

Study & Evaluation Scheme

of

Bachelor of Technology (Computer Science & Engineering) With Specialization in Cloud Technology & Information Security (CTIS)

[Applicable w.e.f. Academic Session 2017-18 till revised]



TEERTHANKER MAHAVEER UNIVERSITY

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TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P)

Study & Evaluation Scheme Bachelor of Technology CS&E (CTIS)

SUMMARY

Programme	:	B. Tech. CSE (CTIS)																		
Duration	:	Four year full time (Eight Semesters)																		
Medium	:	English																		
Minimum Required Attendance	:	75 %																		
Credit	:																			
Maximum Credit	:	234																		
Minimum credit required for the degree	:	218																		
Assessment Theory	:	<table border="1"> <thead> <tr> <th>Internal</th> <th>External</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>60</td> <td>100</td> </tr> </tbody> </table>	Internal	External	Total	40	60	100												
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Internal Evaluation (Theory Papers)		<table border="1"> <thead> <tr> <th>Class Test I</th> <th>Class Test II</th> <th>Class Test III</th> <th>Assignment(s)</th> <th>attendance</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td colspan="3">Best two out of the three</td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>40</td> </tr> </tbody> </table>	Class Test I	Class Test II	Class Test III	Assignment(s)	attendance	Total	Best two out of the three						10	10	10	10	10	40
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Project Phase-1		<table border="1"> <thead> <tr> <th>Internal</th> <th>External</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>-</td> <td>100</td> </tr> </tbody> </table>	Internal	External	Total	100	-	100												
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Evaluation of Practical/ Industrial Training/ Project Phase-2	:	<table border="1"> <thead> <tr> <th>Internal</th> <th>External</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>50</td> <td>100</td> </tr> </tbody> </table>	Internal	External	Total	50	50	100												
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Duration of Examination	:	<table border="1"> <thead> <tr> <th>External</th> <th>Internal</th> </tr> </thead> <tbody> <tr> <td>3 hrs.</td> <td>1 ½ hrs</td> </tr> </tbody> </table>	External	Internal	3 hrs.	1 ½ hrs														
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To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester examination and teachers continuous evaluation. (i.e. both internal and external). A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have secured at least 45% marks in aggregate to clear the semester.

Question Paper Structure

- 1. The question paper shall consist of 6 questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each).*
- 2. Out of the remaining five questions, the long answer pattern will have internal choice with unit wise questions with internal choice in each unit. In units having numerical, weightage and information should be available both in the syllabus and the paper pattern. The weightage of Question No. 2 to 6 shall be 10 marks each.*

Internal Evaluation (50 marks)

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
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External Evaluation (50 marks)

The external evaluation would also be done by the External Examiner based on the experiment performed during the examination.

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)
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Evaluation Scheme for Odd Semesters
(For English and Communication related subject)

B. Tech. CSE (CTIS)

(All Odd semesters)

Assessment:

<i>Internal</i>	<i>Viva</i>	<i>External</i>	<i>Total</i>
40	30	30	100

Internal Evaluation: 40

<i>Best Two out of Three CTs</i>	<i>Attendance</i>	<i>Assignment/Presentation</i>	<i>Total</i>
20	10	10	40

Viva-Voce: 30

Viva will be conducted by External Examiner or by faculty member of another college of the university and a representative from the Training & Placement Cell.

<i>Body Language</i>	<i>Voice Modulation</i>	<i>Time Management</i>	<i>Knowledge of the Topic</i>	<i>You Approach</i>	<i>Confidence & Attitude</i>	<i>Total</i>
5	5	5	5	5	5	30

External Written Examination: 30

Question Paper Structure

1. The question paper shall have two parts, viz., Part A and Part B.
2. Part A will be compulsory of 10 marks and shall be short answer question. It will have two questions from each module and each question will be of 2 marks each. Candidate must attempt five questions in total.
3. Part B will be of 20 marks and shall be long answer questions. This part will have two questions from each module. Each question will carry 5 marks. Candidate must attempt four questions in total.

Evaluation Scheme for Odd Semesters
(For English and Communication related subject)

B. Tech. CSE (CTIS)
Ist year & IInd Year (Even Semesters)

Internal Viva (Marks: 50)

Presentation

S.N	Knowledge of topic	Body Language & Voice Modulation	Quiz	Attendance	Class Participation	Total
1.	(10)	(10)	(10)	(10)	(10)	(50)

External Viva (Marks: 50)

Presentation

S.N	Knowledge of topic	Body Language & Voice Modulation	Time Management	Quiz	Approach to Interaction	Total
	(10)	(10)	(10)	(10)	(10)	(50)

Study & Evaluation Scheme
Programme: B. Tech. CS&E (CTIS)
SEMESTER I

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS116	Engineering Mathematics-I	3	1	0	4	40	60	100
2	EAS113	Engineering Chemistry	3	1	0	4	40	60	100
3	EEE117	Basic Electrical Engineering	3	1	0	4	40	60	100
4	EAS115	Environmental Studies	4	0	0	4	40	60	100
5	EHM199	English communication and soft skills – I	3	0	2	4	50	50	100
6	ICS101	Programming in C	3	1	0	4	40	60	100
7	ICS102	Operating System – Building Blocks	3	1	0	4	40	60	100
8	EAS163	Engineering Chemistry (Lab)	0	0	2	1	50	50	100
9	EEE161	Basic Electrical Engineering (Lab)	0	0	2	1	50	50	100
10	ICS151	Programming in C Language (Lab)	0	0	4	2	50	50	100
11	EME161	Engineering Drawing (Lab)	0	0	4	2	50	50	100
		Total	22	5	14	34	490	610	1100

SEMESTER II

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS211	Engineering Mathematics-II	3	1	0	4	40	60	100
2	EAS212	Engineering Physics	3	1	0	4	40	60	100
3	EEC211	Basic Electronics Engineering	3	1	0	4	40	60	100
4	ICS201	Computer Architecture and Organizations	3	1	0	4	40	60	100
5	EHM249	English communication and soft skills – II	3	0	2	4	40	60	100
6	ICS202	Information Security Fundamentals	3	1	0	4	40	60	100
7	ICS251	Soft Skill - Effective Communication (Lab)	0	0	4	2	50	50	100
8	EEC261	Basic Electronics Engineering (Lab)	0	0	2	1	50	50	100
9	ICS252	Computer Architecture and Organizations (Lab)	0	0	4	2	50	50	100
10	ICS253	Office Automation (Lab)	0	0	4	2	50	50	100
		Total	18	5	16	31	440	560	1000

SEMESTER III

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ICS301	Introduction to Cloud Computing	3	1	0	4	40	60	100
2	ICS302	Data Structure and Algorithms	3	1	0	4	40	60	100
3	ICS303	OSI Layer and Security	3	1	0	4	40	60	100
4	ICS304	OOPS with C++	3	1	0	4	40	60	100
5	ICS305	Designing Enterprise Network – I	3	1	0	4	40	60	100
6	ICS306	Operating System – Windows 2007	3	1	0	4	40	60	100
7	ICS351	Designing Enterprise Network-I (Lab)	0	0	4	2	50	50	100
8	ICS352	Data Structure and Algorithm (Lab)	0	0	4	2	50	50	100
9	ICS353	Operating System Windows (Lab)	0	0	4	2	50	50	100
		Total	18	6	12	30	390	510	900

SEMESTER IV

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ICS401	Relational Database Management System	3	1	0	4	40	60	100
2	ICS402	Network Security Basics	3	1	0	4	40	60	100
3	ICS403	Cryptography Fundamentals	3	1	0	4	40	60	100
4	ICS404	Design and Analysis of Algorithm	3	1	0	4	40	60	100
5	ICS405	Theory of Computing	3	1	0	4	40	60	100
6	ICS406	Logical Reasoning and Thinking	3	0	0	3	40	60	100
7	ICS451	Relational Database Management System (Lab)	0	0	4	2	50	50	100
7	ICS452	Network Security Basics (Lab)	0	0	4	2	50	50	100
9	ICS453	Design and Analysis of Algorithm (Lab)	0	0	4	2	50	50	100
		Total	18	5	12	29	390	510	900

SEMESTER V

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ICS501	Programming Skills in JAVA	3	1	0	4	40	60	100
2	ICS502	Fundamentals of Storage and Recovery	3	1	0	4	40	60	100
3	ICS503	Fundamentals of Web Technology	3	1	0	4	40	60	100
4	ICS504	Fundamentals of Datacenter	3	1	0	4	40	60	100
5	ICS505	Ethical Hacking Fundamentals	3	1	0	4	40	60	100
6	ICS506	Disaster Recovery and Business Continuity Management	3	1	0	4	40	60	100
7	ICS507	Employability Skills	3	0	0	3	40	60	100
8	ICS551	Programming Skills in JAVA (Lab)	0	0	4	2	50	50	100
9	ICS552	Web Technology (Lab)	0	0	4	2	50	50	100
10	ICS553	Ethical Hacking Fundamentals (Lab)	0	0	4	2	50	50	100
		Total	21	6	12	33	430	570	1000

SEMESTER VI

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ICS601	Principles of Virtualization	3	1	0	4	40	60	100
2	ICS602	Server Operating System – Windows 2012	3	1	0	4	40	60	100
3	ICS603	IT Governance, Risk and Information Security Audit	3	1	0	4	40	60	100
4	ICS604	Cyber Forensics	3	1	0	4	40	60	100
5	ICS605	Fundamentals of Exchange Server	3	1	0	4	40	60	100
Elective – I (Select any one)									
6	ICS606	Open Web Application Security Project (OWASP) Framework	3	1	0	4	40	60	100
	ICS607	Hacktivism, Cyber Warfare and Cyber Terrorism							
	ICS608	Payment Card Industry Data Security Standard (PCIDSS) and Health Insurance Portability and Accountability Act (HIPAA)							
7	ICS651	Principles of Virtualization (Lab)	0	0	4	2	50	50	100
8	ICS652	Server Operating System – Windows 2012 (Lab)	0	0	4	2	50	50	100
9	ICS653	Cyber Forensics (Lab)	0	0	4	2	50	50	100
		Total	18	6	12	30	390	510	900

SEMESTER VII

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ICS701	Virtualization and Cloud Security	3	1	0	4	40	60	100
2	ICS702	Server Operating System – Linux	3	1	0	4	40	60	100
3	ICS703	Mobile, Wireless & VOIP Security	3	1	0	4	40	60	100
4	ICS704	Introduction to Windows Azure	3	1	0	4	40	60	100
Elective – II (Select any one)									
5	ICS705	Advanced Web Technology	3	1	0	4	40	60	100
	ICS706	Fundamentals of Information Technology Infrastructure Library (ITIL)							
	ICS707	Introduction to Voice Over IP (VOIP)							
Elective – III (Select any one)									
6	ICS708	Management Theory and Practice	2	1	0	3	40	60	100
	ICS709	Industrial Organization and Management							
	ICS710	Business Communication							
7	ICS751	Mini Project (Lab)	0	0	8	4	50	50	100
8	ICS752	Server Operating System - Linux (Lab)	0	0	4	2	50	50	100
9	ICS753	Windows Azure (Lab)	0	0	4	2	50	50	100
		Total	17	6	16	31	390	510	900

SEMESTER VIII

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
Elective - IV (Select any one)									
1	ICS801	Introduction to Soft Computing	3	1	0	4	40	60	100
	ICS802	Discrete mathematics and graph							
	ICS803	Natural Language processing							
Elective - V (Select any one)									
2	ICS804	Machine Learning	3	1	0	4	40	60	100
	ICS805	High Performance Computing							
	ICS806	Linux Security and Forensics							
3	*ICS851	Internship / Project	0	0	16	8	50	50	100
		Total	6	2	16	16	130	170	300

SEMESTER I

Engineering Mathematics-I

Course Code: EAS116

L T P C

3 1 0 4

Objective:

- To familiarize the basics of matrices, differential calculus, multiple integrals and vector calculus.
- To solve all problems related to matrices, calculus and vectors.

Course Outcomes:

On successful completion of this course, students will be able to:

- Calculate eigenvalues and eigenvectors, apply Caley-Hamilton theorem, and diagonalize of symmetric matrices and demonstrate the nature of quadratic forms.
- Demonstrate understanding of
- The derivatives of functions of several variables, viz., partial and total differentiation, and differentiation of implicit functions and optimize the functions of several variables.
- Evaluate double integration and triple integration using Cartesian, polar co-ordinates and the concept of Jacobian of transformation from one coordinate system to another coordinate system.
- Identify the improperness in integrals and evaluate the integrals using appropriate mathematical tools and how to apply beta and gamma integrals keeping improperness in mind.
- Perform gradient, divergence and curl operations in vector and scalar fields, apply Green's theorem, Gauss Theorem, and Stokes theorem as the generalization of fundamental theorem of Integral calculus.

Unit A (Unit A is for building a foundation and shall not be a part of examination)

Some general theorem on deviation-Derivative of the sum or difference of two function, Derivative of product of two functions, Derivative of quotient, Derivative of Trigonometry function, Derivative of inverse Trigonometry function, Logarithms differential, Integration of $1/x$, e^x , Integration by simple substitution. Integrals of the type $f'(x)$, $[f(x)]^n$, $\frac{f'(x)}{f(x)}$, Integration of $1/x$,

e^x , $\tan x$, $\cot x$, $\sec x$, $\operatorname{cosec} x$, Integration by parts, Integration using partial fractions.

Course Contents-

Unit I

(Lectures 08)

Determinants- Rules of computation; Linear Equations and Cramer's rule.

Matrices: Elementary row and column transformation; Rank of matrix; Linear dependence; Consistency of linear system of equations; Characteristic equation; Cayley-Hamilton Theorem (without proof); Eigen values and Eigen vectors; Complex and Unitary matrices.

Unit II

(Lectures 08)

Differential Equation--First order first degree Differential equation: variable separable, Homogeneous method, Linear differential equation method, Exact Differential equation.

Unit III

(Lectures 08)

Differential Calculus: Leibnitz theorem; Partial differentiation; Euler's theorem; Change of variables; Expansion of function of several variables. Jacobians, Error function.

Unit IV

(Lectures 08)

Multiple Integrals: Double integral, Triple integral, Beta and Gamma functions; Dirichlet theorem for three variables, Liouville's Extension of Dirichlet theorem.

Unit V

(Lectures 08)

Vector Differentiation:

Vector function, Differentiation of vectors, Formulae of Differentiation, Scalar and Vector point function, Geometrical Meaning of Gradient, Normal and Directional Derivative, Divergence of a vector function, Curl of a vector

Vector Integration:

Green's theorem, Stokes' theorem; Gauss' divergence theorem.

Text Books-

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers.
2. Prasad C., *Engineering Mathematics for Engineers*, Prasad Mudralaya.
3. Dass H.K., *Engineering Mathematics Vol-I*, S. Chand.

Reference Books-

1. Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern.
2. Piskunov N., *Differential & Integral Calculus*, Moscow Peace Publishers.
3. Narayan Shanti, *A Text book of Matrices*, S. Chand

***Latest editions of all the suggested books are recommended.**

SEMESTER I

Engineering Chemistry

Course Code: EAS113

L T P C
3 1 0 4

Objective:

The basic objective of Engineering Chemistry is to educate the students about the chemical aspects of engineering and to provide leadership in advanced studies of engineering, in industry, academia and government.

Course Outcomes:

Student after successful completion of course must possess skills to think critically and analyze chemical problems. Students are also expected to learn solving chemistry problems with an engineering purview. Laboratory work is intended for students to learn conducting experiments, and analyze experimental data.

Course Contents:

UNIT I

(Lecture 08)

Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgon etc.

UNIT II

(Lecture 08)

Fuels and Combustion: Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.

UNIT III

(Lecture 08)

Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories.

UNIT IV

(Lecture 08)

Polymers: Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.

UNIT V

(Lecture 08)

A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.

B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.

Text Books:

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Lee I.D., Inorganic Chemistry.
3. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books:

1. Morrison & Boyd, Organic Chemistry, Prentice Hall
2. Barrow Gordon M., Physical Chemistry, McGraw-Hill.
3. Manahan Stanley E., Environmental Chemistry, CRC Press.

***Latest editions of all the suggested books are recommended.**

SEMESTER I

Basic Electrical Engineering

Course Code: EEE117

L T P C
3 1 0 4

Objective- To understand the fundamental concept of Electrical Engineering like D.C. Network, A.C. Network, Measuring Instruments, Energy Conversion Devices etc.

Course Outcome:

- Students are expected to learn the physical recognition of different electrical components like Resistances, Inductances, Capacitances and their ratings.
- Students are expected to have learnt the verifications of basic laws of electric circuits like Ohm's law and Kirchhoffs' laws.
- Students are expected to connect electric circuits, and able to use electric instruments to perform experiments.
- Cite the operating principles and identify various ac, dc machines and transformers.

Course Contents-

Unit I

(Lectures 10)

D.C. Network Theory: Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.

Unit II

(Lectures 10)

Steady State Analysis of A.C. Circuits: Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.

Unit III

(Lectures 06)

Basics of Measuring Instruments: Introduction to voltmeter, ammeter, Wattmeter & Energy meter.

Unit IV

(Lectures 06)

Single phase Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.

Unit V

(Lectures 08)

Three Phase A.C. Circuits: Line and phase voltage/current relations; three phase power, power measurement using two wattmeter method. Introduction to earthing and electrical safety.

Text Books-

1. V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.
2. W.H. Hayt & J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.

3. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill.

Reference Books-

1. Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.
2. A Grabel, Basic Electrical Engineering, McGraw Hill.
3. Cotton H., Advanced Electrical Technology, Wheeler Publishing.

***Latest editions of all the suggested books are recommended.**

SEMESTER I

Environmental Studies

Course Code: EAS115

L T P C
4 0 0 4

Objective: To create awareness among students about environment protection.

Course Outcomes:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

Course Content:

Unit I

(Lectures 08)

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development.

Ecology and Environment: Concept of an Ecosystem- its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid & Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

Unit II

(Lectures 08)

Natural Resources: Renewable & Non-Renewable resources; Land resources and land use change; Land degradation, Soil erosion & desertification. **Deforestation:** Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources:** Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies.

Biodiversity: Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Biogeographical Classification of India

Unit III

(Lectures 08)

Environmental Pollutions: Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies

Unit IV

(Lectures 08)

Environmental policies & practices: Climate change & Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

Unit V

(Lectures 08)

Human Communities & Environment:

Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case study

Field Work:

1. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
2. Visit to a local polluted site: urban/ rural/industrial/agricultural.
3. Study of common plants, insects, birds & basic principles of identification.
4. Study of simple ecosystem; pond, river etc.

Text Books:

1. “Environmental Chemistry”, De, A. K., New Age Publishers Pvt. Ltd.
2. “Introduction to Environmental Engineering and Science”, Masters, G. M., Prentice Hall India Pvt. Ltd.
3. “Fundamentals of Ecology”, Odum, E. P., W. B. Saunders Co.

Reference Books:

1. “Biodiversity and Conservation”, Bryant, P. J., Hypertext Book
2. “Textbook of Environment Studies”, Tewari, Khulbe & Tewari, I.K. Publication

***Latest editions of all the suggested books are recommended.**

SEMESTER I

English Communication and Soft Skills – I

Course Code: EHM199

L T P C

3 0 2 4

Objectives:

1. To remove the phobia of conversing in English.
2. To make the learners enable to express themselves among peers & teachers.
3. To enable learners, improve their vocabulary.
4. To introduce them with basic communicative skills in real life situations

Course Outcomes: At the end of the semester, the learner will be able to

1. Remove fear of speaking in English among peers & teachers.
2. Develop the ability to speak in English (even if grammatically not perfect).
3. Use vocabulary taught for speaking and writing simple sentence for day to day conversation.
4. Use taught vocabulary for writing applications on common issues.

Course Contents:

Unit – I Fear of Failure, Reasons of Fear of Failure & How to overcome it (12 hours)

- Self-Introduction
- Identifying strengths and weakness
- Fear of Failure: Signs of Fear of Failure, Reasons of Fear of Failure, Strategies to overcome Fear of Failure
- Positive Attitude
- Motivation
- Building Self Confidence

Unit – II Confidence, Presentability, Etiquettes & Manners (10 hours)

- Body Language: Facial Expression, Eye Contact, Gesture, Posture, Tips to have appropriate body language
- Grooming & Dressing Sense
- Etiquette & Manners: Social Etiquettes, Telephonic Etiquettes, Dining Etiquettes, Etiquettes to handle cultural differences, Etiquettes of Effective Conversation.
- Problem Sounds (s-sh,j-z,v-b)

Unit – III Conversation Practice, commonly made mistake & Initiating a conversation (10 hours)

- Vocabulary of commonly used words (50 Words)
- Conversation Practice: At College, At Bank, At Ticket Counter (Railway Station & Movie Theatre)
- How to initiate a conversation
- Commonly made mistakes in conversation
- Basic of Communication: 7Cs of Communication

Unit – IV Application writing (08 hours)

- Format & Style of Application Writing
- Practice of Application writing on common issues.

Reference Books:

- Mitra, Barun. K. “*Personality Development and Soft skills*” New Delhi: Oxford University Press.

- Kumar, Sanjay. & Pushp Lata. “*Communication Skills*” New Delhi: Oxford University Press.
- Carnegie Dale. “*How to win Friends and Influence People*” New York: Simon & Schuster.
- Harris, Thomas. A. “*I am ok, You are ok*” New York: Harper and Row.
- Coleman, Daniel. “*Emotional Intelligence*” Bantam Book.

Methodology:

1. Language Lab software.
2. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
3. Conversational Practice will be effectively carried out by Face to Face & Via Media (Telephone, Audio-Video Clips)
4. Modern Teaching tools (PPT Presentation, Tongue-Twisters & Motivational videos with sub-titles) will be utilized.

Note:

- 2 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning.
- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
50 Marks		50 Marks		100
40 Marks (Progressive Evaluation) After each unit-completion: Assignments / oral Presentation	10 Marks (Attendance)	25 Marks Midway external assessment (Viva)*	25 Marks (External Viva)**	

Note: Midway external assessment of 25 marks will be submitted and considered with external evaluation with a total of 50 marks.

***Parameters of Midway external assessment (Viva)**

Content	Dressing sense & Grooming	Confidence	Pronunciation	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

Note: To take corrective actions, midway assessment will be conducted by 2-member committee of Director’s nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students after two units are completed.

****Parameters of External Viva**

Content	Dressing sense & Grooming	Confidence	Pronunciation	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

Note: External Viva will be conducted by 3-member committee comprising

- a) Faculty teaching the class*
- b) English faculty from other college of the University (As approved by VC).*
- c) T&P officer of other colleges of the University (As approved by VC).*

Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.

SEMESTER I

Programming in C

Course Code: ICS101

L	T	P	C
3	1	0	4

Objective:

The objective of the course is to understand computer based problem solving and to learn programming concepts. Students will also understand and learn the Programming in C Language

Course Contents-

Unit I: Overview of Programming: (Lectures 08)

Introduction to computer based problem solving, Program design and implementation issues- Flowcharts & Algorithms, Top down design & stepwise refinement.

