tutorial.pdf)



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**16IT8T19**

**CYBER SECURITY**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Realize the differences between Indian Perspective on Cyber Crimes and Global Perspective on Cyber Crimes.	
CO2	Analyze how criminals plan attacks and the fuel for cybercrimes.	
CO3	Identify different classes of attacks and frauds.	
CO4	Enumerate the tools and methods used in Cybercrime.	
CO5	Elaborate the legal implications of Cybercrimes and Cyber security.	
CO6	Perform digital forensic analysis.	

**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.



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**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.

**TEXT BOOKS:**

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 LINKS:**

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



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**16IT8T20**

**DATA WAREHOUSING AND BUSINESS INTELLIGENCE**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

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

**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.



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**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.

**TEXT BOOKS:**

1. Data Mining Concepts and Techniques Third Edition Jiawei Han University of Illinois at Urbana–Champaign Micheline Kamber Jian Pei Simon Fraser Universit. (Unit-I,II)
2. Fundamentals of Business Intelligence grossmann, Wilfried, rinderle-ma, Stefanie(Unit-III,IV,V,VI)

**REFERENCE BOOKS:**

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

**WEB LINKS:**

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>



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**ELECTIVE-III**

**16IT8D13**

**I. AGILE METHODOLOGIES**

**COURSE OBJECTIVES:**

- Know about software and its development
- Gain knowledge in agile development
- Study the agile methods
- Student will know about lifecycle of agile methods
- Student will have an appreciation of the necessity and difficulty in case study.
- Student will know about Agile Practice And Testing

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	List out various software development techniques.	
CO2	Outline about Agile method and its tools.	
CO3	Identify software motivation techniques.	
CO4	Classify about need of Evidence in agile.	
CO5	Implement Scrum model.	
CO6	Design and test project using agile methodology.	

**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.



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**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.

**TEXT BOOKS:**

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

**REFERENCES:**

1. Agile Software Development – Wikipedia.
2. Alistair “Agile Software Development series” Cockburn - 2001.

**WEBLINKS:**

1. [www.agileintro.wordpress.com/2008](http://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>





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**16IT8D14**

**II. INTERNET OF THINGS**

**COURSE OBJECTIVES:**

- To assess the vision and introduction of IoT.
- To Understand IoT Market perspective.
- To Implement Data and Knowledge Management and use of Devices in IoT Technology.

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Describe about IoT Design, deployment templates in which domain it is useful.	
<b>CO2</b>	Explain different network management techniques and protocols used for managing IoT systems with NETCONF, YANG, NETOPEER	
<b>CO3</b>	Design IoT based applications by using PYTHON packages	
<b>CO4</b>	Formulate IoT applications that uses Raspberry Pi	
<b>CO5</b>	Illustrate IoT Design in the form of a case study	
<b>CO6</b>	Build a data analytic system for IoT	

**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 IoTs: 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



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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.

**TEXT BOOKS:**

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

**REFERNCE BOOKS:**

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

**WEB LINKS:**

1. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/preview](https://onlinecourses.nptel.ac.in/noc17_cs22/preview)
2. <http://nptel.ac.in/courses/106105166/>
3. [https://onlinecourses.nptel.ac.in/noc18\\_cs08/preview](https://onlinecourses.nptel.ac.in/noc18_cs08/preview)
4. [https://onlinecourses.nptel.ac.in/noc17\\_ee20/preview](https://onlinecourses.nptel.ac.in/noc17_ee20/preview)



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**16IT8D15**

**III. COMPUTER VISION**

**COURSE OBJECTIVES:**

- The fundamentals of Computer Graphics and Image Processing
- The concepts related edge detection, segmentation, morphology and image compression methods.

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Compare different image formation methods.	
CO2	Elaborate various image processing transformations.	
CO3	Perform feature detection and matching.	
CO4	Implement image segmentation.	
CO5	Compare 2-D and 3-D feature based alignment.	
CO6	Explain about Two-frame structure from motion.	