Programming environment – Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters

Unit II: Fundamentals of C programming: (Lectures 08)

Overview of C, Data Types, Constants & Variables, Operators & Expressions, **Control constructs**-if then, for, while.

Arrays- single & multidimensional arrays,

Functions-fundamentals – general form, function arguments, return value, **Basic I/O**-formatted and Unformatted I/O.

Advanced features- Type modifiers and storage class specifiers for data types, Bit operators, operator, &operator, * operator, Type casting, type conversion.

Unit III: Advanced programming techniques: (Lectures 08)

Control constructs- Do while, Switch statement, break and continue, exit() function, go to and label,

Scope rules- Local & global variables, scope rules of functions, **Functions**-parameter passing, call by value and call by reference, calling functions with arrays, argc and argv, recursion- basic concepts, ex-towers of Hanoi

Unit IV: Dynamic data structures in C: (Lectures 08)

Pointers- The & and * operator, pointer expression, assignments, arithmetic, comparison, malloc vs calloc, arrays of pointers, pointers to pointers, initializing pointers, pointers to functions, function returning pointers, Structures- Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure pointers, arrays and structures within structures, Unions – Declaration, uses, enumerated data-types, typedef.

Unit V: Additional features: (Lectures 08)

File Handling – The file pointer, file accessing functions, fopen, fclose, puc,getc, fprintf.

C Preprocessor- #define, #include, #undef, Conditional compilation directives.

C standard library and header files: Header files, string functions, mathematical functions, Date and Time functions

Course Outcome:

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

- Understand the Concept problem solving
- Classify the different Programming Environments
- Understand the Concept of C Language

- Describe data types, and control construct
- Describe the different scope rules
- Understand the Concept of Pointers
- Describe and define structures and union
- Describe and use file handling operations
- Understand the header files and standard library functions

Reference Books-

1. Let us C by Yashwant Kanetka, 6th Edition, PBP Publication.
2. The C programming Language by Richie and Kenninghan, 2004, BPB Publication.

Text Books-

1. Programming in ANSI C by Balaguruswamy, 3rd Edition, 2005, Tata McGraw Hill.

***Latest editions of all the suggested books are recommended.**

SEMESTER I

Operating System – Building Blocks

Course Code: ICS102

L	T	P	C
3	1	0	4

Objective:

To learn fundamental concept of Operating System, Process management & Memory management in detail

- To learn fundamental of protection and security in Operating System

Course Contents-

Unit I: Introduction

(Lectures 08)

Objectives and functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual machines

Unit II: Process Management

(Lectures 08)

Processes - Process concept, Process scheduling, Co-operating processes, Operations on processes, Inter process communication, Communication in client-server systems. Thread - Introduction to Threads, Single and Multi-threaded processes and its benefits, User and Kernel threads, Multithreading models, Threading issues.

Unit III

(Lectures 08)

CPU Scheduling - Basic concepts, Scheduling criteria, Scheduling Algorithms, Multiple Processor, scheduling, Real-time Scheduling, Algorithm Evaluation, Process Scheduling Models. Process Synchronization - Mutual Exclusion, Critical -Section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, Monitors, OS Synchronization, Atomic Transactions

Deadlocks - System Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit IV: Storage Management

(Lectures 08)

Memory Management - Logical and physical Address Space, Swapping, Contiguous Memory Allocation, Paging, Segmentation with Paging

Virtual Management - Demand paging, Process creation, Page Replacement Algorithms, Allocation of Frames, Thrashing, Operating System Examples, Page size and other considerations, Demand segmentation

File-System Interface - File concept, Access Methods, Directory structure -File- system Mounting, File sharing, Protection and consistency semantics

File-System Implementation- File-System structure, File-System Implementations, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery

Disk Management - Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, Stable-storage Implementation

Unit V: Protection and Security

(Lectures 08)

Protection - Goals of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Capability- Based Systems, Language –based Protection

Security - Security Problem, User Authentication, One – Time Password, Program Threats, System Threats, Cryptography, Computer – Security Classifications

Course Outcome:**Students will be able to:**

- Grasp a fundamental understanding of goals, components and evolution of operating systems
- Explain System Calls and System Programs along with it types
- Explain the concepts and creation of processes and threads
- Differentiate b/w program and process and various states under which process goes in detail
- Understand the various modes of inter-process communication like message passing buffering
- Learn the scheduling policies of modern operating systems
- Understand critical section problem and various synchronization schemes
- Explain the deadlock avoidance, prevention, detection and recovery.
- Understand Paging, segmentation and virtual memory concepts in modern OSs
- Understand the concepts of data input/output, storage and file management
- Explain protection matrix in terms of domain and object, reacquisition, back pointers
- Analyze breach of confidentiality, integrity , availability

Text Books-

1. Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 109092.
2. Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
3. Silberschatz / Galvin / Gagne, Operating System,6th Edition,WSE (WILEY Publication).

Reference Books-

1. William Stallings, Operating System, 4th Edition, Pearson Education.
2. H.M.Deitel, Operating systems, 2nd Edition ,Pearson Education.
3. Abraham Silberschatz and peter Baer Galvin, Operating System Concepts, 8th Edition, Pearson Education 109809 (Chapter 1,3.1,3.2,3.3,3.4,3.6,4,5,6 (Except 6.8,6.09), 7, 8,09,10,11,13, (Except 13.6) 109 (Except 109.6),20(Except 20.8, 20.09), 22,23)
4. Nutt: Operating Systems, 3/e Pearson Education.

***Latest editions of all the suggested books are recommended.**

SEMESTER I

Engineering Chemistry (Lab)

Course Code: EAS163

L T P C
0 0 2 1

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list.

1. Determination of Total Hardness of a given water sample.
2. Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate
3. To determine the pH of the given solution using pH meter and pH-metric titration.
4. Determination of dissolved oxygen content of given water sample.
5. To find chemical oxygen demand of waste water sample by potassium dichromate
6. Determination of free chlorine in a given water sample.
7. To determine the chloride content in the given water sample by Mohr's method.
8. To prepare the Bakelite resin polymer.
9. To determine the concentration of unknown sample of iron spectrophotometrically.
10. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
11. To determine the flash & fire point of a given lubricating oil.
12. Determination of calorific value of a solid or liquid fuel.
13. Determination of calorific value of a gaseous fuel.
14. Determination of % of O₂, CO₂, % CO in flue gas sample using Orsat apparatus.
15. Proximate analysis of coal sample.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

SEMESTER I
Basic Electrical Engineering (Lab)

Course Code: EEE161

L T P C
0 0 2 1

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

List of Experiments:

Note: Minimum eight experiments should be performed-

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave rectifier using silicon diode.
4. To study the full-wave rectifier using silicon diode.
5. To study the Zener diode as a shunt regulator.
6. To study transistor in Common Base configuration & plot its input/output characteristics.
7. To study the operational amplifier in inverting & non-inverting modes using IC 741.
8. To study the operational amplifier as differentiator & integrator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

SEMESTER I

Programming In C Language (Lab)

Course Code: ICS151

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS

Part A

1. Printing the reverse of an integer.
2. Printing the odd and even series of N numbers.
3. Get a string and convert the lowercase to uppercase and vice-versa using getchar() and putchar().
4. Input a string and find the number of each of the vowels appear in the string.
5. Accept N words and make it as a sentence by inserting blank spaces and a full stop at the end.
6. Printing the reverse of a string.

Part B

1. Searching an element in an array using pointers.
2. Checking whether the given matrix is an identity matrix or not.
3. Finding the first N terms of Fibonacci series.
4. Declare 3 pointer variables to store a character, a character string and an integer respectively.
5. Input values into these variables. Display the address and the contents of each variable.
6. Define a structure with three members and display the same.
7. Declare a union with three members of type integer, char, string and illustrate the use of union.
8. Recursive program to find the factorial of an integer.
9. Finding the maximum of 4 numbers by defining a macro for the maximum of two numbers.
10. Arranging N numbers in ascending and in descending order using bubble sort.
11. Addition and subtraction of two matrices.
12. Multiplication of two matrices.
13. Converting a hexadecimal number into its binary equivalent.
14. Check whether the given string is a palindrome or not.
15. Demonstration of bitwise operations.
16. Applying binary search to a set of N numbers by using a function.
17. Create a sequential file with three fields: empno, empname, empbasic. Print all the details in a neat format by adding 500 to their basic salary.

Course Outcome:

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

- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers.

SEMESTER I

Engineering Drawing (Lab)

Course Code: EME161

L T P C
0 0 4 2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS- [All to be performed]

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

SEMESTER II

Engineering Mathematics- II

Course Code: EAS211

L T P C
3 1 0 4

Objective:

To familiarize the basic concept of Differential Equations, Laplace Transform, Fourier series etc.

Course Outcome: On successful completion of this course, students will be able to:

- Take Laplace transformation of different types of functions, derivatives and integrals, and how it converts complex systems into simple algebraic equations to find out solutions.
- Demonstrate the understanding of solving ordinary differential equations using operator methods, method of undetermined coefficients, method of variation of parameters and Laplace transformation techniques.

Course Contents-

Unit I

(Lectures 08)

Differential Equations: Linear Differential Equation, Linear Differential Equation with constant coefficient: Complementary functions and particular integrals, Linear Differential Equation with variable coefficient: Removal method, changing independent variables, Method of variation of parameters, Homogeneous Linear Differential Equation, Simultaneous linear differential equations.

Unit II

(Lectures 08)

Series Solutions: Power Series solutions of ODE, Ordinary Point, Singular Points, Frobenius Method.
Special Functions: Legendre equation and Polynomial, Legendre Function, Rodrigue's formula, Laplace definite integral for first and second kind, Bessel equation and Polynomial, Bessel Function, Orthogonal properties and Recurrence Relation for Legendre and Bessel function.

Unit III

(Lectures 08)

Partial differential equations – Method of separation of variables for solving partial differential equations; Wave equation up to two dimensions; Laplace equation in two-dimensions; Heat conduction equations up to two-dimensions; Equations of transmission Lines.

Unit IV

(Lectures 08)

Fourier Series: Periodic functions, Trigonometric series; Fourier series; Dirichlet's conditions, Determination of fourier coefficient by Euler's formulae; Fourier series for discontinuous functions, Even and odd functions, Half range sine and cosine series.

Unit V

(Lectures 08)

Laplace Transform: Laplace transform; Existence theorem; Laplace transform of derivatives and integrals; Inverse Laplace transform; Unit step function; Diratch delta function; Laplace transform of periodic functions; Convolution theorem.

Text Books-

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers.
2. Prasad C., Engineering Mathematics for Engineers, Prasad Mudralaya.
3. Das H.K., Engineering Mathematics Vol-II, S. Chand.

Reference Books-

1. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.
2. Piskunov N, Differential & Integral Calculus, Moscow Peace Publishers.
3. Narayan Shanti, A Text book of Matrices, S. Chand
4. Bali N.P., Engineering Mathematics-II, Laxmi Publications.

***Latest editions of all the suggested books are recommended.**

SEMESTER II Engineering Physics

Course Code: EAS212

L T P C
3 1 0 4

Objective: To understand the fundamentals of physics like interference of light, diffraction, Polarization, elements of material science, special theory of relativity etc.

Course Outcome:

Students undergoing this course will have a fundamental understanding of basic physics concepts and its applications in a day to day life & also able to explain the basic understandings of the special theory of relativity, Polarization, elements of material science.

Unit A (Unit A is for building a foundation and shall not be a part of examination)

Optics- Properties of light, Lens, Mirror, Focal length, Intensity, Power, Eye-piece, Work, Energy and its types, Waves, longitudinal and transverse waves, Time period, Frequency

Course Contents-

Unit-I

(08 Lectures)

Interference of Light: Introduction, Principle of Superposition, Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.

Unit-II

(08 Lectures)

Diffraction: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction:** Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power:** Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.

Unit-III

(08 Lectures)

Polarization: Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.

Unit-IV

(08 Lectures)

Elements of Material Science: Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.

Unit-V

(08 Lectures)

Special Theory of Relativity: Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.

Text Books:

1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.
2. Engineering Physics, Bhattacharya & Tandon, Oxford University Press.
3. Optics, Ajay Ghatak, Tata Mc Graw-Hill.
4. H. K. Malik & A.K. Singh, Engineering Physics, McGraw-Hill, latest edition.

Reference Books:

1. F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill.
2. Concept of Modern Physics, Beiser, Tata McGraw-Hill.
3. R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.

***Latest editions of all the suggested books are recommended.**

SEMESTER II

Basic Electronics Engineering

Course Code: EEC211

L T P C

3 1 0 4

Objective- To understand the basic concept of Electronics Engineering like p-n Junction, Bipolar Junction Transistor, Field Effect Transistor, Operational Amplifier and switching theory.

Course Outcomes:

On successful completion of this course students will be able to:

- Enumerate the basics of electric circuit elements, related terminologies and fundamental laws governing the operation and analysis of those circuits with DC sources and laws, and also concepts related to magnetic circuits.
- Illustrate common solid-state devices & access their characteristic and explain the basic of logic gates.

Course Contents:

UNIT I

(Lectures 08)

p-n Junction: Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator.

UNIT II

(Lectures 08)

Bipolar Junction Transistor (BJT): Basic construction, transistor action; CB, CE and CC configurations, input/output characteristics, Relation between α , β & γ , Biasing of transistors: Fixed bias, emitter bias, potential divider bias.

UNIT III

(Lectures 08)

Field Effect Transistor (FET): Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.

UNIT IV

(Lectures 08)

Operational Amplifier (Op-Amp): Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.

UNIT V

(Lectures 08)

Switching Theory: Number system, conversion of bases (decimal, binary, octal and hexadecimal numbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.

Text Books-

1. Robert Boylestad & Louis Nashelsky, Electronic Circuit and Devices, Pearson India.
2. Millman & Halkias, Integrated Electronics, McGraw Hill.
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.
4. Morris Mano M., Digital Design, Prentice Hall.

Reference Books-

1. Sedra and Smith, Microelectronic Circuits, Oxford University Press.
2. Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.

3. Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.

***Latest editions of all the suggested books are recommended.**

SEMESTER II

Computer Architecture and Organizations

Course Code: ICS201

L	T	P	C
3	1	0	4

Objective:

To familiarize the Concept of Register Transfer and Micro-operation. To understand the Computer Organization, Computer Arithmetic & I/O Organization, and Memory organization.

Course Contents-

Unit I

Register Transfer and Micro-operation

(Lectures 08)

Register Transfer Language, Register Transfer, Bus and Memory Transfer: Three state bus buffers, Memory Transfer, Arithmetic Micro-operations: Binary Adder, Binary Adder-Subtractor, Binary Incrementer, Logic Micro-operations: List of Logic micro Operations, Shift Micro-operations (excluding H/W implementation), Arithmetic Logic Shift Unit.

Unit II

Basic Computer Organization

(Lectures 08)

Instruction Codes, Computer Registers: Common bus system, Computer Instructions: Instruction formats, Instruction Cycle: Fetch and Decode, Flowchart for Instruction cycle. Register reference instructions. Control Memory, Address Sequencing, Conditional branching, Mapping of instruction, Subroutines, Design of Control Unit,

Unit III

Central Processing Unit

(Lectures 08)

Central Processing Unit: Introduction, General Register Organization, Stack Organization: Register stack, Memory stack; Instruction Formats, Addressing Modes. CISC & RISC

UNIT IV

Computer Arithmetic & I/O Organization

(Lectures 08)

Introduction, Addition and Subtraction, Multiplication Algorithms (Booth algorithm), Division Algorithms, Input – Output Organization: Peripheral devices, Input – Output interface, Introduction of Multiprocessors: Characteristics of multi-processors. Modes of Data Transfer, Priority Interrupt, Direct Memory Access,

UNIT V

Memory Organization

(Lectures 08)

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative, Memory, Cache Memory, Virtual Memory

Course Outcome:

Students will be able to:

- Identify various gates and their working and working of full adder and half adder
- Identify the working of control memory
- Distinguish between various components of control unit
- Draw and explain the various components of central processing unit.
- Illustrate the structure of memory stack
- Explain the working of RISC & CISC
- Identify and explain the various computer arithmetic functions.
- Understand the functioning of multiprocessors and peripheral devices.
- Identify the various modes of data transfer.
- Understand the internal configuration of memory.
- Differentiate between cache memory and virtual memory

Text Books-

1. Computer System Architecture by Morris Mano, PHI Publication
2. Computer Organization and Architecture by William Stallings, PHI Publication
3. Digital Computer Electronics: An Introduction to Microcomputers by Malvino, Tata McGraw Hill Publication

Reference Books-

1. PC Hardware in a Nutshell by Barbara Fritchman Thompson, Robert Bruce Thompson, O'Reilly, 2nd Edition , 2010
2. Fundamentals of Computer Organization and Architecture by Mostafa AB-EL-BARR and Hesham EL-REWNI, John Wiley and Sons
3. Fundamental Of computer Organization by Albert Zomaya, 2010 Edition

***Latest editions of all the suggested books are recommended.**

SEMESTER II

English Communication and Soft Skills-II

Course Code: EHM249

L T P C
3 0 2 4

Objectives:

1. To enhance the vocabulary of learners to address competitive exams like GATE/PGT/TGT
2. To develop ability of sentence construction.
3. To enhance learner's writing ability.
4. To make the learner effective in presenting himself/herself.

Course Outcomes: At the end of the semester, the learner will be able to

1. Learn additional 100 words apart from 50 words learnt in preceding semester (3words/lecture)
2. Write letters effectively.
3. Acquire competence in constructing short sentences dealing day to day activities with grammatical accuracy.
4. Express themselves before class / in a group and attain proficiency in deliverance.
5. Acquire adequate knowledge of grammar to address competitive exams like GATE/PGT/TGT

Course Contents:

Unit – I Vocabulary & Grammar **(14 hours)**

- Homophones, Homonyms, Synonyms, Antonyms and one-word substitution.
- Parts of Speech, Modals, Tenses and Simple sentence construction.

Unit – II Listening Skills **(05 hours)**

- Difference between listening & hearing, Types of Listening, Process
- Importance and Barriers to listening

Unit – III Writing Skills **(08 hours)**

- Letters and Email writing
- Story Narration

Unit – IV Strategies & Structure of Presentation and Problem Sounds **(13 hours)**

- Managing Time, Audience & Locale, Structure and Organization of Content and 5 W's
- Problem Sounds: S- Sh, J-Z and V-B*

Reference Books:

- Nesfield J.C. "*English Grammar Composition & Usage*" Macmillan Publishers
- Sood Madan "*The Business letters*" Goodwill Publishing House, New Delhi
- Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.

Methodologies:

1. Words and exercises, usage in sentences.
2. Sentence construction on daily activities and conversations.
3. Format and layout to be taught with the help of samples and preparing letters on different subjects.
4. JAM sessions and Picture presentation.
5. Tongue twisters, Newspaper reading and short movies.

Note:

- 3 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning.
- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.
- Repeated practice of sound.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
40 Marks		60 Marks		100
30 Marks (Progressive Evaluation) After each unit-completion: Assignments / oral Presentation	10 Marks (Attendance)	20 Marks Midway external assessment (Oral Presentation) *	40 Marks (Written Examination)	

*** Parameters of Midway external assessment Oral Presentation**

Content	Pronunciation	Delivery of Content	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note:

Midway Assessment: To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed. The marks in sealed envelope will be send to Examination Department.

Written Examination: There would be four questions with internal choice one from each unit of 10 marks.

SEMESTER II

Information Security Fundamentals

Course Code: ICS202

L	T	P	C
3	1	0	4

Objective:

To understand the fundamentals of Information Security, risk management and Network Infrastructure Security and Connectivity

Course Contents-

Unit-I

INTRODUCTION TO INFORMATION SECURITY (Lectures 08)

Definition and Evolution of Information Security, Basic Principles and critical concepts, Components of Information System, Balancing Information Security and Access, Security professional in the organization

Unit-II

USER IDENTITY AND ACCESS MANAGEMENT (Lectures 08)

User identity and Access Management: Authentication, Account Authorization, Validation, Access Control and Privilege management. Hashing and Cryptography- Encryption and Decryption

Unit-III

SYSTEM AND SERVER SECURITY (Lectures 08)

System Security, Desktop & Server Security, Firewalls, Password cracking Techniques, Key-logger, viruses and worms, Malwares & Spy wares, Windows Registry

Unit-IV

INTERNET SECURITY (Lectures 08)

Internet Security: LAN Security, Email Security, Hacking attacks, preventive measures

Unit-V

RISK ASSESSMENT AND CYBER LAWS (Lectures 08)

Vulnerability Assessment, Penetration Testing, Cyber Laws. FAIR (Factor Analysis of Information Risk) Model.

Course Outcome:

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

- Understand the Concept and need of Information Security
- Define the Server Security, Concept and need of Firewalls
- Understand the Concept of Internet Security
- Describe the various attacks and preventive measure
- Understand vulnerability assessment
- Understand the Cyber laws
- Describe model for Risk Assessment

TEXT BOOK:

1. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices - Nina Godbole, ISC2 Press, 2010

Reference Books:

1. Information Security Management Handbook, Volume 4 - Micki Krause, ISC2 Press, 2007

***Latest editions of all the suggested books are recommended.**

SEMESTER-II
SOFT SKILL - EFFECTIVE COMMUNICATION (LAB)

Course Code: ICS251

L	T	P	C
0	0	4	2

Objective:

- To improve effective communication, creative writing. And also to improve reading skill and general awareness.

Course Contents

Soft Skill - Effective Communication

1. Introduction

- Good communication v/s Effective Communication
- Characteristics of Effective Communication
- Styles of Communication

2. General Awareness

- General Knowledge & Current Affairs (Politics, Business, Sports, Science & Technology, & Entertainment)

3. Creativity and Lateral Thinking

- Creativity and Teamwork
- Collage Making

4. Reading Skills

- Newspaper Review & Book Review

5. Creative Writing

- Paragraph
- Articles
- Story Writing

COURSE OUTCOME:

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

- Acquire knowledge about the various principles of communication, understand its various stages and the role of audience and purpose, deal with the barriers that affect communication in a professional set up.
- Understand the different channels that are functional at the work place.
- Learn the importance of verbal and non-verbal communication in the professional world along with its uses.

SEMESTER II

Basic Electronics Engineering (Lab)

Course Code: EEC261

L T P C
0 0 2 1

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS

Note: Minimum eight experiments should be performed-

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave rectifier using silicon diode.
4. To study the full-wave rectifier using silicon diode.
5. To study the Zener diode as a shunt regulator.
6. To study transistor in Common Base configuration & plot its input/output characteristics.
7. To study the operational amplifier in inverting & non-inverting modes using IC 741.
8. To study the operational amplifier as differentiator & integrator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

SEMESTER II
COMPUTER ARCHITECTURE AND ORGANIZATIONS (LAB)

Course Code: ICS252

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS

1. Observing logic gates and circuits using corresponding IC's.
2. Constructing full adder, and half adder circuit using suitable IC's.
3. Constructing the other logic circuits using AND, NOT, OR gates.
4. A brief report on Task management in Virtual memory.
5. A brief report on cache memory operations with to and fro operations.
6. A brief report on paging.
7. Difference between RISC and CISC.
8. Using 8085 Microprocessor write a program for implementing subroutine concept.
9. Difference between dual core and hexa core with example.
10. Write a note on importance of control unit and arithmetic logic unit in processor.
11. Explain a brief report on Memory Hierarchy.
12. List out 10 real time application of stack.

Course Outcome:

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

- Master the binary and hexadecimal number systems including computer arithmetic.
- Be familiar with the functional units of the processor such as the register file and arithmetic-logical
- Be familiar with the basics of systems topics: single-cycle (MIPS), multi-cycle (MIPS), parallel, pipelined, superscalar, and RISC/CISC architectures.
- Be familiar with the cost-performance issues and design trade-offs in designing and constructing a computer processor including memory.
- Be familiar with the quantitative performance evaluation of computer systems,
- Be familiar with the cache subsystem,

SEMESTER II
OFFICE AUTOMATION (LAB)

Course Code: ICS253

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge about MS-Word, MS-Excel, Power point, Webmail and Internet.

LIST OF EXPERIMENTS

MS-WORD

1. Prepare a News Paper Layout. Insert appropriate pictures wherever necessary. Use the following Features:
 - Three Column and Four Column setting
 - Set One or Two Advertisements
 - Use Bullets and Numbering.
2. Create a Document consisting of Bio-data. It includes
 - A table giving your qualification and/or experience of work. Table should be Bordered and Shaded.
 - A Multilevel list giving your areas of interest and further areas of interest. The sub areas should be numbered as
 - 'a', 'b', etc while the areas should be numbered as '1', '2', etc.
 - The information should be divided in “General” and “Academic” sections.
 - The header should contain “BIO-DATA” while the footer should have page numbers in the format Page 1 of 10.
 - Assign a password for the document to protect it from unauthorized access.
3. Assume that you are coordinating a seminar in your organization. Write a letter to 10 different IT companies asking them to participate in the seminar using mail merge facility.
4. Prepare a document about any topic in mathematics which uses mathematical symbols. (At least 5 mathematical symbols should be used). Assign a password for the document to protect it from unauthorized access. Demonstrate the use of Hyperlink Option. Sets margins to your document, a font of size and double spaced document

MS - Excel

5. Open a new workbook, save it as JavaCoffeeBar.xls. In sheet1 write following sales data for Java Coffee bar to show their first 6 months sales.
 - Select cell B4:D4 and change the horizontal alignment to center and text to 90 degree.
 - All titles should be in bold
 - Format all cells numbers to currency style and adjust width as necessary.
 - Add border to data.
 - Select the cell range A1:H1, merge and center these cells. Apply same format to A2:H2.
 - Give border, shading and pattern to data in sheet
 - Apply different font settings for all titles in sheet

- Apply green color and bold setting to sales above 10000 (use conditional formatting)
 - Rename current worksheet as FirstHalfSales
6. Prepare a worksheet to maintain student information. The work sheet should Contain Roll Number, Name and marks in 5 subjects. (Max Marks is 100). Validate the marks. Calculate the total marks. Assign the grade according to the following. Assign grade 'A' if the total marks is above 450. From 401 to 449 assign the grade as 'B'. From 351 to 400 assign the Grade as 'C'. From 300 to 350 the grade to be assigned is 'D'. For the total marks less than 300 No grade is assigned. A student is eligible to get a grade only when he gets 40 and above in all the subjects. In such cases the grade is “FAIL”. (Assume that there are 10 students)
 7. Create a statement of Telephone Bill Charge for a customer.
 - Telephone Calls
 - Up to 150 calls- free
 - 151 to 500 calls- 0.80 per call
 - 501 to 1000 calls- 1.00 per call
 - 1001 to 2000 - 1.25 per call
 - Above 2000- 1.40 per call

MS – POWER POINT

8. Assume that you are going to give a presentation about Information Technology. (Choose some latest technologies). The presentation should have minimum 10 slides. Insert appropriate images wherever necessary. Use proper formatting, Diagrams and tables. Show the usage of action buttons, hyperlinks, and animations.

INTRODUCTION TO BASIC SOFTWARE

9. Introduction to Different kinds of browsers.
 - I. Prepare a comparison sheet for the following browsers
 - Internet explorer
 - Google chrome
 - Firefox
 - Safari
 - II. Introduction to different webmail -
 - Gmail
 - Yahoo mail
 - Rediffmail
 - zimbramail
 - III. Introduction to different search engine – Prepare a comparison sheet for the following search engines
 - Google
 - Yahoo
 - Ask.com
 - AOL

MS-ACCESS

10. Introduction to MS-Access, Creation of one MS-Access Database, Form, and Query.

SEMESTER III

INTRODUCTION TO CLOUD COMPUTING

Course Code: ICS301

L	T	P	C
3	1	0	4

Objective:

In Science, Cloud Computing is a synonym for distributed computing over a network and exhibits the ability to run a program on many connected computers at the same time. Cloud Technologies are being used by all of us in our daily lives, when we are using the internet, a mobile app or online shopping. It is significantly used in 'Big data' applications that have taken a huge leap. This is an introductory course where students will learn the fundamental concepts like working of cloud system and form the necessary foundation for studying distributed systems concepts like Virtualization. It is also the objective of this course to understand both the hardware and software requirements required to develop a cloud solution and effective methods to install and administer cloud solution centrally.

Course Contents-

Unit I

(Lectures 08)

Introduction: Introduction to Cloud Computing, History and Evolution of Cloud Computing, Types of clouds, Private Public and hybrid clouds, Cloud Computing architecture, Cloud computing infrastructure, Merits of Cloud computing, , Cloud computing delivery models and services (IaaS, PaaS, SaaS), obstacles for cloud technology, Cloud vulnerabilities, Cloud challenges, Practical applications of cloud computing.

Unit II

(Lectures 08)

Cloud Computing Companies and Migrating to Cloud: Web-based business services, Delivering Business Processes from the Cloud: Business process examples, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Efficient Steps for migrating to cloud., Risks: Measuring and assessment of risks, Company concerns Risk Mitigation methodology for Cloud computing, Case Studies

Unit III

(Lectures 08)

Cloud Cost Management and Selection of Cloud Provider: Assessing the Cloud: software Evaluation, System Testing, Seasonal or peak loading, Cost cutting and cost-benefit analysis, Selecting the right scalable application. Considerations for selecting cloud solution. Understanding Best Practices used in selection of Cloud service and providers, Clouding the Standards and Best Practices Issue: Interoperability, Portability, Integration, Security, Standards Organizations and Groups associated with Cloud Computing, Commercial and Business Consideration

Unit IV

(Lectures 08)

Governance in the Cloud

Industry Standards Organizations and Groups associated with Cloud Computing, Need for IT governance in cloud computing, Cloud Governance Solution: Access Controls, Financial Controls, Key Management and Encryption, Logging and Auditing, API integration. Legal Issues: Data Privacy and Security Issues, Cloud Contracting models, Jurisdictional Issues Raised by Virtualization and Data Location, Legal issues in Commercial and Business Considerations

Unit V

(Lectures 08)

ten cloud do an do nots.

Don't be reactive, do consider the cloud a financial issue, don't go alone, do think about your architecture, don't neglect governance, don't forget about business purpose, do make security the centerpiece of your strategy, don't apply the cloud to everything, don't forget about Service Management, do start with a pilot project.

Course Outcome:

Students will be able to:

- Differentiate and demonstrate the various types of clouds and their working
- Explain the various delivery models of cloud computing
- Explain the various merits and vulnerabilities of cloud
- Summarize the need for migration on cloud and identify the economic considerations involved
- Illustrate the various risk involved and identify the risk techniques & how to cope them
- Explain the Best Practices used in selection of Cloud service providers
- Identify Standards, Organizations and Groups associated with Cloud Computing
- Identify the role of Industry Standards Organizations and Groups associated with Cloud Computing
- Demonstrate the importance of IT governance in cloud computing
- Illustrate the various Jurisdictional Issues Raised by Virtualization and Data Location
- Understand the importance of government regulations and identify the process to be automated with respect to cloud.
- Explain the comparative study of cost involved in computing at data center and at cloud.

Text Books

1. Cloud Computing: Principles and Paradigms, RajkumarBuyya, James Broberg, Andrzej M. Goscinski,, John Wiley and Sons Publications, 2011

Reference Books

1. Brief Guide to Cloud Computing, Christopher Barnett, Constable & Robinson Limited, 2010
2. Handbook on Cloud Computing, BorivojeFurht, Armando Escalante, Springer, 2010

***Latest editions of all the suggested books are recommended.**

SEMESTER III

DATA STRUCTURE AND ALGORITHMS

Course Code: ICS302

L	T	P	C
3	1	0	4

Objective:

A data structure is a particular way of storing and organizing data in a computer so that it can be used efficiently. Different kinds of data structures are suited to different kinds of applications and some are highly specialized to specific tasks. In this course the student will be learning about different data structures and their applications.

Course Contents-

Unit I

(Lectures 08)

Introduction to Data structures: Definition, Classification of data structures: primitive and non primitive, Elementary data organization, Time and space complexity of an algorithm (Examples), String processing. Dynamic memory allocation and pointers: Definition of dynamic memory allocation, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, Meaning of static and dynamic memory allocation, Memory allocation functions: malloc(), calloc(), free() and realloc(). Recursion: Definition, Recursion in C (advantages), Writing Recursive programs – Binomial coefficient, Fibonacci, GCD

Unit II

(Lectures 08)

Searching and Sorting : Basic Search Techniques: Sequential search: Iterative and Recursive methods, Binary search: Iterative and Recursive methods, Comparison between sequential and binary search. Sort: General background and definition, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort

Unit III

Stack and Queue

(Lectures 08)

Stack – Definition, Array representation of stack, Operations on stack: Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, Applications of stacks. Queue: Definition, Array representation of queue, Types of queue: Simple queue, Circular queue, Double ended queue (deque) , Priority queue , Operations on all types of Queues

Unit IV

(Lectures 08)

Linked List

Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Types of linked list: Singly linked list, doubly linked list, Circular linked list, Operations on singly linked list: creation, insertion, deletion, search and display.

Unit V

(Lectures 08)

Definition : Tree, Binary tree, Complete binary tree, Binary search tree, Heap Tree terminology: Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node. Binary tree: Array representation of tree, Creation of binary tree. Traversal of Binary Tree: Preorder, Inorder and postorder. Graphs, Application of Graphs, Depth First search, Breadth First search.

Course Outcome:

Students will be able to:

- Learn how the choice of data structures and algorithm design methods impact the performance of programs
- Demonstrate asymptotic notations with example and calculate the time and space complexities of any sorting algorithm

- Explain static and dynamic memory allocation with respect to compilation and execution time.
- Analyze the importance and use of Abstract Data Types (ADTs)
- Explain various searching techniques with example
- Analyze the working of various sorting algorithms
- Understand the basic features of stack and queue.
- Explain the various operations on stack and queue.
- Illustrate the implementation of stack and queue using array.
- Understand the basic structure of linked list and its various types.
- Illustrate the advantages and disadvantages of circular linked list and doubly linked list
- Explain the basic tree terminology
- Draw binary tree from inorder, preorder and postorder
- Differentiate between different types of graphs and their search algorithms

Text Books-

1. Weiss, Data Structures and Algorithm Analysis in C, II Edition, Pearson Education, 2001
2. Lipschutz: Schaum's outline series Data structures, Tata McGraw-Hill
3. Robert Kruse, Data Structures and program designing using 'C'
4. Trembley and Sorenson, Data Structures
5. E. Balaguruswamy Programming in ANSI C.

Reference Books-

1. Bandyopadhyay, Data Structures Using C Pearson Education, 1999
2. Tenenbaum, Data Structures Using C. Pearson Education, 200
3. Kamthane: Introduction to Data Structures in C. Pearson Education 2005.
4. Hanumanthappa M., Practical approach to Data Structures, Laxmi Publications, Fire Wall media 2006
5. Langsam, AusensteinMaoshe& M. Tanenbaum Aaron Data Structures using C and C++ Pearson Education

***Latest editions of all the suggested books are recommended.**

SEMESTER III

OSI LAYER AND SECURITY

Course Code: ICS303

L	T	P	C
3	1	0	4

Objective:

OSI model is a conceptual model developed to explain the basic working of communication system through the concept of abstraction layers. Seven layers are defined as standards and multiple protocols operate at each level and carry out specific tasks. A sound knowledge of OSI layer, its protocols and their specific functions is very important for any computer professional to harness the full capabilities of the system and deliver best output. Different layers of OSI model are explained to the students, along with protocols in each category. The functions of each protocol are taught in subsequent chapters.

Course Contents

Unit I

(Lectures 08)

Open Systems Interconnection (OSI) Model : Introduction to the 7 layers of the OSI model, concept of the OSI model, the Application Layer, the Presentation Layer, the Session Layer, the Transport Layer, the Network Layer, the Data Link Layer & the Physical layer

Unit II

(Lectures 08)

Security Protocols - Application Layer: Introduction to Protocol concepts, Important Protocols, File Transfer Protocol, Socket Secure (SOCKS), Secure Shell (SSH), Remote Terminal Control Protocol (Telnet), Transport Layer Security/Secure Sockets Layer (TLS/SSL), Extensible Messaging & Presence Protocol (XMPP), Wireless Application Protocol (WAP) & Internet Relay Chat (IRC)

Unit III

(Lectures 08)

Transport Layer - Introduction to Transport Layer, TCP/IP, User Datagram Protocol (UDP), Real-time Transport Protocol (RTP), Datagram Congestion Control Protocol (DCCP), Stream Control Transmission Protocol (SCTP), Resource reservation Protocol (RSVP) & Explicit Congestion Notification (ECN)

Unit IV

(Lectures 08)

Network Layer: Introduction to Network Layer, Internet Protocol Version 4 (IP4), Internet Protocol Version 6 (IP6), Internet Protocol Security (IPSEC), Internet Control Message Protocol (ICMP) & Internet Group Management Protocol (IGMP)

Unit V

(Lectures 08)

Data Link Layer: Introduction to Data Link Layer, the Address Resolution Protocol (ARP), the Open Shortest Path First (OSPF), the Neighbor Discovery Protocol (NDP), the Tunneling Protocol (Tunnels) & the Point to Point Protocol (PPP)

Course Outcome:

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

- Describe the Concept of Open System Interconnection (OSI) Model
- Describe various security protocols on Application Layer
- Understand the functioning of Transport Layer
- Describe various protocols on Transport Layer
- Describe various protocols on Network Layer
- Describe various protocols on Data Link Layer

Reference Books

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole
2. Network Security Bible by Eric Cole

***Latest editions of all the suggested books are recommended.**

SEMESTER III

OOPS With C++

Course Code: ICS304

L	T	P	C
3	1	0	4

Objective:

The main objective is to learn the basic concept and techniques which form the object oriented programming paradigm. Object-oriented programming is a new way of thinking about problem using models organizes around real world concept. The Fundamental construct is the object which combines both data-structure and behavior in a single entity which is in contrast to conventional programming in which data-structure and behavior are loosely connected.

Course Contents

Unit I

(Lectures 08)

Introduction: Procedure oriented versus Object Oriented Programming-characteristics of OOP, Merits and Demerits of OOP.

Data Types: Different data types, operators and expressions in C++, Keywords in C++. Input and Output: Comparison of stdio.h and iostream.h, cin and cout.

Decision and loop: Conditional statement - if-else statement, nested if-else statement, switch, break, continue, Looping statements- for loop, while loop, Do-while loop.

Arrays, String and Structures: fundamentals-Single dimensional, multi-dimensional arrays, Basics of structures-declaring and defining structure- Accessing structure members, array of structures, Unions difference between structures and Unions.

Unit II

(Lectures 08)

Class: Definition-defining the class, defining data members and member functions, Access specifier-private, public, protected, objects as function arguments, returning objects from the function, scope resolution operator, and member function defined outside the class, difference between class and structure, array as class member data, Array of objects.

Functions in C++: Function definition, function declaration, Built-in functions, user defined functions, calling the function, passing parameter-actual and formal, overload function-different types of arguments-different number of arguments, inline function, default argument.

Constructor and Destructor: Constructors-constructor with argument, constructor without arguments, constructor with default arguments, Dynamic constructor, constructor overloading, copy constructor, destructors, Manipulating private data members.

Unit III

(Lectures 08)

Operator Overloading: Defining operator overloading, overloading unary operator, overloading binary operator, manipulation of string using overloaded operator, rules for overloading operator. Data conversion: conversion between Basic types, conversion between objects & Basic types, conversion between objects of different classes.

Inheritance: Base Class & derived class, defining derived classes, protected access specifier, public inheritance and private inheritance-member accessibility, constructors and destructors in derived classes, Level of inheritance-single inheritance, multiple inheritance, multi-level inheritance, hierarchical inheritance, hybrid inheritance.

Unit IV

(Lectures 08)

Pointer: Pointer declaration and Access, memory management-new and delete, pointer to object-referencing members using pointers, this pointer, returning values using this pointer.

Virtual function: Normal member functions accessed with pointers, virtual member function access, late binding, pure virtual function, abstract class, virtual base class.

Friend functions and static function: Purpose, defining friend functions, friend classes, static function, accessing static function numbering positive objects.

Unit V

(Lectures 08)

Console IO Operator: C++ stream and C++ stream classes, unformatted I/O operators, formatted I/O operators-manipulators-user defined manipulators. Files : Class for file stream operators, opening and closing a file, file nodes, writing an object to disk, reading an object from disk, binary versus character files, I/O with multiple object, stream class, file pointer-specifying the position, specifying the object, tellg() function, seekg() function. Command line arguments.

Course Outcome:

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

- Understand the Concept Object Oriented Programming
- Understand the Concept class, objects and their implementation in C++
- Implement programs using Constructor and Destructors
- Understand the Concept of operator overloading and its implementation in C++
- Describe the concepts of various types of Inheritance and its implementation in C++
- Understand the Concept of Pointers and Virtual Functions and its implementation in C++
- Describe the concepts of friend functions, static functions and its implementation in C++
- Describe the concepts of File and various file operations and its implementation in C++

Text Books-

1. E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill Publications.
2. Strousstrup: The C++ Programming Language, Pearson Edition, 3rd Edition
3. Lafore Robert: Object Oriented Programming in Turbo C++, Galgotia Publications

Reference Books-

1. Lippman: C++ Primer, 3/e Pearson Education
2. C++ completer reference by Herbert Schildt, Tata McGraw Hill Publications.
3. Let us C++ by Yeshwanth Kanetkar

***Latest editions of all the suggested books are recommended.**

SEMESTER III DESIGNING ENTERPRISE NETWORK- I

Course Code: ICS305

L	T	P	C
3	1	0	4

Objective:

Cisco IP Routing (ROUTE) is a vendor certification program and is a qualifying examination for Cisco Certified Network Professional CCNP. It tests for knowledge and skills necessary to use advanced IP addressing and routing in implementing scalable and secure Cisco ISR routers connected to LANs and WANs. The unit will explore the complete process of implementing Cisco IP Routing and by the end of it; the students will have the skills and the knowledge to take up the Cisco IP Routing (ROUTE) certification examination

Course Contents-**Unit I****(Lectures 08)**

Networking Fundamentals: The TCP/IP and OSI Networking Models, Fundamentals of Ethernet LANs, Fundamentals of WANs, Fundamentals of IPv4 Addressing and Routing, Fundamentals of TCP/IP Transport and Applications

Unit II**(Lectures 08)**

Ethernet LANs and Switches: Building Ethernet LANs with Switches, Cisco LAN Switches, Configuring Ethernet Switching

Unit III**(Lectures 08)**

IP Version 4 Addressing and Subnetting: Perspectives on IPv4 Subnetting, Analyzing Classful IPv4 Networks, Analyzing Subnet Masks, Analyzing Existing Subnets, Implementing IP Version 4: Operating Cisco Routers, Configuring IPv4 Addresses and Routes, Implementing Ethernet Virtual LANs, Troubleshooting Ethernet LANs, Spanning Tree Protocol Concepts, Troubleshooting LAN Switching

Unit IV**(Lectures 08)**

LAN Routing: Configure IPv4 Routing, Configure and Verify Host Connectivity, Advanced IPv4 Addressing Concepts, Describe the boot process of Cisco IOS routers; Operation status of a serial interface; Manage Cisco IOS files; Routing and Routing Protocols; OSPF (multi-area); EIGRP (single AS); Passive Interface

Unit V**(Lectures 08)**

IPv4 Services and IP Version 6: Basic IPv4 Access Control Lists, Advanced IPv4 ACLs and Device Security, Network Address Translation, Recognize high availability (FHRP); Describe SNMP v2 and v3, IPV6 addressing

Course Outcome:

At the end of this course, student will able to understand-

- The role of TCP/IP and OSI Layers
- Concepts of IPv4 and Routing concepts.
- The working of Switch device in Networking.
- Designing the LAN and Switch Configuration.
- The concept of IP Addressing and Subnetting.
- Working of Router device.
- Advanced Concepts of IPv4
- Concepts of Routing Protocols.
- Importance of Network Address Translation.

Text Books:

1. CCENT/CCNA ICND1 640-822 Official Cert Guide 3 Edition (Paperback), Pearson, 2013

2. Routing Protocols and Concepts CCNA Exploration Companion Guide (With CD) (Paperback), Pearson, 2008
3. CCNA Exploration Course Booklet : Routing Protocols and Concepts, Version 4.0 (Paperback), Pearson, 2010

Reference Books:

1. CCNA Cisco Certified Network Associate: Study Guide (With CD) 7th Edition (Paperback), Wiley India, 2011.

***Latest editions of all the suggested books are recommended.**

SEMESTER III

OPERATING SYSTEM – WINDOWS 2007

Course Code: ICS306

L	T	P	C
3	1	0	4

Objective:

Operating system is the foundation of any technology or application that is being developed. A good understanding of any OS is very much essential for every computer technology aspirant to reap maximum performance out of the machines. File systems, storage mechanisms, security aspects, Protocols functioning and policy implementations are some of the basic concepts learnt in this subject.