**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.



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**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

**WEB LINKS:**

1. [https://onlinecourses.nptel.ac.in/noc18\\_ee08/preview](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>



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**16IT8D16**

**IV. MULTIMEDIA PROGRAMMING**

**COURSE OBJECTIVES:**

- To provide the foundation knowledge of multimedia computing, e.g. media characteristics, compression standards, multimedia representation, data formats, multimedia technology development.

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Illustrate the characteristics of Text, Images, Audio and Video (Multimedia Information Representations).	
<b>CO2</b>	Differentiate between Lossy and Lossless Compression techniques.	
<b>CO3</b>	Compare and Contrast GIF, TIFF and JPEG Image Compression Techniques	
<b>CO4</b>	Compare and Contrast DPCM, ADPCM, MPEG Audio Compression Techniques.	
<b>CO5</b>	Enumerate Basic video Compression Techniques.	
<b>CO6</b>	Design Interactive Applications over the Internet.	

**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.



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**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.

**TEXT BOOKS:**

1. Halshall, Fred. "Multimedia Communications – Applications, Networks, Protocols and Standards". 2001. Pearson Education.

**REFERENCE BOOKS:**

1. Chapman, Nigel and Chapman, Jenny. "Digital Multimedia". 2000. John Wily & Sons.
2. Steinmaetz, Ralf and Nahrstedt, Klara. Multimedia: "Communications and Applications" 2003. Pearson Education.

**WEB LINKS:**

1. [www.lit.ie/Courses/LC234](http://www.lit.ie/Courses/LC234)
2. <https://www.youtube.com/watch?v=U7Iso9GW158>
3. [http://www.bmcc.cuny.edu/media-arts/mmp\\_program.jsp](http://www.bmcc.cuny.edu/media-arts/mmp_program.jsp)
4. [https://www.youtube.com/watch?v=s\\_EQcpN00mg](https://www.youtube.com/watch?v=s_EQcpN00mg)



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**16IT8D17**

**V. SOCIAL NETWORKING & SEMANTIC WEB**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

CO#	Statement	Cognitive Level
CO1	Enumerate the measures of social network analysis.	
CO2	Illustrate Electronic sources for network analysis and different Ontology languages	
CO3	Model and aggregate social network data	
CO4	Develop social-semantic applications	
CO5	Evaluate Web- based social network	
CO6	Demonstrate model of ontologies	

**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.



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**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

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, R.Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reilly, SPD.

**WEB LINKS:**

1. <https://link.springer.com/content/pdf/10.1007%2F978-0-387-71001-3.pdf>
2. [www.springer.com/in/book/9780387710006](http://www.springer.com/in/book/9780387710006)
3. [https://en.wikipedia.org/wiki/Social\\_Semantic\\_Web](https://en.wikipedia.org/wiki/Social_Semantic_Web)





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**16IT8D18**

**VI. CONCURRENT & PARALLEL PROGRAMMING**

**COURSE OBJECTIVES:**

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

**COURSE OUTCOMES:**

The Student will be able to:

<b>CO#</b>	<b>Statement</b>	<b>Cognitive Level</b>
<b>CO1</b>	Compare parallel programs and sequential programs.	
<b>CO2</b>	Classify parallel computing platforms.	
<b>CO3</b>	List the parallel algorithm models.	
<b>CO4</b>	Write shared memory parallel programs with openMP.	
<b>CO5</b>	Develop distributed memory parallel programs using MPI.	
<b>CO6</b>	Design the parallel algorithm for Matrix and Graph related problems.	

**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.



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**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

**TEXT BOOKS:**

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 By 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 by M J Quinn
2. Programming Massively Parallel Processors by D.Kirk and W. Hwu

**WEB LINKS:**

1. [http://nptel.ac.in/syllabus/syllabus\\_pdf/106102114.pdf](http://nptel.ac.in/syllabus/syllabus_pdf/106102114.pdf)
2. <http://nptel.ac.in/courses/106102114/23>
3. <http://nptel.ac.in/courses/106102163/>