Course Contents-

Unit I

(Lectures 08)

Introduction to Operating System: Introduction to Operating System, Evolution of operating system, Structure of Operating, OS Operations OS Organizations, Distributed Systems, Open source Operating systems, Process Management, Memory Management, Storage Management, Computing Environment

Unit II

(Lectures 08)

Installing, Upgrading and Managing Windows – 7

Gathering hardware devices, preparing to install windows 7, upgrading and migrating to windows 7, Clean and Image based installation, Configuring Application Compatibility, administrating windows features, Disk management, and installing and configuring device drivers

Unit III

(Lectures 08)

File Access, Printers and Network Connectivity with Windows – 7

Introduction to Authentication and Authorization, Managing file access , Shared Folders, File compression, file archiving, managing printers, connecting windows 7 client with server, configuring ipv4 & ipv6 connectivity, Implementing APIPA, Introduction to Name resolution, troubleshooting network issues, Overview of wireless network, configuring wireless network

Unit IV

(Lectures 08)

Securing, Optimizing and Maintaining Windows 7 Client

Overview of local security management, local security policy settings, EFS and Bitlocker, Application restrictions, UAC, Windows Firewall, Administrating IE8, Windows Defender

Unit V

(Lectures 08)

Configuring Mobile Computing and Remote Access in Windows 7: Configure Mobile computer and device settings, Remote desktop, remote assistance, direct access, branch cache

COURSE OUTCOME

At the end of this course, student will able to understand-

- Basic Concepts of Operating Systems.
- Concepts of Process Management ,Memory management and Storage Management.
- Upgrading , Migrating and Installing to Windows -7
- Sharing folder, files and printers in Windows -7
- Configuring IP Addressing in Windows 7.
- How to apply security Policy in Windows 7.
- Implementation and need of Bitlocker and Firewall
- Concepts and Role of Direct access and Branch Cache.

Text Books

1. Milan Milenkovic - Operating Systems – TATA McGRAW HILL, 2009

Reference Books

1. Operating Systems Fundamentals D. Irtegov, 2005
2. A Short Introduction to Operating Systems (M. Burgess), 2010
3. Operating Systems: Design and Implementation (Second Edition)., Andrew S. Tanenbaum, 2010

***Latest editions of all the suggested books are recommended.**

SEMESTER III
DESIGNING ENTERPRISE NETWORK-I (LAB)

Course Code:ICS351

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS

1. Switch Configuration - Basic Commands
2. Switch Configuration - Switch Port Security
3. Router - Configuration
4. Configuration of IP Address for a Router
5. Setting up of Passwords
6. PPP Encapsulation, PPP PAP Authentication, PPP CHAP Authentication
7. Configuration of Static and Dynamic Routing
8. Configuration of Default Route
9. Implementation of EIGRP
10. Implementation of OSPF
11. VLAN Configuration
12. Switch Troubleshooting
13. Configuration of Access-lists - Standard & Extended ACLs
14. Cisco Discovery Protocol
15. DHCP, DHCP Relay & DHCP Exclusions
16. Configuring Logging to a Remote Syslog Server

Course Outcome:

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

- Implementing networking protocols of various OSI layers.
- Implementing routing protocols.
- Study of various networking and inter – networking devices.
- Study of some important computer networking tools in UNIX / Windows environment.
- Studying client – server programming using TCP and UDP sockets
- Study of important command line utilities involved in computer networks

SEMESTER III
DATA STRUCTURE AND ALGORITHM (LAB)

Course Code:ICS352

L	T	P	C
0	0	4	2

Objective The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS

1. To write programs implementing Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.
2. To write programs implementing Searching programs: Linear Search, Binary Search.
3. To write programs Array implementation of Stack, Queue, Circular Queue, Linked List.
4. To write programs implementing Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.
5. To write program implementing Binary tree.
6. To write programs implementing Tree Traversals (pre-order, in-order, post-order).
7. To write programs implementing graph traversal (BFS, DFS).
8. To write programs implementing minimum cost spanning tree, shortest path.

COURSE OUTCOME

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

- Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, binary trees, heaps, and hash tables.
- Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
- Students learn to analyze and compare algorithms for efficiency using Big-O notation.
- Students implement projects requiring the implementation of the above data structures

SEMESTER III
OPERATING SYSTEM WINDOWS (LAB)

Course Code:ICS353

L	T	P	C
0	0	4	2

Objective: Students will put the knowledge and aspects learnt in Windows 7 sessions to test, while performing tasks mentioned in the lab.

LIST OF EXPERIMENTS

1. Installing Windows 7
2. Using Windows Upgrade Advisor or Upgrade Assistance
3. Migrating to Windows 7 using Windows Easy Transfer and User State Migration Tool
4. Creating a Small Office Network or Home Network.
5. Configuring TCP/IP in Windows.
6. Sharing Resources in Windows
7. Creating Users and Groups
8. Performing a Windows Update
9. Capturing image of existing installed operating system and deploy it to another system using imagex.
10. Configuring disk partitions, Virtual HD in Disk Management.

Course Outcome:

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

- Students can able to know basics of installation part, kernel memory partition etc.
- Create groups networking and sharing of data.

SEMESTER IV

RELATIONAL DATABASE MANAGEMENT SYSTEM

Course Code: ICS401

L	T	P	C
3	1	0	4

Objective:

There are many distinct objectives that you must achieve in order to design a good, sound, structured database. You can avoid many of the problems you may encounter by keeping the following objectives in mind and constantly focus on these whilst designing your database.

Course Contents-

Unit I

(Lectures 08)

Introduction: Purpose of Database System — Views of data – Data Models – Database Languages — Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases

Unit II

(Lectures 08)

Relational Model: The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals.

Unit III

(Lectures 08)

Oracle data types, Data Constraints, Column level & table Level Constraints, working with Tables. Defining different constraints on the table, Defining Integrity Constraints in the ALTER TABLE Command, Select Command, Logical Operator, Range Searching, Pattern Matching, Oracle Function, Grouping data from Tables in SQL, Manipulation Data in SQL. Joining Multiple Tables (Equi Joins), Joining a Table to itself (self Joins), Sub queries Union, intersect & Minus Clause, Creating view, Renaming the Column of a view, Granting Permissions, - Updating, Selection, Destroying view Creating Indexes, Creating and managing User Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases

Unit IV

(Lectures 08)

Database Design: Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

Unit V

(Lectures 08)

Transactions: Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock-Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency.

Course Outcome:

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

- Understand the Concept and need of Database System

- Design and run SQL queries
- Perform various constraints of database
- Understand the concept of distributed databases
- Understand the design of Database System
- Understand the transactions and system recovery
- Describe the deadlock and serializability

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006
2. RamezElmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition, Pearson/Addison Wesley, 2007.

Reference Books:

1. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2003.

***Latest editions of all the suggested books are recommended.**

SEMESTER IV NETWORK SECURITY BASICS

Course Code: ICS402

L	T	P	C
3	1	0	4

Objective:

The power of computers can be witnessed when multiple computers are connected to form a network and start sharing information amongst them. But when this happens, the entire network becomes an open source and exposed to threats due to many users who log into these networks and their environments. Therefore it becomes important to learn about Network Security, in order to safeguard our networks from hackers and damages. Learning network concepts therefore becomes significant and no study of computers is complete without them.

Course Contents-

Unit I:

(Lectures 08)

Introduction to Network Security: Perimeter Security – Overview of Network Security, Access Control, Device Security, and Security features on Switches, Firewall, Types of firewall, Access Management, Multifactor Authentication, Wireless LAN (WLAN) Security and Network Admission Control (NAC)

Unit II:

(Lectures 08)

Threats, Vulnerabilities and Attacks: Threat; Vulnerabilities; Attacks – Application Attack, Network Attack and Mitigating & Deterring Attacks; Network Security – Security through network devices, Security through Network Technologies and Security through Network Design Elements, Administering a Secure Network

Unit III:

(Lectures 08)

Network Security Management: Secure Socket Layer (SSL) – Introduction to SSL, Open SSL basics, Problems with SSL, Cryptography, Message Digests Algorithms, Digital Signature and Public Key Infrastructure (PKI); Data Privacy – IPsec VPN, Dynamic Multipoint VPN (DMVPN), Group Encrypted Transport VPN (GET VPN), Secure Sockets Layer VPN (SSL VPN) and Multiprotocol Label Switching VPN (MPLS VPN).

Unit IV:

(Lectures 08)

Network Security Controls : Network Intrusion Prevention – Overview of Intrusion Prevention System (IPS), Intrusion Detection System (IDS), Deploying IPS and IPS high Availability; host Intrusion Prevention; Anomaly Detection and Mitigation

Unit V:

(Lectures 08)

Network Management: Security Monitoring and correlation; Security Management - Security and Policy Management and Security Framework and Regulatory Compliance; Best Practices Framework, Case Studies.

Course Outcome:

At the end of this course, student will able to understand-

- State the importance of need and maintain Network Security
- Outline the impact of Network Security threats to people ,technology and application

- Classify the steps to overcome the network security threats.
- Illustrate the use and implementation of Virtual Private Network How Network Intrusion Detection system helps for securing a Network.
- Recognize the Intrusion Detections System as a measure used for detecting Network Intrusions.
- The Intrusion prevention system concepts and impenemtaion.
- The concept and techniques for security Monitoring.
- Interpret the security management case studies.

Reference/ Text Books:

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole
2. Network Security Bible by Eric Cole

***Latest editions of all the suggested books are recommended.**

SEMESTER IV

CRYPTOGRAPHY FUNDAMENTALS

Course Code: ICS403

L	T	P	C
3	1	0	4

Objective:

Security is ubiquitous. With the advent of e-commerce and electronic transactions, the need for development of secured systems has grown tremendously. Cryptography is the study of building ciphers to ensure the confidentiality and integrity of information. Along with it is the activity of analyzing the strength of a cipher by subjecting it to several forms attack

Course Contents-

Unit I **(Lectures 08)**

Introduction to Cryptography: The Confidentiality, Integrity & Availability (CIA) Triad, Cryptographic concepts, methodologies & practices, Symmetric & Asymmetric cryptography, public & private keys, Cryptographic algorithms and uses, Construction & use of Digital signatures

Unit II **(Lectures 08)**

Types of Algorithms : The basic functionality of hash/crypto algorithms (DES, RSA, SHA, MD5, HMAC, DSA) and effects on key length concepts in Elliptical Curve Cryptography & Quantum Cryptography

Unit III **(Lectures 08)**

Key Management: The basic functions involved in key management including creation, distribution, verification, revocation and destruction, storage, recovery and life span and how these functions affect cryptographic integrity

Unit IV **(Lectures 08)**

Application of Cryptography: Major key distribution methods and algorithms including Kerberos, ISAKMP etc., Vulnerabilities to cryptographic functions, the Use and functions of Certifying Authorities (CAs)

Unit V **(Lectures 08)**

Public Key Infrastructure (PKI) and System architecture requirements for implementing cryptographic functions

Course Outcome:

At the end of this course, student will able to understand-

- The need and principles of Cryptography.
- Role of Digital Signature for Authentication.
- The various Algorithms for the implementation of cryptographic principles .
- Concept and Need of Elliptical Curve Cryptography and Quantum Cryptography.
- The management for Key Distribution to make communication secure.
- The various methods used for distributing Key in a secure manner.
- Role of Certificate Authorities in Key Distribution.
- The concepts and role of PKI for Cryptography functionality.

Reference Books:

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole.
2. Cryptography and Security by C K Shyamala, N Harini and Dr T R Padmanabhan – Wiley Publications, First Edition

***Latest editions of all the suggested books are recommended.**

SEMESTER IV

DESIGN AND ANALYSIS OF ALGORITHM

Course Code: ICS404

L	T	P	C
3	1	0	4

Objective: This course will help the students to develop efficient data structures and algorithms in a systematic manner. In order to develop efficient software systems, it is essential that efficient algorithms and appropriate data structures are used.

Course Contents-

Unit I (Lectures 08)

Role of Algorithms in Computing: Introduction: What is an Algorithm? Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Role of algorithms in computing, Algorithms as a technology. Fundamentals of the Analysis of Algorithm Efficiency, Asymptotic notation and Basic Efficiency Classes, Algorithm design.

Unit II (Lectures 08)

Dynamic Programming: The method, Computing of Binomial Coefficient and Fibonacci Series, All pairs shortest path-Floyd's algorithm, Assembly line scheduling.

Brute Force Approaches: The method, Exhaustive search – Traveling salesman problem, Assignment problem,.

UNIT III (Lectures 08)

Greedy Algorithms : The greedy strategy, Greedy methods & optimization, Topological sort, Bipartite cover, Minimum cost spanning trees, Huffman codes, Single source shortest paths-Dijkstra's algorithm

UNIT IV (Lectures 08)

Sorting, Sets and Selection: Merge sort, The Set Abstract Data Type, Quick sort, Bucket sort, Radix sort, Selection Sort and Bubble Sort, Sequential Search Comparison of sorting algorithms.

Unit V

Text Processing and Cryptography: Strings and Pattern matching algorithms, Introduction to cryptography concepts.

Graphs: Graph abstract data type, Data structures for graphs, Graph traversals-BFS, DFS, Directed graphs, weighted graphs

Course Outcome:

At the end of this course, student will able to understand-

- The importance of an Algorithm for Computer solving problems.
- The various measures of an Algorithm
- Various algorithms of Dynamic approach.
- The concept of Brute force Approaches and its different methods.
- Various algorithms of Greedy approach and their importance.
- Various algorithms for Sorting elements .
- Measure the efficiency of sorting Algorithms.
- Concepts of Graph and its Traversing methods

Text Books:

1. Introduction to Algorithms. Thomas H Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Second Edition/ Prentice Hall of India Pvt. Ltd 2004.

Reference Books:

1. Data Structures, Algorithms and Applications in C++, Sartaj Sahni, Second Edition. University Press 2005.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, 2nd

***Latest editions of all the suggested books are recommended.**

SEMESTER IV THEORY OF COMPUTING

Course Code: ICS405

L	T	P	C
3	1	0	4

Objective: The goal of this course is to provide students with an understanding of basic concepts in the theory of computation. At the end of this course students will: Be able to construct finite state machines and the equivalent regular expressions. Be able to prove the equivalence of languages described by finite state machines and regular expressions. Be able to construct pushdown automata and the equivalent context free grammars. Be able to prove the equivalence of languages described by pushdown automata and context free grammars. Be able to construct Turing machines and Post machines. Be able to prove the equivalence of languages described by Turing machines and Post machines. Students will learn about a variety of issues in the mathematical development of computer science theory, particularly finite representations for languages and machines, as well as gain a more formal understanding of algorithms and procedures.

Course Contents-

Unit I

(Lectures 08)

Introduction to Finite Automata: Introduction to finite automata, The central concepts of automata theory, Deterministic finite automata – definition, how a DFA processes strings, notations for DFA's Non-deterministic finite automata – definition, extended transition function, the language of an NFA

Finite Automata ,Regular Expressions: An application – Text search, finding strings in a Text, NFA for text search, a DFA to recognize a set of keywords, Finite automata with Epsilon transitions, exercise problems, Finite automata and regular expressions - from DFA's to regular expressions, converting DFA's to regular expressions by eliminating states, Applications of regular expressions

Unit II

(Lectures 08)

Regular languages, Properties of Regular Languages: Regular Languages, Applications of regular expressions, properties of regular languages- proving languages not to be regular, the pumping lemma for regular languages , Closure properties of regular languages – closure of regular languages under Boolean operations-union, complementation, intersection & difference , Equivalence and minimization of automata.

Unit III

(Lectures 08)

Context free grammars and languages: Definition of context-free grammars, derivations using a grammar, leftmost and rightmost derivations, the language of a grammar and sentential forms, exercise problems, Parse trees – constructing a parse tree, the yield of a parse tree, inference, derivations and parse trees, Applications of context free grammars – Markup languages, XML and document-type definitions, Ambiguity in grammars and languages – ambiguous grammars.

Properties of context free languages: Normal forms for context free grammars – eliminating useless symbols, computing the generating and reachable symbols, Eliminating ϵ -productions, eliminating unit productions, Chomsky normal form (CNF), exercise problems, The pumping lemma for context free languages, Closure properties of context free languages.

Unit IV

(Lectures 08)

Pushdown automat: The languages of a PDA – acceptance by final state, acceptance by empty stack Informal introduction, formal definition of PDA, a graphical notation for PDA's, The languages of a PDA – from empty stack to final state, from final state to empty stack, Equivalence of PDA's and CFG's – from grammars to PDA, from PDA's to grammars

Unit V

(Lectures 08)

Introduction to Turing machines: Problems that computers cannot solve, The Turing machine – the quest to decide all mathematical questions, notation for the Turing machine, instantaneous descriptions for Turing machines, Programming techniques for Turing machines – storage in the state, multiple subroutines, exercises tracks

Undecidable: A language that is not recursively enumerable, an undecidable problem that is RE, Post's correspondence problem, other undecidable problems, Exercises

Course Outcome:

Students will be able to:

- Explain and classify mathematical models for representing finite state systems
- Explain and analyze state diagrams for finite automata
- Design various types of automata.
- Identify the various applications of regular expressions and understand the properties of regular languages
- Write regular expressions for regular languages and interconvert automata and regular expressions.
- Explains the steps involved in minimization and equivalence of automata
- Explain, analyze, and design context free grammars for context free languages
- Construct parse trees and analyze the ambiguity of grammar.
- Understand the closure properties of CFL
- Understand the working of PDA
- Analyze the acceptance of string by final state and empty stack.
- Identify the PDA from grammars.
- Design and analyze Turing machines
- Interpret and explain the limits of computing

Text Books:

1. Introduction to Automata theory, Languages and Computation, John E. Hopcroft, Rajeev Motwani Jeffery D. Ullman, Third Edition Pearson education. 2007

Reference Books :

1. Fundamentals of the Theory of computation, Principles and Practice, Raymond Greenlaw, H. James Hoover, Morgan Kaufmann, 1998
2. Introduction to languages and theory of computation, John Martin, , Tata McGraw Hill, 2007
3. Introduction to Computer theory, Daniel I A Cohen, 2nd Edition, John Wiley & Sons.

***Latest editions of all the suggested books are recommended.**

SEMESTER IV

LOGICAL REASONING AND THINKING

Course Code: ICS406

L	T	P	C
3	0	0	3

Objective: The objective of the course is to impart students the knowledge of the following-

- Synonyms, Antonyms and One word substitutes
- Basic quantitative aptitude i.e. Speed, Time and Distance, Time and Work
- Logical Reasoning i.e. Series, Calendars, Clocks, Cubes
- Measures of Central Tendency

Unit – I: Verbal ability

(Lectures 06)

Synonyms, Antonyms and One word substitutes

Unit - II: Basic quantitative aptitude

(Lectures 08)

Speed, Time and Distance, Time and Work, Linear Equations, Progressions (Sequences & Series), Permutation and Combination, Probability, Functions, Set Theory, Number Systems, LCM and HCF, Percentages, Collection and Scrutiny of data: Primary data, questionnaire and schedule; secondary data, their major sources including some government publications.

Unit - III: Logical Reasoning

(Lectures 08)

Number and Letter Series, Calendars, Clocks, Cubes, Venn Diagrams, Binary Logic, Seating Arrangement, Logical Sequence, Logical Matching, Logical Connectives, Syllogism, Blood Relations; concept of a statistical population and sample from a population; qualitative and quantitative data

Unit - IV: Measures of Central Tendency

(Lectures 08)

Objective of averaging, characteristics of good average, types of average, arithmetic mean of grouped and ungrouped data, correcting incorrect values, weighted arithmetic mean
Median - median of grouped and ungrouped data merit and limitation of median, computation of quartile, decile and percentile
Mode - calculation of mode of grouped and ungrouped data, merits and limitation of mode, relationship between mean, median and mode. Geometric mean and Harmonic mean.

Unit - V: Presentation of Data

(Lectures 08)

Construction of tables with one or more factors of classification; Diagrammatic and Graphical representation of non-frequency data; Frequency distribution, cumulative frequency distribution and their graphical representation - histogram, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Data Interpretation – Introduction and approaches

LEARNING OUTCOME-

At the end of the course, student will understand-

- Synonyms, Antonyms and One word substitutes
- Basic quantitative aptitude i.e. Speed, Time and Distance, Time and Work
- Logical Reasoning i.e. Series, Calendars, Clocks, Cubes
- Measures of Central Tendency
- Presentation of Data such as Construction of tables and graphs etc

Text Books:

1. Richard I Levin, David S. Rubin: Statistics for Management, Pearson Prentice Hall Education Inc. Ltd, NewDelhi, 5th Ed. 2007
2. Bajpai, N. Business Statistics, Pearson, 2010
3. Sharma J.K., Business Statistics, Pearson Education India, 2010.

Reference Books:

1. Anderson; David R, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business, Prentice-Hall, WestPublishing Company, 1996.
2. CAT Complete course, UPKAR publications

***Latest editions of all the suggested books are recommended.**

SEMESTER IV
RELATIONAL DATABASE MANAGEMENT SYSTEM (LAB)

Course Code:ICS451

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS:

1. Create User in Oracle Database and grant and revoke the privileges and use of commit save point role back command.
2. Create the following:
 - Synonym sequences and Index
 - Create alter and update views.
3. Create PL/SQL program using cursors, control structure, exception handling
4. Create following:
 - Simple Triggers
 - Package using procedures and functions.
5. Create the table for
 - COMPANY database
 - STUDENT database and Insert five records for each attribute.
6. Illustrate the use of SELECT statement
7. Conditional retrieval - WHERE clause
8. Query sorted - ORDER BY clause
9. Perform following:
 - UNION, INTERSECTION and MINUS operations on tables.
 - UPDATE, ALTER, DELETE, DROP operations on tables
10. Query multiple tables using JOIN operation.
11. Grouping the result of query - GROUP BY clause and HAVING clause
12. Query multiple tables using NATURAL and OUTER JOIN operation

Course Outcome:

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

- Run SQL queries
- Perform various operation and constrains on database

SEMESTER IV
NETWORK SECURITY BASICS (LAB)

Course Code:ICS452

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS:

1. Firewall Configuration
2. VPN Configuration
3. IDS Configuration
4. Router Security
5. Traffic Monitoring using Wire Shark
6. Traffic Monitoring
7. Network Security risk assessment
8. Network security policies and standards
9. VLANs & Wireless LANs
10. Defense in Depth & DMZs
11. Network Security for BYODs

Course Outcome:

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

- Implementation of security feature.
- Traffic management.

SEMESTER IV
DESIGN AND ANALYSIS OF ALGORITHMS (LAB)

Course Code:ICS453

L	T	P	C
0	0	4	2

Objective:

The laboratory experiments will reinforce the knowledge students have gained in the respective theory class.

LIST OF EXPERIMENTS:

1. Write a program in C++ to sort a set of elements by implementing Merge sort.
2. Write a program in C++ to sort the array elements recursively using the quick sort.
3. Create a Graph class to implement an adjacency list representation of a graph. Devise an appropriate input method for populating the Graph. Also implement the following method for Graph:
 - a. BFSPath(s,t) – finds a path from node s to the node t using BFS.
4. Create a Graph class to implement an adjacency list representation of a graph. Devise an appropriate input method for populating the Graph. Also implement the following method for Graph:
 - a. DFSPath(s,t) – same as BFS Path except that it uses DFS to look for a path.
5. Implement a C++ program for prim's algorithm to find out the minimum cost spanning tree
6. Implement a C++ program for kruskal's algorithm to find out the minimum cost spanning tree.
7. Write a program in C++ to implement greedy topological sorting algorithm to find a topological sequence for the completion of a set of given tasks.
8. Implement a Roadster package that has a network of nodes (locations) and edges (roads) between pairs of nodes with the distances between the end nodes as the weights. I should be able to query Roadster with any pair of nodes and it should return the shortest path between the two (Dijkstra's)
9. Write a C++ program to implement Radix sort.
10. Implement a C++ program for Floyds all pair shortest path algorithm and wars hall's all pair shortest path algorithm.
11. Implement a non-recursive version of the Euclid's GCD algorithm.
12. Implement Binomial co –efficient problem using the by dynamic programming.
13. Implement a C++ program to solve knapsack problem by dynamic programming.

Course Outcome:

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

- Know the running time of algorithm.
- Know the implementation and comparison of problem like kruskal and prim, recursive algorithm.
- Able to understand the working of various problem.

SEMESTER V

PROGRAMMING SKILLS IN JAVA

Course Code: ICS501

L	T	P	C
3	1	0	4

Objective:

To provide students with an understanding of the object oriented concepts which helps in the field of programming, management of data, etc. and of Java programming which helps to explore the object oriented nature of the language and the multi-platform versatility offered by it.

Course Contents

Unit I:

(Lectures 08)

Introduction: History, Overview of Java, Object Oriented Programming, A simple Programme, Two control statements - if statement, for loop, using Blocks of codes, Lexical issues - White space, identifiers, Literals, comments, separators, Java Key words. Data types: Integers, Floating point, characters, Boolean, A closer look at Literals, Variables, Type conversion and casting, Automatic type promotion in Expressions Arrays. **Operators:** Arithmetic operators, The Bit wise operators, Relational Operators, Boolean Logical operators, Assignment Operator, Operator Precedence. Control Statements: Selection Statements - if, Switch: Iteration Statements - While, Do-while, for Nested loops, Jump statements.

Unit II

(Lectures 08)

Classes: Class Fundamentals, Declaring objects, Assigning object reference variables, Methods, constructors, “this” keyword, finalize () method A stack class, Over loading methods, using objects as parameters, Argument passing, Returning objects, Recursion, Access control, Introducing final, understanding static, Introducing Nested and Inner classes, Using command line arguments. Inheritance: Inheritance basics, Using super, method overriding, Dynamic method Dispatch, using abstract classes, using final with Inheritance

Unit III

(Lectures 08)

Packages: Definition, Access protection importing packages, Interfaces: Definition implementing interfaces. Exception Handling: Fundamental, Exception types, Using try and catch, Multiple catch clauses, Nested try Statements, throw, throws, finally, Java’s Built - in exception, using Exceptions

Unit IV

(Lectures 08)

Multithreaded Programming

The Java thread model, The main thread, Creating a thread, Creating multiple thread, Creating a thread, Creating multiple threads, Using is alive() and Join(), Thread - Priorities, Synchronization, Inter thread communication, suspending, resuming and stopping threads, using multi-threading. I/O basics, Reading control input, writing control output, Reading and Writing files, Applet Fundamentals, the AWT package,AWT Event handling concepts The transient and volatile modifiers, using instance of using assert

JAVA Database Connectivity (JDBC): Database connectivity: JDBC architecture, JDBC Drivers, the JDBC API: loading a driver, connecting to a database, Creating and executing JDBC statements, Handling SQL exceptions, Accessing result sets: Types of result sets, Methods of result set interface. An example JDBC application to query a database

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- History and Need of Object Oriented Concepts.
- Concepts of Class and Object in Java Programming.
- Packages and Thread Programming in JAVA
- Creating application in JAVA based on Database.

Reference Books:

1. The complete reference Java –2: V Edition By Herbert Schildt Pub. TMH.
2. SAMS teach yourself Java – 2: 3rd Edition by Rogers Cedenhead and Leura Lemay
Pub. Pearson Education.

***Latest editions of all the suggested books are recommended.**

SEMESTER V

FUNDAMENTALS OF STORAGE AND RECOVERY

Course Code: ICS502

L	T	P	C
3	1	0	4

Objective:

The most vital part of a computer system today is data which may be in the form of banking data, a company's inventory database or a multimedia presentation. This data needs to be safeguarded or managed in such a way that it can be accessed readily or speedily restored in the event of a hardware failure

Course Contents:

Unit I

(Lectures 08)

Introduction to Information storage and Management: Information Storage: Data – Types of Data – Information - Storage , Evolution of Storage Technology and Architecture, Data Center Infrastructure - Core elements- Key Requirements for Data Center Elements -Managing Storage Infrastructure, Key Challenges in Managing Information, Information Lifecycle - Information Lifecycle Management - ILM Implementation -ILM Benefits ,Summary

Unit II

(Lectures 08)

Storage System Environment : Components of a Storage System Environment – Host –Connectivity – Storage, Disk Drive Components –Platter – Spindle - Read/Write Head - Actuator Arm Assembly - Controller - Physical Disk Structure - Zoned Bit Recording - Logical Block Addressing , Disk Drive Performance -1 Disk Service Time , Fundamental Laws Governing Disk Performance , Logical Components of the Host - Operating System - Device Driver -Volume Manager - File System – Application , Application Requirements and Disk Performance, Summary

Unit III

(Lectures 08)

Storage Backup and Recovery:

Storage Backup Purpose - Storage Disaster Recovery - Storage Operational Backup –Archival, Backup Considerations, Backup Granularity, Storage Recovery Considerations, Backup Storage Methods , Storage Backup Process, Storage Backup and Restore Operations, Backup Topologies - Server less Backup , Backup Technologies -Backup to Tape - Physical Tape Library - Backup to Disk - Virtual Tape Library

Unit IV

(Lectures 08)

Local Replication : Source and Target -Uses of Local Replicas, Data Consistency - Consistency of a Replicated File System - Consistency of a Replicated Database , Local Replication Technologies - Host-Based Local Replication - Storage Array-Based Replication , Res tore and Restart Considerations - Tracking Changes to Source and Target , Creating Multiple Replicas, Management Interface

Managing the storage Infrastructure

Monitoring the Storage Infrastructure -Parameters Monitored - Components Monitored - Monitoring Examples - Alerts, Storage Management Activities - Availability management - Capacity management - Performance management - Security Management - Reporting- Storage Management Examples, Storage Infrastructure Management Challenges

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Concepts of Data Storage in Computing Environment
- Management of Data/Info Storage
- How to Recover the Data and Backup concepts
- Various Storage Devices used for Info Storage

Text Books

1. Storage Networks: The Complete Reference, Robert Spalding, Tata McGraw Hill Publication, 2003

Reference Book:

2. Information Storage and Management: Storing, Managing, and Protecting Digital Information, EMC Education Services, Wiley; 1 edition (April 6, 2009)

***Latest editions of all the suggested books are recommended.**

SEMESTER V

FUNDAMENTALS OF WEB TECHNOLOGY

Course Code: ICS503

L	T	P	C
3	1	0	4

Objective:

Web Technology has revolutionized mankind and entirely changed the way we look at things. Banking, Education, Retailing, Manufacturing and Research are some of the things that have undergone major transformations due to influence from web development. By adding more features, increasing the scope and reach of industries, making it available to users irrespective of their geography, web has captivated the human minds. Learning web technology is one of the top priorities for every computer enthusiast in order to better understand its working and scope

Course Contents

Unit I

(Lectures 08)

Introduction to Internet: Introduction, History of internet, Internet Design Principles, Internet Protocols - FTP, TCP/IP, SMTP, Telnet, etc., Client Server Communication, Web System architecture

Unit II

(Lectures 08)

Introduction to World Wide Web: Evolution of Web, Static and Dynamic Web Sites, Web Applications, Web Development Technologies - HTML, CSS, JS, XML; Protocols - HTTP, secure HTTP, etc; URL, Web Browser, Web Server, Web Services

Unit III

(Lectures 08)

HTML: Introduction to Html, Html Document structure, Html Editors, Html element/tag & attributes, Designing simple page - Html tag, Head tag, Body tag; More Html tags - Anchor tag, Image tag, Table tag, List tag, Frame tag, Div tag ; Html forms - Input type, Text area, Select , Button, Images

Unit IV

(Lectures 08)

CSS: Introduction to CSS, Syntax, Selectors ,Embedding CSS to Html, Formatting fonts, Text & background colour, Inline styles, External and Internal Style Sheets, Borders & boxing

Unit V

(Lectures 08)

XML: Introduction to XML, Difference b/w Html & XML, XML editors, XML Elements & Attributes XML DTD, XML Schema, XML Parser, Document Object Model (DOM), XML DOM.

Course Outcome:

At the end of this Subject Syllabus , student will able to understand-

- Concepts of Internet and various Protocols used over the Internet
- Types of Websites over WWW
- Web designing using HTML
- Use of CSS to create Web pages
- Web designing using XML

Reference Books

- Web Technologies - HTML, JavaScript, PHP, Java, JSP, ASP.NET, XML and Ajax, Black Book, by Dreamtech Press
- HTML, XHTML & CSS Bible, Brian Pfaffenberger, Steven M.Schafer, Charles White, Bill Karow- Wiley Publishing Inc, 2010
- HTML Black Book by Steven Holzner
- Web Design with HTML, CSS, JavaScript and jQuery Set by Jon Duckett

***Latest editions of all the suggested books are recommended.**

SEMESTER V

FUNDAMENTALS OF DATACENTER

Course Code:ICS504

L	T	P	C
3	1	0	4

Objective:

A data center is a physical facility that is used to store computer systems and related components and usually consists of security devices, backup power supplies, data communication connections and huge air-conditioners and fire-suppression units to prevent any catastrophe that might damage the data. With the exponential growth in data that has occurred in the past decade and which is only expected to grow at an alarming rate, the need for data center to store these data for further analytics and processing, has become an immediate necessity. This course will impart knowledge in students about storage system, storage networking technologies and Business Continuity aspects. Business continuity and disaster recovery are two important aspects that are very critical for smooth operations of an organization's Infrastructure. The course also aims at imparting knowledge in students about BC planning lifecycle, BC technology solutions and backup / restore operations.

Course Contents

Unit I

(Lectures 08)

Overview of Data Centers: Data Centers Defined, Data Center Goals, Data Center Facilities, Roles of Data Centers in the Enterprise, Roles of Data Centers in the Service Provider Environment, Application Architecture Models. The Client/Server Model and Its Evolution, The n-Tier Model, Multitier Architecture Application Environment, Data Center Architecture

Unit II

(Lectures 08)

Data Center Requirements: Data Center Prerequisites, Required Physical Area for Equipment and Unoccupied Space, Required Power to Run All the Devices, Required Cooling and HVAC, Required Weight, Required Network Bandwidth, Budget Constraints, Selecting a Geographic Location, Safe from Natural Hazards, Safe from Man-Made Disasters, Availability of Local Technical Talent, Abundant and Inexpensive Utilities Such as Power and Water, Selecting an Existing Building (Retrofitting), tier standard

Unit III

(Lectures 08)

Data Center Design: Characteristics of an Outstanding Design, Guidelines for Planning a Data Center, Data Center Structures, No-Raised or Raised Floor, Aisles, Ramp, Compulsory Local Building Codes, Raised Floor Design and Deployment, Plenum, Floor Tiles, Equipment Weight and Tile Strength, Electrical Wireways, Cable Trays, Design and Plan against Vandalism

Unit IV

(Lectures 08)

Introduction to Server Farms: Types of server farms and data centre, internet server farm, intranet server farm, extranet server farm, internet data center, corporate data center, software defined data center, data center topologies, Aggregation Layer, Access Layer, Front-End Segment, Application Segment, Back-End Segment, Storage Layer, Data Center Transport Layer, Data Center Services, IP Infrastructure Services, Application Services, Security Services, Storage Services

Unit V

(Lectures 08)

Introduction to Software Defined Datacenter (SDDC), Define SDDC, need and characteristics, SDDC Architecture with reference to Infrastructure building, Software Defined Compute (SDC), Software Defined Network (SDN) and Software Defined Storage (SDS). SDDC application in VMware using vSan, vROP. SDDC Application in Windows Server 2016 and in Linux.

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Need and Importance of Data Centre
- Requirements to design Data Centre
- Importance of various Server accordingly
- Concepts of Business Continuity and Disaster Recovery Fundamentals.

Reference Books

1. IP Storage Networking by : Gary Oreinstein, Addison Wesley Professional, 2006
2. Information Storage and Management, G. Somasundaram – Alok Srivastava, Wiley; 1 edition (April 6, 2009)
3. Administering Data-Centers, KailashJayswal, Wiley; 1 edition (November 28, 2005)

***Latest editions of all the suggested books are recommended.**

**SEMESTER V
ETHICAL HACKING FUNDAMENTALS**

Course Code: ICS505

L	T	P	C
3	1	0	4

Objective: To enable students to better understand the Ethical hacking concepts and various phases of hacking along with the objective of providing an in-depth knowledge on Web Application vulnerabilities and exploitation techniques. To familiarize them with the wide range of attacks in a Networking environment and to enable him/her to prepare a well-defined vulnerability reporting procedure along with the remediation techniques

Course Contents:

Unit I

(Lectures 08)

Introduction to Ethical Hacking: Hacking Methodology, Process of Malicious Hacking, and Foot printing and scanning: Foot printing, scanning. Enumeration: Enumeration. System Hacking and Trojans: System Hacking, Trojans and Black Box Vs. White Box Techniques

Unit II

(Lectures 08)

Hacking Methodology: Denial of Service, Sniffers, Session Hijacking and Hacking Web Servers: Session Hijacking, Hacking Web Servers. Web Application Vulnerabilities and Web Techniques Based Password Cracking: Web Application Vulnerabilities, Web Based Password Cracking Techniques

Unit III

(Lectures 08)

Web and Network Hacking: SQL Injection, Hacking Wireless Networking, Viruses, Worms and Physical Security: Viruses and Worms, Physical Security.

Unit IV

(Lectures 08)

Report writing & Mitigation: Introduction to Report Writing & Mitigation, requirements for low level reporting & high level reporting of Penetration testing results,

Unit V

(Lectures 08)

Linux Hacking: Linux Hacking. Evading IDS and Firewalls: Evading IDS and Firewalls Demonstration of vulnerabilities and Mitigation of issues identified including tracking.

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Various Hacking Methodology
- To find Vulnerability over the network and websites
- Importance of Firewalls and various security measures
- Report writing and Mitigation concepts

Reference Books

- The CEH Prep Guide: The Comprehensive Guide to Certified Ethical Hacking, by Ronald L. Kurtz (Author), Russell Dean Vines, Wiley Publications, First Edition

***Latest editions of all the suggested books are recommended.**

SEMESTER V

DISASTER RECOVERY AND BUSINESS CONTINUITY MANAGEMENT

Course Code: ICS506

L	T	P	C
3	1	0	4

Objective:

To enable learner to familiarize with the concept and importance of Business Continuity Planning for an Organization and to make aware of the recovery strategies on the event of Service Disruption, Testing and Maintenance also the training methodology to educate the user community.

Course Contents

Unit I: (Lectures 08)

Business Continuity Management (BCP): Introduction to Business Continuity Planning (BCP), Business Resumption Plan (BRP) or Disaster Recovery Plan (DRP), Common terminologies used in BCP and DRP, NIST SP800-34 Emergency Action plan which includes the phases of Recover/Resume, Protect and Sustain, Causes of Disasters.

Unit II (Lectures 08)

Stages in BCP: BCP objectives. Information Protection Environment. Security Technology and Tools. Steps involved in creating a BCP, Phase 1: Project Management and Initiation. Phase 2: Business Impact Analysis. Phase 3: Recovery Strategies, Phase 4: Plan Development and Implementation.

Unit III (Lectures 08)

Business Recovery strategies: Facility and Supply Recovery strategies. User Recovery strategies. Technical Recovery strategies, Data Recovery strategies, Activation Phase- Major Disaster or Disruption, Intermediate Disaster or Disruption, Minor Disaster, Activating BC/DR Teams, Developing Triggers, Transition Trigger. Defining BC/DR Team and Key Personnel, Defining Tasks, Assigning Resources, Communication Plan

Unit IV (Lectures 08)

Testing, Maintenance, Awareness & Training Mechanisms: Different types of tests including structured walk-through, checklist test, simulation, parallel test and full interruption test. Steps required to maintain a BCP

Unit V (Lectures 08)

Preparation of BCP: Requirements for BCP awareness and training Visit a business organization of your choice and prepare a Business Continuity Plan for the same using the learning from this course.

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Concepts of Business continuity planning
- Various Terminologies used in BCP
- Different types of Recovery Strategies
- Types of Testing Concepts

Text Books

1. Business Continuity and Disaster Recovery Planning – Susan Snedaker, Pub: Syngress, 2007
2. Crisis Management Mastering Skills – Harvard Business School, 2004

Reference Books

1. Disaster Recovery Planning: Preparing – Jon William Toigo, 3rd Edition, 2012

***Latest editions of all the suggested books are recommended.**

Semester V
EMPLOYABILITY SKILLS

Course Code: ICS507

L	T	P	C
3	0	0	3

Objective:

To enable students to better understand the **employability skills** concepts of developing a speaking skills in a group discussion, & Identifying **skills** and personal attributes commonly required by employers.& methodology of professional presentations ,about resume preparation & Interviews.

Course Contents

UNIT I: Speaking skills (6 hours)

Group Discussions; Importance of Group Discussions; Difference between Group Discussion, Panel Discussion and Debate; Format of GD as used in national level recruitment boards, Rules, ambience and normal practices, Dos and Don'ts in Group Discussions, Traits Evaluated in GDs; Etiquette & Mannerisms; Professional Presentations & Personal Grooming

UNIT II: Etiquette and Mannerism (6 hours)

Introduction; Professional etiquette – Etiquette at meetings, Dining, Involuntary Awkward Actions; Technology Etiquette – Phone, Email, Social Media, Video Conferencing, Web interview

UNIT III: Professional Presentations (6 hours)

Nature of Oral Presentation; Planning a Presentation, Preparing the Presentation; Delivering the Presentation

UNIT IV: Resume & Job Application (6 hours)

Introduction; What is a Resume; What is a Curriculum Vitae; What is a scannable resume; How to develop an impressive resume; Different formats of Resume; Job application or cover letter

UNIT V: Job Interviews (6 hours)

Definition of interview; Background information; Types of interviews; Preparatory steps for Job interviews; Interview Skill tips; Changes in the interview process, Frequently asked questions during interviews

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Various Speaking Skills like group discussion etc
- Various Professional etiquette and Manners
- To prepare the presentations accordingly.
- How to prepare for the Interview

Text books:

1. Objective English: 3 rd Edition, Edgar Thorpe and Showick Thorpe, Pearson Publishers, 2010 print.
2. Presentation skills. The essential guide for students, Patsy Mc Carthy & Caroline Hatcher, Sage publications, 2002.
3. Soft Skills – An integrated approach to Maximise Personality, Gajendra Singh Chauhan & Sangeeta Sharma, Wiley Publications
4. Material prepared by the Department.

***Latest editions of all the suggested books are recommended.**

SEMESTER V

PROGRAMMING IN SKILLS IN JAVA (LAB)

Course Code: ICS551

L T P C

0 0 4 2

Objective:

Students will write JAVA programs to accomplish the tasks stated in the lab syllabus, which are designed to test different aspects of Programming concepts learnt in theory class.

LIST OF EXPERIMENTS

Part A

1. Write a program to check whether two strings are equal or not.
2. Write a program to display reverse string.
3. Write a program to find the sum of digits of a given number.
4. Write a program to display a multiplication table.
5. Write a program to display all prime numbers between 1 to 1000.
6. Write a program to insert element in existing array.
7. Write a program to sort existing array.
8. Write a program to create object for Tree Set and Stack and use all methods.
9. Write a program to check all math class functions.
10. Write a program to execute any Windows 95 application (Like notepad, calculator etc)
11. Write a program to find out total memory, free memory and free memory after executing garbage Collector (gc).

Part B

12. Write a program to copy a file to another file using Java to package classes. Get the file names at run time and if the target file is existed then ask confirmation to overwrite and take necessary actions.
13. Write a program to get file name at runtime and display number of lines and words in that file.
14. Write a program to list files in the current working directory depending upon a given pattern.
15. Create a textfield that allows only numeric value and in specified length.
16. Create a Frame with 2 labels, at runtime display x and y coordinate of mouse pointer in the labels.

SEMESTER V

WEB TECHNOLOGY (LAB)

Course Code: ICS552

L T P C

0 0 4 2

Objective: Web Technology lab has revolutionized mankind and entirely changed the way we look at things. Banking, Education, Retailing, Manufacturing and Research are some of the things that have undergone major transformations due to influence from web development. By adding more features, increasing the scope and reach of industries, making it available to users irrespective of their geography, web has captivated the human minds.

LIST OF EXPERIMENTS

1. Design a simple web page with head, body and footer, with heading tags, image tag
2. Design a web site for book information, home page should contain books list, when particular book is clicked, information of the books should display in the next page.
3. Design a page to display the product information such as name, brand, price and etc with table tag
4. Design a web site for book information using frames, home page should contain two parts, left part should contain books list, and right part should contain book information.
5. Design a web page to capture the user information such as name, gender, mobile number, mail id, city, state, and country using form elements.
6. Design a web page with nice formatting like background image, text colors and border for text using external CSS.
7. Design a web page to perform mathematical calculations such as addition, subtraction, multiplication, and division
8. Design a web page to read data from an XML file and display the data in tabular format, take the data as employee information.
9. Design a web site for online purchase using CSS, JS and XML, web site should contain the following web pages.
 - Home page
 - Login page
 - Signup page
 - Product details page

SEMESTER V

ETHICAL HACKING FUNDAMENTALS (LAB)

Course Code:ICS553

L T P C

0 0 4 2

Objective: To enable students to better understand the Ethical hacking concepts and various phases of hacking along with the objective of providing an in-depth knowledge on Web Application vulnerabilities and exploitation techniques. To familiarize them with the wide range of attacks in a Networking environment and to enable him/her to prepare a well-defined vulnerability reporting procedure along with the remediation techniques

LIST OF EXPERIMENTS:

1. Passive Reconnaissance using “Who is” and Online tools
2. Active Reconnaissance using “Sampad” and web site details
3. Full Scan, Half Open Scan and Stealth scan using “nmap”
4. UDP and Ping Scanning using “Advance Lan Scanner” and “Superscan”
5. Packet crafting using “Packet creator” tools
6. Exploiting NetBIOS vulnerability
7. Creating and Analyzing spoofed emails
8. Creating and Analyzing Trojans
9. OS password cracking

SEMESTER VI

PRINCIPLES OF VIRTUALIZATION

Course Code: ICS601

L	T	P	C
3	1	0	4

Objective:

Virtualization is the most effective way to reduce IT expenses while boosting efficiency and agility in organizations. The goal of this course is to enable students understand the need and circumstances in which virtualization is implemented through deploying one of the many Virtualization software available today. Understanding VSphere components, installation of its user interface, configuring and managing Vmware components and WINDOW SERVER 2008 HYPER V will help students perform well during the real-time applications of virtualization

Course Contents

Unit I

(Lectures 08)

Basics of Virtualization: Understanding Virtualization, Need of Virtualization and Virtualization Technologies: Server Virtualization, Storage Virtualization, I/O Virtualization, Network Virtualization, Client Virtualization, Application virtualization, Desktop virtualization, Understanding Virtualization Uses: Studying Server Consolidation, Development and Test Environments , Helping with Disaster Recovery

Unit II

(Lectures 08)

Deploying and Managing an Enterprise Desktop Virtualization Environment: configure the BIOS to support hardware virtualization; Install and configure Windows Virtual PC: installing Windows Virtual PC on various platforms (32-bit, 64-bit), creating and managing virtual hard disks, configuring virtual machine resources including network resources, preparing host machines; create, deploy, and maintain images

Unit III

(Lectures 08)

Deploying and Managing a Presentation Virtualization Environment: Prepare and manage remote applications: configuring application sharing, package applications for deployment by using RemoteApp, installing and configuring the RD Session Host Role Service on the server.

Unit IV

(Lectures 08)

Accessing Published Applications: Access published applications: configuring Remote Desktop Web Access, configuring role-based application provisioning, configuring Remote Desktop client connections. Configure client settings to access virtualized desktops: configuring client settings

Unit V

(Lectures 08)

Understanding Virtualization Software: List of virtualization Software available .VMware-introduction to VSphere, ESXi, VCenterServerandVsphere client. Creating Virtual Machine.. Introduction to HYPER-V role. Create Virtual Machines. Create Hyper-v virtual networking, Use virtual Machine Snapshots. Monitor the performance of a Hyper-v server, Citrix XENDesktop fundamentals

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Need of Virtualization and Various Virtualization Techniques.
- Applying System Settings to implement Virtualization .
- Configuration of various applications used for Virtualization.
- Creating Virtual machines and client settings.

Reference Books

1. Virtualization with Microsoft Virtual Server 2005 by TwanGrotenhuis, RogierDittner, Aaron Tiensivu, Ken Majors, Geoffrey Green, David Rule, Andy Jones, Matthijs ten Seldam, Syngress Publications, 2006
2. Virtualization--the complete cornerstone guide to virtualization best practices, Ivanka Menken, Gerard Blokdijk, Lightning Source Incorporated, 2008
3. Virtualization: From the Desktop to the Enterprise, Chris Wolf, Erick M. Halter, EBook, 2005

***Latest editions of all the suggested books are recommended.**

SEMESTER VI

SERVER OPERATING SYSTEM – WINDOWS 2012

Course Code: ICS602

L	T	P	C
3	1	0	4

Objective: To enable the students to attain the skills required to manage and administer systems and servers using windows server 2012.

Course Contents:

Unit I: Installing and Configuring Servers

(Lectures 08)

Selecting a Windows Server 2012:- Edition, Supporting Server Role, Supporting Server Virtualization, Server Licensing. **Installing Windows Server 2012:** System Requirement, Performing a Clean Installation, Installing Third-Party Drivers, Working with Installation Partitions, Using Server Core, Server Core Defaults, Server Core Capabilities, Using the Minimal Server Interface, Upgrade paths, Preparing to Upgrade Installation, Installing Windows Server Migration Tools.

Configuring Servers: Completing Post-Installation Tasks and GUI Tools, Converting Between GUI and Server, Configuring NIC Teaming, Using Roles, Features, and Services, Using Roles Manager, Adding Roles and Features, Deploying Roles to VHDs, Configuring Services

Unit II: Configuring Local Storage

(Lectures 08)

Planning Server Storage, Determining the Number of Servers Needed, Estimating Storage Requirements, Selecting a Storage Technology, Selecting a Physical Disk Technology, Using External Drive Arrays, Planning for Storage Fault Tolerance, Using Disk Mirroring, Using RAID, Using Storages Spaces, Understanding Windows Disk setting, selecting a Partition style, understanding disk and Volume Types, Choosing a Volume Size, Understanding File System, Working with Disks, Adding a New Physical Disk, Creating and Mounting VHDs, Storage Pool, Virtual Disks, Simple Volume, Creating a Striped, Spanned, Mirrored, or RAID-5 Volume, Extending and Shrinking Volumes and Disks

Unit III: Configuring File and Share Access

(Lectures 08)

Designing a File-Sharing Strategy, Arranging Shares, Controlling Access, Mapping Drives, Creating Folder Shares, Assigning Permissions, Understanding the windows Permission Architecture and Basic, Advanced Permissions, Allowing and Denying Permissions, Inheriting Permissions, Understanding Effective Access, Setting Share Permissions, Understanding NTFS Authorization, Assigning Basic NTFS Permissions, Understanding Resource Ownership, Combining Share and NTFS Permissions

Unit IV: Configuring Print, Document Services, Servers for Remote Management.

(Lectures 08)

Understanding the Windows Print Architecture and Printing, Server Printing Flexibility, sharing a Printer Drivers and Managing Printer Drivers, Using Remote Access Easy Print, Configuring Printer Security, Adding Printer Servers, Deploying Printers with Group Policy, Adding Server and Workgroup Servers, Calibrating Server Manager Performance, Configuring WinRM and Windows Firewall, Creating Server Groups, Using Remote Server Administration Tools, Using Windows PowerShell Web Access, Installing Windows PowerShell Web Access, Configuring the Windows PowerShell Web Access Gateway, Configuring a Test Installation, Customizing a Gateway Installation, Creating Authorization Rules, Working with Remote Servers

Unit V: Creating and Configuring Virtual Machine Settings and Storage (Lectures 08)

Virtualization Architectures, Hyper-V Implementations and Licensing, Hyper-V Hardware Limitations and Server, Installing Hyper-V, Using Hyper-V Manager, Creating a VM, Installing an Operating System, Configuring Guest Integration Services, Allocating Memory, Using Dynamic Memory, working with Virtual Disks, Understanding Virtual Disk Formats, Creating Virtual Disks, Creating a New Virtual Disk, Adding Virtual Disks to Virtual Machines, Creating Differencing Disks, Configuring Pass-Through Disks, Modifying Virtual Disks, Creating Snapshots, Connecting to a SAN, Connecting Virtual Machines to a SAN

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Installation and configuration of Server 2012.
- Configuration and management of Storage .
- Apply File Access Management Techniques .
- Configure various services for the Remote Access.

Reference Books:

1. Windows Server 2012: A Handbook for Professionals by Aditya Raj
(Author)
2. MCSA 70-410 Cert Guide R2: Installing and Configuring Windows Server
2012 (Certification Guide) Hardcover – Import, 12 Sep 2014 by Don
Poulton (Author), David Camardella (Author)

Text Books:

1. Installing and Configuring Widows Server 2012 by Craig Zacker
1. Mastering Windows Server 2012 R2 by Mark Minasi, Kevin Greene,
Christian Booth, Robert Butler

***Latest editions of all the suggested books are recommended.**

SEMESTER VI

IT GOVERNANCE, RISK AND INFORMATION SECURITY AUDIT

Course Code: ICS603

L	T	P	C
3	1	0	4

Objective:

The Unit Primarily covers the importance of IT and IS Governances and the best practices followed by the Role of Steering committee and Chief Information Security Officer. The Unit also deals with the Risk management and the Information Security Management Practices including COBIT.

Course Contents

Unit I

(Lectures 08)

IT Governance: Introduction & Concepts, Role of Governance in Information Security, Best Practices for IT Governance. Role of IT Strategy Committee, Standard IT Balanced Scorecard. Val-IT framework of ISACA

Unit II

(Lectures 08)

Information Systems Strategy: Role of Strategic Planning for IT, Role of Steering committee, Policies and Procedures

Unit III

(Lectures 08)

Risk Management Program: Develop a Risk Management Program. Risk Management Process. Risk Analysis methods. Risk-IT Framework of ISACA

Unit IV

(Lectures 08)

Information Security Management: Introduction, Performance Optimization, IT Security roles & responsibilities.

Unit V

(Lectures 08)

COBIT: Segregation of Duties, Description of COBIT and other Frameworks

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Role of Government in Information Security.
- Role of IT Strategy Committee .
- Various IT Policies and Procedures .
- COBIT framework implementation.

Reference Books

- Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole

SEMESTER VI

CYBER FORENSICS

Course Code: ICS604

L	T	P	C
3	1	0	4

Objective:

Students are taught about different forms of cybercrime and its implications and duties of professionals employed at different levels towards analyzing and controlling cybercrime. Methods to recover data from storage devices are covered in following chapters. Different forensic techniques and cyber laws are also dealt in detail.

Course Contents

Unit I

(Lectures 08)

Computer Forensics

Introduction to Computer Forensics, Forms of Cyber Crime, First Responder Procedure- Non-technical staff, Technical Staff, Forensics Expert and Computer Investigation procedure

Unit II

(Lectures 08)

Storage Devices & Data Recover Methods

Storage Devices- Magnetic Medium, Non-magnetic medium and Optical Medium. Working of Storage devices-Platter, Head assembly, spindle motor. Data Acquisition, Data deletion and data recovery method and techniques

Unit III

(Lectures 08)

Forensics Techniques

Windows forensic, Linux Forensics, Mobile Forensics, Steganography, Application Password cracking- Brute force, Dictionary attack, Rainbow attack.

Unit IV

(Lectures 08)

Email Protocols: Email Tacking – Header option of SMTP, POP3, IMAP

Unit V

(Lectures 08)

Cyber Law

Corporate espionage, Evidence handling procedure, Chain of custody, Main features of Indian IT Act 2008 (Amendment)

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Types of Cyber Crime and Importance of Cyber Forensic.
- Various Storage Mediums and Data Recovery methods
- Various types of Forensics Technique such as Windows and Linux forensic
- Features of Cyber Law accordingly.

Text Books

- Guide to Computer Forensics and Investigations by Nelson

***Latest editions of all the suggested books are recommended.**

SEMESTER VI

FUNDAMENTALS OF EXCHANGE SERVER

Course Code: ICS605

L	T	P	C
3	1	0	4

Objective:

E-mail has become a very powerful today in business communication and helps people organize their work and schedule very efficiently. Exchange server is at the center of email system and understanding its working becomes very important to harness the full capabilities of e-mail systems. More advanced topics in Exchange server like virtualization, power shell and exchange management helps professionals to maintain exchange server efficiently.

Course Contents

Unit I

(Lectures 08)

Putting Exchange Server 2013 into context, Introducing Change in Exchange Server 2013:

Significance of e-mail communication: Importance of Email, Messaging Services, Exchange Server, Many modes of access, The Universal Inbox, Architecture Overview. Controlling Mailbox growth, Personal folders or PST files, Email archiving, Public Folders, Things every Email-administrators should know, Tools. **Exchange Server 2013:** Getting to know Exchange Server 2013, Exchange Server Architecture, x64 processor requirement, Windows Server 2008 R2 and Widows Server 2012 Installer, Service Pack and Patching Improvements Server roles, Edge Transport Services, Unified Messaging and Client Connectivity. The managed store, High-Availability Features Content Storage, Exchange Server Management, Improved Message and Content Control, Built-in Archiving, Message Transport Rules, Message Classifications, Rights Management, Service Message Protection Programming Interfaces, New and Improved Outlook Web App, Mobile Clients and Improved Security.

Unit II

(Lectures 08)

Understanding Availability, Recovery, Compliance, and Virtualization Server Exchange 2013:

What's in a Name, Backup and Recovery, Disaster Recovery, Management Frameworks, A Closer Look at Availability, Storage Availability , An Overview of Exchange Storage, Direct Attached Storage, Storage Area Networks, Compliance and Governance, The Bottom Line. Virtualization Overview, Understanding Virtualized Exchange, Understanding Your Exchange Environment Effects of Virtualization, Environmental Impact, Space Impact, Complexity Impact, Additional Considerations, Virtualization Requirements, Hardware Requirements, Software Requirements, Operations, Deciding What to Virtualized, Exchange Roles ,Testing, Possible Virtualization Scenarios, Small Office/Remote or Branch Office , Site Resilience, Mobile Access

Unit III

(Lectures 08)

Introducing Power Shell, Exchange Management Shell and Getting Exchange Server Running. Why Use Power Shell, Understanding the Command Syntax, Verbs and Nouns, The -Identity Parameter, Camlet Parameters, Alias, Object-oriented Use of Power Shell, Filtering Output, Formatting Output, Directing Output to Other Camlets, Power Shell v3 , Remote Power Shell, Tips and Tricks, Managing Output, Running Scripts, Running Scheduled Power Shell Scripts, Debugging and Troubleshooting from Power Shell, Auto discover Concepts, What Auto discover Provides , How Auto discover Works. Hardware, Operating Systems, Configuring Windows, Understanding Server Role and Configuration, Active Directory Requirements, Installing Exchange Server 2013, GUI-based Installation, Command-line Installation, Post-installation Configuration Steps, Final Configuration.

Unit IV

(Lectures 08)

Understanding Server roles, configuration, Exchange server 2013 requirement and Installation.

Server Roles, exchange server 2013 server roles, mailbox server, client access server, possible role configurations, combined-function server, scaling exchange server 2013 roles. Selecting the right server hardware, the typical user, CPU recommendations, memory recommendations, network recommendations, disk recommendations, software recommendations, operating recommendations, windows 7/windows 8 management consoles, additional requirement, active directory requirement, installation and preparation permission.

Unit V

(Lectures 08)

Preparing for exchange 2013: Existing exchange organization, preparing the schema, preparing the active directory forest, preparing additional domains, GUI Setup, Command-Line Setup, Command-Line installation option, Command-Line Server-recovery option, Command-Delegated server installation, installing language packs

Course Outcome:

At the end of this Subject Syllabus, student will able to understand-

- Concepts of Email Services and Tools of Exchange Servers.
- Concepts of Power Shell and its Implementation.
- Auto Discover concepts and various server roles.
- Configuration of Exchange server 2013

Reference Books

1. Mastering Exchange server 2013 by David Elfassy
2. “Microsoft Exchange Server 2013 Unleashed “ By Rand Morimoto, Michael Noel, Guy Yardeni, Chris Amaris, Andrew Abbate, Technical Edit by Ed Crowley, 2012 edition.

SEMESTER VI

ELECTIVE – I: OPEN WEB APPLICATION SECURITY PROJECT (OWASP) FRAMEWORK

Course Code: ICS606

L	T	P	C
3	1	0	4

Objective:

The objective of this unit is to provide students with understanding of web application security, framework, how authentication and authorization work and security log.

Course Contents

Unit I

(Lectures 08)

INTRODUCTION TO OWASP: Different security framework, web application framework, mission; Injection Prevention- Safe from Interpretation by Browsers, Parameterized Query Functionality for SQL Statements, Safe from Interpretation by XML Processors, Query Functionality for LDAP Statements, Option to Disallow Newline Characters in Text File Logging; Input Validation- Configurable Validation for All Forms of User-Supplied Input, Use Whitelist Validation for File Paths and Names in File Handling Functionality

Unit II

(Lectures 08)

HTTP MONITORING: Specify an Encoding Format for Every HTTP Response Page, Not Accepting Characters with Illegal Byte Sequences, Detect HTTP Parameter Tampering, Automatically Generate Content Security Policy (CSP) Headers, Automatically Generate Content Security Policy (CSP) Headers, Specify a Default Maximum Payload Size

Unit III

(Lectures 08)

AUTHENTICATION AND AUTHORIZATION: Enforce Default Deny Policy for Framework Managed Authorization, Provide Indirect Object Reference Functionality, Provide a Function That Hashes and Salts Input with Random Bytes; Session Management- Use Cryptographically Secure Random Numbers for Session IDs, Provide Automatic Anti-CSRF Tokens, Automatically Reset Session IDs After Authentication, Apply HttpOnly Flag to Session ID Cookie by Default, Provide Configurable Inactive and Absolute Session Timeouts

Unit IV

(Lectures 08)

XML SPECIFIC: Disable the Following Unsafe Features by Default; Cryptography- Transparent Database Encryption, Configurable Cryptographic Algorithms, TLS Protection Cheatsheet for TLS/SSL Implementations; Configuration Security-Encrypt Passwords and Keys Stored in Configuration Files; File Upload-Pluggable Anti Malware Scanning Solutions, Options to Disallow Saving Outside of a Specified Directory, Supports Pluggable Content Validation

SECURITY SPECIFIC LOGS

Security Specific Logs and Log All Attack Points Specified in AppSensor, Automatically Generate X-Frame-Options Header, Arithmetic Utilities that Protect Against Integer and Floating Point Overflow and Underflow, Pluggable Anti-Automation, Return Generic Error Pages by Default, Centralized Security Configuration Options

Course Outcome:

At the end of this Subject Syllabus, student will able to learn and understand-

- Different security framework viz. OWASP
- HTTP monitoring
- Automatically Generate Content Security Policy
- Authentication and Authorization
- Configuration Security-Encrypt Passwords and Keys
- Security specific log and attack points

Text Books

1. OWASP Code Review, By OWASP Foundation,2008

Reference Books

1. OWASP Testing Guide v3: Back to the OWASP Testing Guide Project:
http://www.owasp.org/index.php/OWASP_Testing_Project
2. OWASP Testing Guide, By OWASP Foundation,2007

SEMESTER VI

ELECTIVE – I: HACKTIVISM, CYBER WARFARE AND CYBER TERRORISM

Course Code: ICS607

L	T	P	C
3	1	0	4

Objective:

Hactivists and cyber terrorists are a serious threat to information world and the extent of damage possibly caused due to their activities is reaching alarming levels. The reason for this is the availability of better software, tools, techniques and organizational methods. One of the possible methods to stop these attacks is to understand these concepts better and develop programs to protect your personal and organizational information from these attacks.

Course Contents

Unit I

(Lectures 08)

Introduction to Hactivism, cyber warfare and cyber terrorism: Define Hactivism, Define Cyber warfare, Define Cyber terrorism, Impact of hactivism, cyber warfare and cyber terrorism to society and business. Types of Information warfare strategies and activities, Economic Impact of Information warfare

Unit II

(Lectures 08)

Current trends in hactivism: Current trends in hactivism including wikileaks, anonymous and lulz movements, Political nature of Hactivism, Players involved in hactivism and discuss the recent incidents, Countermeasures to protect against such incidents. Defensive strategies for Private Companies, Surviving Offensive Ruinous and Containment

Unit III

(Lectures 08)

Nature of Cyber warfare: 5 types of modern warfare including cyber warfare, Strategic nature of cyber warfare, Computer Network Attack (CNA) and Computer Network Exploitation (CNE), How to deploy CNA and CNE assets within a strategic context in support of obtaining a kinetic goal, Review historic attacks and learn new cyber warfare models that can be used to analyze a state-sponsored attack

Unit IV

(Lectures 08)

DEFENSIVE MEASURES: Defence in Depth and real life examples of how to apply it to network defense. Why information assurance of computer equipment is critical to defend the network from nefarious attacks. Use Defense tools

Unit V

(Lectures 08)

CURRENT TRENDS: Current trends in Cyber warfare and Cyber terrorism including the players and groups involved, Analyze the resent incidents of Cyber warfare and Cyber terrorism, Case Studies

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- Hactivism, cyber warfare and cyber terrorism
- Current trends in hactivism including wikileaks

- Modern warfare including cyber warfare
- Defence in Depth and real life examples
- Current trends in Cyber warfare and Cyber terrorism

Text Books

1. Cyber security – From Luxury to Necessity by BalajiSrimoolanathan, Pub: Frost & Sullivan, 2011 (Unit I,II)
2. Information Warfare and Security (Addison Wesley, 1998) Dorothy E Denning (Unit III)
3. Cyberterrorism – The Jihadi Cyber terror Threat – By Dorothy E Denning – Naval Postgraduate school, 2009 (Unit IV)
4. Information Warfare – How to survive Cyber attacks – Michael Erbschloe, Osborne/McGraw Hill, 2008 (Unit V)

***Latest editions of all the suggested books are recommended.**

SEMESTER VI

ELECTIVE – I: PAYMENT CARD INDUSTRY DATA SECURITY STANDARD (PCIDSS) AND HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA)

Course Code: ICS608

L	T	P	C
3	1	0	4

Objective:

The objective of this course is to provide an overview of three international best practices on Information Security namely ISO27001, Payment Card Industry Data Security Standard (PCIDSS) and Health Insurance Portability and Accountability Act (HIPAA) Security Rule.

Course Contents

Unit I (Lectures 08)

ISO 27001: Auditing: Principles of auditing, Conducting and Managing an Audit Program. **Auditing Activities:** Scoping and Pre audit Survey, Planning and preparation, Fieldwork, Analysis, Reporting, Closure, **Competence and evaluation of auditors:** Auditor competence, **Information Security Management System Audit Testing:** Information security management system, Management responsibility, Internal ISMS audits, Management review of the ISMS, ISMS improvement

Unit II (Lectures 08)

INFORMATION SECURITY AUDIT CHECK LISTING: Security Policy, Organizing information security, Asset management, Human resources security, Physical and environmental security, Communications and operations management, Access control, Information systems acquisition, development and maintenance, Information security incident management, Business continuity management, Compliance

Unit III (Lectures 08)

PCI DSS: Scope of PCI DSS Requirements, Best Practices for Implementing PCI DSS into Business-as-Usual Processes, PCI DSS Assessment Process, **PCI DSS Requirements:** Build and Maintain a Secure Network and Systems, Protect Cardholder Data, Maintain a Vulnerability Management Program, Implement Strong Access Control Measures , Regularly Monitor and Test Networks
Maintain an Information Security Policy

Unit IV (Lectures 08)

HIPAA - PURPOSE AND SCOPE: HIPAA Security Rule, Security Rule Goals and Objective, Security Rule Organization, **Administrative Safeguards:** Security Management Process, Assigned Security Responsibility, Workforce Security, Information Access Management, Security Awareness and Training, Security Incident Procedures, Contingency Plan, Evaluation, Business Associate Contracts and Other Arrangements.

Unit V (Lectures 08)

PHYSICAL AND TECHNICAL SAFEGUARDS: Physical Safeguards: Facility Access Controls, Workstation Use, Workstation Security, Device and Media Controls, **Technical Safeguards:** Access

Control, Audit Controls, Integrity, Person or Entity Authentication, Transmission Security, **Organizational Requirements:** Business Associate Contracts or Other Arrangements, Requirements for Group Health Plans.

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- Principles of auditing, Conducting and Managing an Audit Program
- Security Policy, Organizing information security, Asset management
- Scope of PCI DSS Requirements
- HIPAA Security Rule, Security Rule Goals and Objective
- Physical and technical safeguards

Text Books

1. Information Security Policy Development for Compliance: ISO/IEC 27001, NIST SP 800-53, HIPAA Standard, PCI DSS V2.0, and AUP V5.0, Barry L. Williams,2013

***Latest editions of all the suggested books are recommended.**

SEMESTER VI

PRINCIPLES OF VIRTUALIZATION (LAB)

Course Code: ICS651

L	T	P	C
0	0	4	2

Objective:

Students will practice on the aspects they have learnt in the theory class which will reinforce the knowledge of theory concepts.

LIST OF EXPERIMENTS

1. Installing VMware ESXi server.
2. Installing VMware vCenter with all the prerequisites.
3. Creating Virtual Machines using vCenter server.
4. Modifying Virtual Machine settings.
5. Clone a VM.

SEMESTER VI

SERVER OPERATING SYSTEM – WINDOWS 2012 (LAB)

Course Code: ICS652

L	T	P	C
0	0	4	2

Objectives: The objective of the course is to make the students apply the theoretical aspects into a practical scenario and create programs, record and analyze their observations.

LIST OF EXPERIMENTS:

1. Converting from windows server 2012 GUI to Core version and vice versa.
2. Installing two or more NIC and configuring NIC Teaming for different Teaming Mode (Switch Independent, Address Hash and Standby).
3. Installing and configuring Hard disks for RAID5.
4. Verifying effective permission for shared resource by combining Shared and NTFS permissions.
5. Installing and adding printers to the print server and accessing print server through Network/Website.
6. Accessing server from windows client through RSAT (Remote Server Administration Tool).
7. Restricting the users to access control panel through group policy.
8. Configuring WinRM with Group Policy.
9. Installing and configuring Hyper-V Role.
10. Creating and configuring parent disk to create Virtual machine from differencing disk.

SEMESTER VI

CYBER FORENSICS (LAB)

Course Code: ICS653

L	T	P	C
0	0	4	2

Objectives:

Students will work on various skills and Forensics technology required to carry out Forensics study on computer, network and many different scenarios. They will also study different data recovery techniques for Pen Drive and CD.

LIST OF EXPERIMENTS

1. Physical Collection of electronic evidence using forensic standards
2. Dismantling and re-building PCs in order to access the storage media safely
3. Boot sequence and Power On Self-Test mode analysis
4. Examination of File systems of Windows, Linux and Mac
5. Analysing Word processing and Graphic file format
6. Network data sniffing and analysing
7. Password and encryption techniques
8. Internet forensic and Malware analysis
9. Data recovery techniques for hard drive
10. Data recovery techniques for Pen drive and CD

SEMESTER VII

VIRTUALIZATION AND CLOUD SECURITY

Course Code: ICS701

L	T	P	C
3	1	0	4

Objective:

Server virtualization is today's most rapidly-evolving and widely-deployed technologies. Highly beneficial to organizations in terms of cost and ease of deployment and management of virtualized servers, deploying desktop, application and network virtualization is in demand.

Course Contents

Unit I

(Lectures 08)

Introduction to Virtualization & Cloud: Virtualization and Cloud computing concepts, Private cloud Vs Public cloud, IAAS, PAAS & SAAS concepts, Virtualization security concerns, Hypervisor Security, Host/Platform Security, Security communications, Security between Guest instances, Security between Hosts and Guests

Unit II

(Lectures 08)

Cloud Security: Cloud Security vulnerabilities and mitigating controls, Cloud Trust Protocol, Cloud Controls Matrix. Complete Certificate of Cloud Security Knowledge (CCSK)

Unit III

(Lectures 08)

Cloud Trust Protocol & Transparency: Introduction to Cloud Trust Protocol & Transparency, Cloud Trust Protocol and Transparency, Transparency as a Service, Concepts, Security, Privacy & Compliance aspects of cloud

Unit IV

(Lectures 08)

Cloud Controls Matrix & Top Cloud Threats: Introduction to Cloud Controls Matrix & Top Cloud Threats, Cloud Controls Matrix.

Unit V

(Lectures 08)

Trusted Cloud Initiative architecture: Trusted Cloud Initiative architecture and reference model, requirements of Security as a Service (SecaaS) model and Top Security threats to the cloud model

Course Outcome:

On successful completion of this module the learner will be able to

- Compare modern security concepts as they are applied to cloud computing.
- Assess the security of virtual systems.
- Evaluate the security issues related to multi-tenancy.
- Appraise compliance issues that arise from cloud computing.

Reference Books

1. Cloud Security – A comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz and Russel Dean Vines

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

SERVER OPERATING SYSTEM - LINUX

Course Code:ICS702

L	T	P	C
3	1	0	4

Objective:

The objective of the course is to make the students apply the theoretical aspects to know about Linux, & administration of Linux & unix features.

Course Contents

Unit I: Fundamentals of Linux:

(Lectures 08)

Development of Linux, Linux Distributions. Structure of Linux Operating System, Logging In and General Orientation, The X Window System, KDE, GNOME. Navigating the File Systems, Managing Files, File Permission and Access, Shell Basics, Shell Advanced Features, File Name Generation. Common Unix commands

Unit II: Administration of Linux OS

(Lectures 08)

Installing Linux, Configuring Disk Devices, Creating and Managing File Systems, File System Backup, Kickstart Installation, Linux Boot Loaders, Linux Kernel Management, Managing User Accounts, Understanding File Listing, Ownership and Permission, Managing Software using RPM, Connecting to Network, Linux Network Services, Setting up a Printer

Unit III: Input and Output Redirection

(Lectures 08)

Input Redirection, Output Redirection, Error Redirection, Filter, Pipes. Networking in Linux: Network Connectivity, IP address, Accessing Remote system, Transferring files, and Internet configuration. Process Control: Identifying Process, Managing Process, Background Processing, Putting jobs in Background. Offline File Storage: Storing files to Media Booting process and User

Unit IV: Linux Basic networking and naming service:

(Lectures 08)

Introduction to Networking, Networking, Internet Network Services, Dynamic DNS, Electronic Messaging, Apache , NIS and Network File Sharing: NIS, Network File Sharing, SAMBA. Security: Defining System Security Policies, System Authentication Services and Security, Securing Services, Securing Data and Communication

Unit V: The Unix File System

(Lectures 08)

Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks. System calls for the file System: Open – Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link.

Course Outcome:

On successful completion of this module the learner will be able to

- Understand the basic set of commands and utilities in Linux/UNIX systems.
- To learn the important Linux/UNIX library functions and system calls.
- To understand the inner workings of UNIX-like operating systems.
- Demonstrate understanding of the steps involved installing Linux Operating System

Text Books:

1. The Complete Reference, Linux Sixth Edition by Richard Petersen.

Reference Books:

1. Red Hat ®Enterprise Linux® 6 Administration by Sander van Vugt
2. Linux System Administration by Paul Cobbaut.

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

MOBILE, WIRELESS & VOIP SECURITY

Course Code: ICS703

L	T	P	C
3	1	0	4

Objective:

Basic understanding of security in wireless world is very important for any IT Security Professional. As organizations are increasingly adapting VoIP for converged messaging, call centres and interactive multimedia collaboration, implementing security principles is vital for maintaining confidentiality and privacy.

Course Contents

Unit I

(Lectures 08)

Introduction to Mobile communication: Mobile & Telecommunication protocols and their vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address Mobile & Telecommunication vulnerabilities

Unit II

(Lectures 08)

Wireless Security: Wireless protocols and their vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address Wireless vulnerabilities

Unit III

(Lectures 08)

Voice over Internet Protocol (VOIP) Security: VOIP concepts, protocols and vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address VOIP vulnerabilities

Unit IV

(Lectures 08)

Mobile Forensics: Introduction to Mobile forensics, Mobile Vulnerability, Mobile forensics process including seizure

Unit V

(Lectures 08)

Data Extraction: Introduction to data extraction, data acquisition types like Physical, Logical, Manual, External & Internal memory, storage, analysis using tools & techniques

Course Outcome:

On successful completion of this module the student will be able to

- Understand systems, protocols & mechanisms needed to support mobility in mobile phones & computers
- Study important concepts at each layer of the protocol stack and understand VOIP
- Explore the operation and implications of new or recent technologies such as broadband, wireless and voice and data integration.

- Understand the Mobile Forensics & Data Extraction.

Reference Books

- Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole
- Network Security Bible by Eric Cole – Second Edition

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

INTRODUCTION TO WINDOWS AZURE

Course Code: ICS704

L	T	P	C
3	1	0	4

Objective:

Windows Azure is a cloud computing platform and infrastructure, for building, deploying and managing applications and services through a global network of Microsoft-managed data centers.

Course Contents

Unit I

(Lectures 08)

Introduction: Introduction to MS. Azure, **Virtual Machines:** Creating Virtual Machines, Difference Between Basic and Standard VMs, Logging in to a VM and Working, Attaching an empty Hard Disk to VM, Hosting a Website in VM, Configuring End Points, Scaling up and Down, Creating a custom Image from VM, Creating a VM from a custom Image, Shut down VM without Getting Billed, VM Pricing

Unit II

(Lectures 08)

Managing Infrastructure in Azure: Managing Infrastructure in Azure: Azure Virtual Networks, Highly Available Azure Virtual Machines, Virtual Machine Configuration Management, Customizing Azure Virtual Machine Networking. **Load Balancing:** Creating Cloud Services, Adding Virtual Machines to a Cluster, Configuring Load Balancer.

Unit III

(Lectures 08)

Windows Azure: Azure Storage: What is a Storage Account, Advantages, Tables, blobs, queues and drives, Azure App fabric: Connectivity and Access control **Automation:** Introduction Windows Power Shell, Creation of Run books, uploading a Shell Script, Authoring a Shell Script

Unit IV

(Lectures 08)

SQL Azure: SQL Azure: Creating a SQL Server, Creating a SQL DB, Creating Tables, Adding Data to the Tables, View Connection Strings, Security Configurations, Migrating on premise DB to SQL Azure

Unit V

(Lectures 08)

Websites: Creating a Website, Setting deployment credentials, Choosing a platform, Setting up Default page for website, Scaling ,Auto Scaling by Time, Auto Scaling by Metric, Difference between Free, Shared, Basic and Standard websites, Creating a website using Visual studio

Course Outcome:

On successful completion of this module the student will be able to

- Identify Windows Azure as a cloud application platform that enables companies to build and run applications that scale in a reliable available and fault tolerant manner.
- Understand and utilize the cloud table, queue, blob storage services.
- Study Azure as a suite of hosting services, development environment and development tools combined with the robust services
- Create a website and define its deployment credentials.

Text Books

- Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

Reference Books

- Cloud Computing: Principles and Paradigms, Editors: Raj Kumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
- Windows Azure Step By step by Roberto Brunetti.

***Latest editions of all the suggested books are recommended.**

B. Tech. -SEMESTER VII

ELECTIVE- II: ADVANCED WEB TECHNOLOGY

Course Code: ICS705

L	T	P	C
3	1	0	4

Objective:

The application of web technology is seen everywhere, websites, web programs, web applications and more. The concept of web has penetrated each and every domain we presently deal with and has revolutionized the world. It has immensely enhanced the outcome of web interfaces and presented us with innumerable career options. This course aims at Introducing HTML 5 as the most commonly used web programming language and its features

Course Contents

Unit I

(Lectures 08)

Introduction to HTML5: Why HTML5? HTML, XHTML, Styling HTML5 with CSS, When can you use HTML5?

Unit II

(Lectures 08)

Features of HTML5: Introduction to canvas, multimedia, storage, working offline, geo location, input types, placeholder text, micro data.

Unit III

(Lectures 08)

Multimedia: Video containers, video codec, audio codec, Multimedia accessibility, MIME. Communication API

Unit IV

(Lectures 08)

Canvas and Storage: Basics of Canvas, Using transforms, capturing images, drawing on the animating the canvas, Web storage, Web SQL database

Unit V

(Lectures 08)

Geo location: API methods, Messages, workers and sockets. Limitation in current browsers

Course Outcome:

On successful completion of this module the student will be able to

- Identify the various tags of HTML5
- Understand the development and designing of website using HTML5
- Identify the various features of HTML5
- Embed multimedia files in html page
- Understand the canvas basics and web storage.

Reference Books

- HTML5: Up and Running by Mark Pilgrim, O'Reilly, August 2010
- Pro Html5 Programming: Powerful App Is For Richer Internet Application Development by Peter Lubbers, Brian Albers, Frank Salim, Ric Smith, Apress, 2010
- HTML5 For Web Designers by Jeremy Keith, June 2010
- HTML5 Cookbook, by Christopher Schmitt, Kyle Simpson, O'Reilly, November 2011
- Head First HTML5 Programming by Eric Freeman, Elisabeth Robson, O'Reilly, October 2011

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

ELECTIVE- II: FUNDAMENTALS OF INFORMATION TECHNOLOGY INFRASTRUCTURE LIBRARY (ITIL)

Course Code: ICS706

L	T	P	C
3	1	0	4

Objective:

ITIL-compatible tools offer better integration, interaction and compatibility with your global partners, and in addition, sticking to strict ITIL standards from a single vendor can help process integrations go seamlessly and ensure all parties are speaking the same technical language.

It is always an advantage to understand what types of ITIL tools your global partners are working with and how they rate them. ITIL frameworks provide a homogenous IT environment and eases interactions with other global companies using similar preapproved tools. Managing staff, providing services to customers and creating efficiencies for less money can be daunting tasks for any IT organization.

Course Contents

Unit I

(Lectures 08)

ITIL Overview and Service Strategy: ITIL History, Components of the ITIL Library, IT Service Management, Organizing for IT Service Management, Technology and Architecture, Overview of HPSM and OTRS as service management tool, Service Strategy: Service Strategy Lifecycle Stage, Service Portfolio Management, the Demand Management Process, the IT Financial Management Process, Introduction to ISO 20000 Standards

Unit II

(Lectures 08)

Service Design:Service Design Lifecycle Stage, The Service Catalog Management Process, The Service Level Management Process, The Availability Management Process, The Capacity Management Process, The Information Security, Management Process, The IT Service Continuity, Management Process, The Supplier Management Process

Unit III

(Lectures 08)

Service Transition: Service Transition Lifecycle Stage, the Change Management Process, the Release and Deployment Management Process, the Service Asset and Configuration Management Process, Knowledge Management

Unit IV

(Lectures 08)

Service Operation: Service Operation Functions : Service Operation Lifecycle Stage, The Service Desk Function, The Technical Management Function, The Application Management Function, The IT Operations Management Function Service Operation Processes :The Event Management Process, The

Incident Management Process, The Request Fulfilment Process, The Access Management Process, The Problem Management Process

Unit V

(Lectures 08)

Continual Service Improvement: Continual Service Improvement principles - CSI and organizational change, Ownership, Role definitions , External and internal drivers , Service Level Management , The Deming Cycle, Service measurement ,Knowledge Management, Benchmarks , Governance ,Frameworks, models, standards and quality systems Continual Service Improvement processes : 7step improvement process, Service reporting, Service management, return on investment for CSI, business questions for CSI, Service level management

Course Outcome:

On successful completion of this module the student will be able to

- Identify the components of the ITIL Library
- Understand the Service Design Lifecycle Stage
- Evaluate Change Management and deployment Process
- Identify the various Service Operation Functions
- Understand the continual Service Improvement processes

Reference Books

1. Introduction to ITIL, Jan van Bon Stationery Office Books, The Stationery Office, 2010
2. HP operation Manual from HP, 2010
3. A Guide to Service Desk Concepts Donna Knapp From Cengage Learning, 2010
4. The Shortcut Guide to Virtualization and Service Automation, Greg Shield Real-time Publishers, 2008
5. Service automation and dynamic provisioning techniques in IP/MPLS environments - Christian Jacquenet, Gilles Bourdon, Mohamed Boucadair John Wiley and Sons, 2008

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

ELECTIVE- II: INTRODUCTION TO VOICE OVER IP (VOIP)

Course Code: ICS707

L	T	P	C
3	1	0	4

Objective:

VOIP is collectibles of methodologies used for the delivery of Voice communications and multimedia sessions over IP networks, the most popular of which is Internet. The objectives of this course is to familiarize students about fundamentals of VOIP aspects LIKE Gateway, features of CISCO certified Unified Border Element and so on.

Course Contents

Unit I

(Lectures 08)

VOIP Fundamentals: Describe a dial plan, Describe the basic operation and components involved in a VoIP call , Describe VoIP call flows, RTP, RTCP, cRTP, and sRTP,H.323,MGCP,Skippy Call Control Protocol, SIP, Identify the appropriate gateway signaling protocol for a given scenario, Choose the appropriate codec for a given scenario, Describe and Configure VLANs. Implement Cisco Unified Communications Manager Express to support endpoints using CLI , Describe the appropriate software components needed to support endpoints, Configure DHCP, NTP and TFTP, Describe the differences between the different types of ephones and ephone-dns, Configure Cisco Unified Communications Manager Express endpoints

Unit II

(Lectures 08)

Gateway: Describe the function of gateways, Describe DSP functionality, Describe the different types of voice ports and their usage, Describe dial peers and the gateway call routing process, Describe codecs and codec complexity Implement a gateway: Configure analog voice ports, Configure digital voice ports, Configure dial-peers, Configure digit manipulation, Configure calling privileges, Verify dial-plan implementation, Implement fax support on a gateway Implement Cisco

Unit III

(Lectures 08)

Unified Border Element: Describe the Cisco Unified Border Element features and functionality, Configure Cisco Unified Border Element to provide address hiding, Configure Cisco Unified Border Element to provide protocol and media interworking, Configure Cisco Unified Border Element to provide call admission control, Verify Cisco Unified Border Element configuration and operation

Unit IV

(Lectures 08)

Implementing QoS for Voice and Video

Describe causes of voice and video quality issues, Describe how to resolve voice and video quality issues, Describe **QoS** requirements for voice and video traffic Describe and configure the DiffServ QoS model: Describe the DiffServ QoS model, Describe marking based on CoS, DSCP, and IP Precedence, Configure layer 2 to layer 3 **QoS** mapping, Describe trust boundaries, Configure trust boundary on Cisco switches.

Unit V

(Lectures 08)

QoS OPERATIONS: Describe the operations of the QoS classifications and marking mechanisms, Describe Low Latency Queuing, Describe the operations of the QoS WAN Link Efficiency mechanisms, Enable QoS mechanisms on switches using AutoQoS, Configure Low Latency Queuing

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- VOIP Fundamentals
- The function of gateways, DSP functionality, different types of voice ports
- The Cisco Unified Border Element features and functionality
- Implementation of QoS for Voice and Video
- The operations of the QoS classifications and marking mechanisms

Text Books

1. Voice over IPv6: architectures for next generation VoIP networks, Daniel Minoli, John Wiley and Sons 2009 (Unit I,II)
2. Handbook Of Wireless Networks & Mobile Computing, Stojmenovic, John Wiley and sons Publications, 2010 (Unit III,IV,V)

Reference Books

1. Wireless and mobile data networks, Aftab Ahmad, John Wiley and sons Publications, 2010
2. Ad-hoc, mobile, and wireless networks, Violet R. Syrotiuk, Edgar Chávez - Technology & Engineering Springer, 2009
3. Wireless And Mobile Network Architectures By Yi-Bang Lin, Imrich Chlamtac, Wiley Publications, 2008
4. The wireless mobile Internet: architectures, protocols and services By Abbas Jamalipour Wiley Publications, 2009

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

ELECTIVE- III: MANAGEMENT THEORY AND PRACTICE

Course Code: ICS708

L	T	P	C
3	1	0	4

Objective:

Systematic way of working is very essential to manage the entire operations of an organization. Though each business is run on terms specific to its domain, basic principles of management like decision making, organization, finance management and Human Resource management remain same and good understanding of best practices is very must essential for both employers and employees to work in unison.

Course Contents

Unit I

(Lectures 08)

Introduction: Management – definitions, types of managers; managerial roles and functions; Science or Art? - Administration vs. Management, External environment – Managing people and organizations in the context of New Era- Managing for competitive advantage - the Challenges of Management - Corporate Social responsibility- Managerial Ethics. Perspectives on Management: Scientific Management, Human Relations, the Systems Approach, the Contingency Approach, the Mckinsey 7-S Framework

Unit II

(Lectures 08)

Planning: Nature of planning, Steps in planning, types of planning, Levels of planning - The Planning Process. – Planning practices in USA, Japan and China - Decision Making: Problem and Opportunity finding, the nature of Managerial Decision Making, the Rational Model of Decision Making, Challenges to the Rational Model, Improving the Effectiveness of Decision Making Tools and Techniques, Role of Boards and Committees in Decision Making - Decision making practices abroad.

Unit III

(Lectures08)

Organizing: Nature of organizing, organization levels and span of management – Factors determining span - Organizational design and structure –departmentation, line and staff concepts, staffing – delegation, decentralization and recentralization of authority - responsive organizations –Global organizing

Unit IV

(Lectures 08)

Leading: Leading Vs Managing – Trait approach and Contingency approaches to leadership - Dimensions of Leadership - Leadership Behavior and styles – developing leadership skills – transformational leaders - Leadership in Cross-cultural environment - Evaluating Leader- Women and Corporate leadership –Motivational theories- Building Groups into Teams, Intergroup Behavior, conflict and negotiation – Global leading.

Unit V

(Lectures 08)

Communication: Importance of Communication, Interpersonal communication Barriers to Effective communication, Communication in Organizations, Using Communication Skills to manage Conflicts. Communicating for understanding and results, creating productive interpersonal relationships, Guidelines to improve written and oral communication-communication practices in India and abroad - Controlling: Basic control process- control as a feedback system – Feed Forward Control – Requirements for effective control – control techniques – Overall controls and preventive controls – Global controlling.

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- The concept and challenges of Management
- Nature of planning, Steps in planning, types of planning
- Nature of organizing, organization levels and span of management
- Leading Vs Managing – Trait approach and Contingency approaches to leadership
- The concept and Importance of Communication

Text Books

1. Koontz and O'Donnell. Essentials of Management. E-McGraw Hill, New Delhi,2008 (Unit I,II,III)
2. Fred Luthan S. Introduction to Management. McGraw Hill, New Delhi, 2008 (Unit IV)
3. Peter.F.Drucker. The Practice of Management. Allied Publishers, 2008 (Unit V)

Reference Books

1. Stoner, Freeman and Gilbert. Management. Pearson (6th Edition), 1995
2. Griffin. Management. South Western Educational Publishing, 2006
3. Peter. F. Drucker. Management- Tasks and Responsibilities. Harper Business 1993
4. Theo Haimann. Professional Management. Houghton Miller, 1998
5. Richard L.Draft. Organization Theory and Design. Thomson Learning, 2004
6. Peter F.Drucker. People and Performance. Harvard Business School Press, 2007

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

ELECTIVE- III: INDUSTRIAL ORGANIZATION AND MANAGEMENT

Course Code: ICS709

L	T	P	C
2	1	0	3

Objective:

The objective of the course is to enable our students to approach IT concepts at an organizational level and understand organizational principles, processes and structure deeply. Learning management principles from an organizational perspective becomes very critical for an IT Professional as it has an impact on his performance, growth and his contributions to the growth of the company.

Course Contents

Unit I: Introduction to Organization

(Lectures 08)

Introduction, definition of organization, system approach applied to organization, necessity of organization, elements of organization, process of organization, principles of organization, formal and informal organization, organization structure, types of organization structure

Unit II: Forms of Business Organization

(Lectures 08)

What is a business organization? Concept of ownership organization, types of ownership. Individual ownership, partnership, joint stock Company, private and public limited company, co-operative organizations, state ownership, public corporation

Unit III: Basic Concepts of Management

(Lectures 08)

Introduction, definitions of management, characteristics of management, levels of management, management skills - Management theory: Scientific management, contribution of Gilbreth. Gantt, Neoclassical theory, modern management theories - Functions of management: Planning, forecasting, organizing, staffing, directing, motivating, controlling, co-coordinating, communicating, decision making

Unit IV: Personnel Management

(Lectures 08)

Introduction, definition, objectives, characteristics, functions, principles and organization of personnel management - Markets and marketing: Introduction, the market, marketing information, market segmentation, consumer and industrial markets, pricing, sales, physical distribution, consumer behavior and advertisement - Financial management: the basics, financial accounts, inflation, profitability, budgets and controls, cost accounting, valuation of stock, allocation of overheads, standard costing, marginal costing

Unit V: Productivity and Production**(Lectures 08)**

Measurement of productivity, productivity index productivity improvement procedure – Materials management and purchasing: Objectives, functions, importance of materials management. Stores and storekeeping - Inventory control: Classification, functions, inventory models, inventory costs, EOQ, Materials requirement planning

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- The concept and definition of organization, system approach applied to organization
- Forms of Business Organization
- Basic Concepts of Management
- Functions, principles and organization of personnel management
- Measurement of productivity, productivity index productivity improvement procedure

Text Books

1. Kotlar P, Marketing Management, Prentice Hall India,1998
2. Prasanna Chandra , Finance Management, TMH.5th ed.,
3. Monks J.G Operations Management ,MGH

Reference Books

1. Fraidoon Mazda, Engineering Management-, Addison –Wesley,1997 (Unit I,II)
2. Koontz and O'Donnell, Essentials of Management, McGraw Hill,2006 (Unit III,IV,V)

***Latest editions of all the suggested books are recommended.**

SEMESTER VII

ELECTIVE- III: BUSINESS COMMUNICATION

Course Code: ICS710

L	T	P	C
3	1	0	4

Objective:

Effective communication is the most important aspect in a professional environment like an organization, where information is exchanged in various forms like verbal, written or audio. In order to understand one's responsibilities and deliver output to the management staff, it is required that one has to present his/her work precisely in a manner expected out of them. Business communication is everything to do with knowledge of English language, listening / writing skills, soft skills like speaking, presenting information and so on.

Course Contents

Unit I

(Lectures 08)

Introduction to Communicative English: What is communication? Verbal and non-verbal modes of communication. Function and Role of effective communication. The process of communication - the four skills of listening, speaking, reading and writing. (LSRW)

Active Listening

1. Definition of Active Listening. Difference between listening and hearing.
2. Understanding other viewpoints; suspending judgment; listening for hidden meaning; using verbal and non-verbal signals.
3. Barriers and Filters in listening.
4. The Feedback process.
5. Activities and Tasks: Listening Comprehension, Quizzes, Case Studies.

Speaking

1. Elements of Phonology - diction, pitch, intonation, clarity, articulation.
2. Pronunciation, stress, accent. Activities/exercises based on phonology.
3. Grammar for effective speaking - accuracy focused and fluency focused activities. Fillers, turn taking, pauses, phatic.
4. Appropriate use of register, lexis, style and body language.
5. Case Studies, Role Play - understanding aggressive, assertive and passive behavior.
6. Confidence and Personality building activities - extempore exercises/ just a minute (JAM) exercises, debates, group discussions.

Unit II

(Lectures 08)

Reading and Writing:

1. Methods of effective reading and writing - skimming and scanning, gists, topic Sentences, summaries.
2. Reading Comprehension (passages with focus on business, current affairs, travel and tourism, environment.
3. Letter Writing - invitations and regrets, enquiries and replies, making reservations, lodging Complaints.
4. Report Writing - official and business reports.

Grammar in Context –

- a. Correct use of tense, adverbs and prepositions
- b. phrasal verbs
- c. study of affixes - prefixes and suffixes
- d. study of synonyms, antonyms, homonyms, hyponyms
- e. Word pairs. Accuracy focused exercises in context.
- f. Use of Idioms

Unit III

(Lectures08)

Communication in Business: Introduction, Communication Process, Essentials of Business Communication, Barriers to Business Communication

Unit IV

(Lectures 08)

Communication in an Organization, Business Correspondence, Business Report Writing: Types of Communication Meetings, Memo, Circulars and Notices, General Rules for All Business Correspondence, Guidelines for the Basic Cover Letter, Guidelines for Information Interviewing, Networking Letters, Guidelines for Thank You Letters, Guidelines for Job Offer, Acceptance Letters, Guidelines for Letters Declining a Job Offer, Style in Business Correspondence, Cover Letters, Business Report Writing, The purpose of statistical studies, sample of business correspondence

Unit V

(Lectures 08)

Effective Communication Skills: Perspectives of Communication: Visual Perception, Language, Other factors affecting perspectives, prejudices, feelings and environment Elements of Communication: Face-to-Face Communication, Tone of Voice, Body Language

Course Outcome:

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

- Understand the communication
- Understand the active listening and speaking
- Understand and describe element of phonology
- Describe the and understand reading and writing
- Understand the effective Communication Skills
- Understand grammar in context
- Describe and use communication in business
- Understand the communication in organization

Text Books

1. Corporate Communication: A Guide to Theory and Practice, JoepCornelissen, Edition III, SAGE Publications, 2011

Reference Books

1. Everyday Grammar, Seely John, Oxford University Press, 2010
2. Remedial English Language, Dr. Malti Agarwal, Krishna Prakashan Media, 2010
3. Develop Your Presentation Skills, Theo Theobald, Kogan Page Limited, 2011
4. Business Communication, (Compilation), Harvard University Press, 2005 (last Publication)
5. Business Communication Today, Courtland L. Bovee, John V. Thill, Barbara E. Schatzman, Edition V, Prentice Hall, 2005 (last Publication)
6. Presentations: Proven Techniques for Creating Presentations That Get Results, Daria Price Bowman, Adams Media, 2001

***Latest editions of all the suggested books are recommended.**

**SEMESTER VII
MINI PROJECT (LAB)**

Course Code: ICS751

L	T	P	C
0	0	8	4

Objective:

Students will work on a Mini Project, which is inclined towards practical aspects of the subject of their choice that will help them to reinforce and research further.

Course Contents:

The students will undertake a mini project as part of their VIIth semester. The students can do independent projects or can take up projects in groups of two or more depending on the complexity of the project. The maximum group size will be four and in case of team projects there should be a clear delineation of the responsibilities and work done by each project member. The projects must be approved by the mentor/college guide assigned to the student. The mentors will counsel the students for choosing the topic for the projects and together they will come up with the objectives and the process of the project. From there, the student takes over and works on the project.

Bridge Course:

The bridge course ensures that all the students have the correct prerequisite knowledge before their industry interface. The purpose of a bridge course is to prepare for a healthy interaction with industry and to meet their expectations. It would be difficult to establish standards without appropriate backgrounds and therefore to bridge this gap, students are put through a week mandatory classroom participation where faculty and other experts will give adequate inputs in application based subjects, IT and soft skills.

The Project:

Each group will be allotted a Faculty Guide and an Industry Guide during the internship/project work. Students need to maintain a Project Diary and update the project progress, work reports in the project diary. Every student must submit a detailed project report as per the provided template. In the case of team projects, a single copy of these items must be submitted but each team member will be required to submit an individual report detailing their own contribution to the project.

Each student/group should be allotted a supervisor and periodic internal review shall be conducted which is evaluated by panel of examiners.

Project Evaluation Guidelines:

The Project evaluator(s) verify and validate the information presented in the project report.

The break-up of marks would be as follows:

1. Internal Evaluation
2. External Assessment
3. Viva Voce

Internal Evaluation:

Internal Evaluator of project needs to evaluate Internal Project work based on the following criteria:

- Project Scope , Objectives and Deliverables
- Research Work, Understanding of concepts
- Output of Results and Proper Documentation
- Interim Reports and Presentations– Twice during the course of the project

External Evaluation:

The Project evaluator(s) perform the External Assessment based on the following criteria.

- Understanding of the Project Concept
- Delivery Skill
- The Final Project Report
- Originality and Novelty

Course Outcome

By the end of this course a student should be able to:

- acquire practical knowledge within the chosen area of technology for project development
- identify, analyse, formulate and handle programming projects with a comprehensive and systematic approach
- contribute as an individual or in a team in development of technical projects
- develop effective communication skills for presentation of project related activities

SEMESTER VII

SERVER OPERATING SYSTEM - LINUX (LAB)

Course Code: ICS752

L	T	P	C
0	0	4	2

Objectives:

The objective of the course is to make the students apply the theoretical aspects into a practical scenario and create programs, record and analyze their observations.

LIST OF EXPERIMENTS

- 1) Configure the following tasks & verify it. (Hint - use grep/cut/tr/sed)
 - a) List the lines containing "/sbin/nologin" from the /etc/passwd file.
 - b) List only lines of output from ps, which lists running processes that contain the string "init".
 - c) Display the list of GIDs from /etc/passwd file.
 - d) Alter all the letters that starts from range "a-f" to "A-F" in /etc/passwd file.
- 2) Create an alias named eth0:0 using below credentials in RHEL 5 and verify it.
 - (a) IP ADDRESS = 172.16.0.1
 - (b) 255.255.0.0
 - (c) Default Gateway = 172.16.0.254
 - (d) DNS 1 = 4.2.2.1
- 3) Configure password policy for user john with below arguments in RHEL 5. After configuration verify the policy applied.
 - (a) Minimum password age = 4 days
 - (b) Maximum password age = 15 days
 - (c) Inactive days = 2 days
 - (d) Account Expiration date = 6 months from today
- 4) Configure the following tasks:
 - (a) Add user accounts to your system: Joshua, alex, dax, bryan, zak, ed and manager. Assign each user this password: 123@iMs.
 - (b) Add the groups to your system: sales with GID: 1000, HR with GID: 1100 and web with GID: 1200.
 - (c) Add Joshua and alex to the sales group, dax and bryan to the HR group, zak and ed to the web group and add manager to all of these groups.
 - (d) Login with each user & verify using id command that they are in the appropriate groups.
- 5) Use ACL to accomplish these tasks:
 - (a) Create groups named Admin and Web.
 - (b) Create users named John and Jimmy.

- (c) Create a new directory named /depts/tech/. Change the permission so that root is the owner and Admin is the group owner.
 - (d) Use ACL to give full permission for /depts/tech/ to the Web group.
 - (e) Allow John read/execute but not write permission on the /depts/tech/ directory.
 - (f) Allow Jimmy full permission on the /depts/tech/ directory.
- 6) You are tasked with finding all SUID & SGID files under the / directories.
- 7) Configure your system that boots to run level 3 by default. Configure X server using command in run level 3.
- 8) Devise a ps command that does the following. (Hint: sort/ps/top)
- (a) List all processes.
 - (b) For each process, prints the information which displays the percentage of CPU usage, the process ID & name of the command that created it.
 - (c) The output is sorted by the %cpu value from highest to lowest
- 9) Explain the suid, sgid& sticky bit permission with example
- 10) Customize the Bash prompt as per given tasks (Hint - PS1)
- (a) Display the current value of primary prompt string.
 - (b) Changes prompt to print a static string "ITIMS -".
 - (c) Restore the original prompt.
 - (d) Insert the bash history prompt special character "\!" between the hostname and dollar-sign.
- 11) Configure given tasks for package management: (Hint: use rpm command)
- (a) Check whether ftp package is installed or not.
 - (b) If it is not installed, install it & verify it.
 - (c) Display the configuration files available through this package.
 - (d) Be sure that ftp service must be enabled at startup.
- 12) Use rpm queries to answer the following questions.
- (a) What files are in the "initscripts" package?
 - (b) Which installed packages have "gnome" in their names?
 - (c) Which RPM provides /etc/inittab?
- 13) Prepare a cron job that take the backup of /home at 5:00pm on every Saturday.
- 14) Change your system date to 1:00pm March 1990.
- 15) Copy /etc/fstab file to /tmp directory as newfstab file. The user owner is Jack and group owner is admin. Give full permission to user owner and read, write permission to group owner. No permission to others.
- 16) Configure your system such that SELinux must be in enforcing mode and firewall is enables and ssh service is not allowed through your firewall.

- 17) Configure ftp server such that anonymous can download and upload the data to ftp server. Deny users John and Carel to access the ftp server. Note that your ftp server must be accessible in your private network only. It can't be accessible in another network.
- 18) Create a RAID level 1 on /dev/md0 device by creating two equal partitions of 100MB size and mount it on /data. The RAID device must be mounted at the time of system startup.
- 19) Configure LVM in volume group named volgrp by creating 2 partitions of 100MB size and mount it on /exam directory. The initial size of LVM is approximately 40MB and after extending the size of LVM is 80MB.
- 21) Configure the DHCP server such that your DHCP server will be able to provide IP configuration to 65 systems in your network.
- 22) Configure the station as NFS server such that /share directory is shared & only accessible in your network. This NFS share should be automatically mounted on remote client using autofs. On remote client system, NFS share should be mounted on /data/share directory.
- 23) Configure stationx.example.com for quota such that when user neo type

dd if=/dev/zero of=/quota/somefilebs=1024 count=30, he succeed. When he type

dd if=/dev/zero of=/quota/somefilebs=1024 count=70 he fails

SEMESTER VII

WINDOWS AZURE (LAB)

Course Code: ICS753

L	T	P	C
0	0	4	2

Objectives:

The objective of the course is to make the students apply the theoretical aspects into a practical scenario and create programs, record and analyze their observations.

LIST OF EXPERIMENTS

1. Create and document the process of creating a windows azure account
2. Create a virtual machine from the gallery of windows server 2008 R2
3. Create a virtual machine using the option “quick Create”
4. Create a custom VM and Capture the image
5. Create a vm from a captured image
6. Add a VMs to a cluster and deploy load balancer on the same
7. Create and publish / host a webpage in windows azure
8. Create a website using Visual studio
9. Create a SQL server DB , Create tables and add data to the table
10. Test basic sql commands on the table created in the previous step.
11. Migrate an on premise DB to Azure
12. Create a storage account in Azure

SEMESTER VIII

ELECTIVE – IV: INTRODUCTION TO SOFT COMPUTING

Course Code: ICS801

L	T	P	C
3	1	0	4

Objective:

Students will learn about soft computing techniques that are different from conventional AI techniques. This course also provides necessary mathematical background for understanding and implementing soft computing Techniques, such as neural networks, fuzzy systems, and genetic algorithms. Theory class which will reinforce the knowledge of theory concepts.

Course Contents:

Unit I: Introduction to Soft Computing and Genetic Algorithms (Lectures 08)

Introduction - What is soft computing?, Differences between soft computing and hard Computing, Soft Computing constituents, Methods in soft computing, Applications of Soft computing. Introduction to Genetic Algorithms - Introduction to Genetic Algorithms (GA), Representation, Operators in GA, Fitness function, population, building block hypothesis and schema theorem. Genetic algorithms operators- methods of selection, crossover and mutation, simple GA(SGA), other types of GA, generation gap, steady state GA, Applications of GA

Unit II: Neural Networks (Lectures 08)

Concept, biological neural system, Evolution of neural network, McCulloch-Pitts neuron model, activation functions, feed forward networks, feedback networks, learning rules – Hebbian, Delta, Perceptron learning and Windrow-Hoff, winner-take-all.

Unit III: Supervised Learning (Lectures 08)

Perceptron learning, single layer/multilayer perceptron, linear separability, hidden layers, back propagation algorithm, Radial Basis Function network; Unsupervised learning - Kohonen, SOM, Counter-propagation, ART, Reinforcement learning, adaptive resonance architecture, applications of neural networks to pattern recognition systems such as character recognition, face recognition, application of neural networks in image processing.

Unit IV: Fuzzy Systems (Lectures 08)

Basic definition and terminology, set-theoretic operations, Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules & Fuzzy Reasoning, Fuzzy

Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making; Neuro-fuzzy modeling- Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modeling, Classification and Regression Trees, Data Clustering Algorithms, Rulebase Structure Identification and Neuro-Fuzzy Control, Applications of neuro-fuzzy modeling.

Unit V: Swarm Intelligence

(Lectures 08)

What is swarm intelligence? Various animal behavior which have been used as examples, ant colony optimization, swarm intelligence in bees, flocks of birds, shoals of fish, antbased routing, particle swarm optimization

Course Outcome:

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

- Understand the Concept of soft computing and genetic algorithm
- Describe and Classify the neural network
- Understand the Concept of supervised learning
- Describe the fuzzy systems
- Describe and understand swarm intelligence

Reference Books:

1. Principle of soft computing by S.N. Shivanandam, Wiley
2. Neuro-Fuzzy and Soft Computing by Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, Prentice – Hall of India
3. Fuzzy Sets and Fuzzy Logic-Theory and Applications by George J. Klir and Bo Yuan, Prentice Hall
4. Neural Networks Algorithms, Applications, and Programming Techniques by James A. Freeman and David M. Skapura, Pearson Editions
5. An Introduction to Genetic Algorithm by Mitchell Melanie, Prentice Hall
6. Genetic Algorithms in Search, Optimization & Machine Learning by David E. Goldberg, Addison Wesley

***Latest editions of all the suggested books are recommended.**

SEMESTER VIII

ELECTIVE – IV: DISCRETE MATHEMATICS AND GRAPH THEORY

Course Code: ICS802

L	T	P	C
3	1	0	4

Objective:

Students will learn about the application of discrete mathematics in the field of computer science .IT covers sets, logic, Proving techniques, Combinatory, functions, relations, graph theory and algebraic structures. These basic concepts of sets, logic functions and graph theory are applied to Boolean algebra and logic networks, while the advanced concepts of functions and algebraic structures are applied to finite state machines and coding theory.

Course Contents:

Unit I: Logic – I and Logic – II

(Lectures 08)

Proposition, logical connectives, laws of logic, logical equivalence, rules of inference. Predicate and Quantifiers, Negations, Logical equivalence with quantifiers

Unit II: Basics of Counting

(Lectures 08)

Basics of Counting, Fundamental principles, Permutation and Combinations, Mathematical Induction, Recursive Definitions. Relations & Functions, Sets, Relations, Functions, Pigeonhole Principle.

Unit III: Properties of Relations

(Lectures 08)

Representing Relations, Hasse diagrams, Closure of Relations

Unit IV: Group Theory

(Lectures 08)

Definition and Properties of Groups, Sub Groups, Cyclic Groups. Cosets and Coding Theory: Cosets and Lagrange's Theorem. Coding Theory, Hamming Matrix, Parity Check and Generator Matrices.

Module V: Group Codes

(Lectures 08)

Group codes, Decoding with coset leaders, Hamming Matrices.

Course Outcome:

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

- Understand the Concept of proposition logic
- Describe and understand basic of counting
- Understand the Concept of properties of relations
- Describe the group theory
- Describe and understand Hamming matrices

Books for Reference:

- Discrete and Combinatorial Mathematics, by R. P. Grimaldi – Pearson Education
- Discrete Mathematics with Applications, by Thomas Koshy – Academic Press
- Discrete Mathematics and its Applications, Kenneth H. Rosen – Tata McGraw Hill
- Elements of Discrete Mathematics by Liu – Tata McGraw Hill
- Essence of Logic, by John Kelley – PHI

***Latest editions of all the suggested books are recommended.**

SEMESTER VIII

ELECTIVE – IV: NATURAL LANGUAGE PROCESSING

Course Code: ICS803

L	T	P	C
3	1	0	4

Objectives:

Students will learn about NLP techniques, tasks and methods. This course provides necessary background for understanding NLP techniques such as programming and analytical that help students in defining a NLP problem, find a suitable solution and implement the NLP system.

Course Contents:

Unit I – Introduction to NLP

(Lectures: 08)

Introduction; Brief History of NLP; significance; early NLP systems; role of knowledge in NLP; human languages, models, ambiguity, processing paradigms, speech processing; phases in natural language processing, applications; programming languages used for NLP

Unit II – Structure of Words

(Lectures: 08)

Working with strings; preprocessing tasks on text – tokenization and normalization; string matching; statistical language modelling techniques; linguistic resources; regular expressions; morphology – stemmer, analyzer, generator

Unit III – Part-of-Speech Tagging

(Lectures: 08)

Part-of-Speech tagging - Stochastic POS tagging, HMM, Transformation based tagging (TBL); statistical modeling using n-gram; Penn Treebank Part-of-Speech Tagset; estimating probabilities; Trigrams; Maximum Entropy Markov Model MEMM; Brown Corpus; Bidirectionality

Unit IV – Syntactic Analysis

(Lectures: 08)

Parsing Natural Language; algorithms and techniques; Syntactic structure and analysis; ambiguity resolution; transition networks; chart and efficient parsing; CFG construction; CYK algorithm; transliteration; semantic parsing; shallow semantic analysis; WSD using Wordnet

Unit V – Information Retrieval and Discourse Analysis

(Lectures: 08)

Accessing information; stop word removal; vector space model; vector space scoring and query operator interaction; developing IR system using latent semantic indexing; text summarization; discourse analysis using centering theory; anaphora resolution; case study on applications of NLP

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- Role of knowledge in NLP
- Working with strings; preprocessing tasks on text
- Part-of-Speech tagging - Stochastic POS tagging
- Parsing Natural Language; algorithms and techniques
- Information Retrieval and Discourse Analysis

Text Books:

1. Natural Language Processing by Ela Kumar
2. Natural language processing: a Paninian perspective by Bharati A., Sangal R., Chaitanya V

Reference Books:

1. Mastering Natural Language Processing by Deepti Chopra, Nisheeth Josh

***Latest editions of all the suggested books are recommended.**

SEMESTER VIII

ELECTIVE – V: MACHINE LEARNING

Course Code: ICS804

L	T	P	C
3	1	0	4

Course objectives

This course is aimed at introducing the concept of machine learning to the students. They will be able to understand and explore various machine learning types like supervised, unsupervised and reinforcement.

Course Content:

Unit-I: Introduction to Machine Learning

(Lectures: 08)

Introduction to machine learning, types of learning, Learning Input-Output Functions, Designing a learning system, perspectives and issues in machine learning. Basic algorithms methods, Inferring Rudimentary Rules, Simple Probabilistic Modelling, Divide and Conquer: Constructing Decision Trees, Covering Algorithms: Constructing Rules, Mining Association Rules, Linear Models, Instance-based Learning, Clustering, Multi-Instance Learning.

Unit-II: Supervised Learning Algorithms

(Lectures: 08)

Supervised Machine Learning Algorithms, working of supervised machine learning algorithm, Naive Bayes algorithm, decision tree, Support Vector Machines, KNN, Random Forest algorithm.

Unit-III: Unsupervised Learning Algorithms

(Lectures: 08)

Unsupervised Machine Learning Algorithms, working of unsupervised machine learning algorithm, clustering, neural networks, Blind Signal Separation Techniques like Principal Component Analysis, Singular Value Decomposition.

Unit-IV: Reinforcement Learning Algorithms

(Lectures: 08)

Reinforcement Machine Learning Algorithms, working of reinforcement machine learning algorithm, Finite Markov Decision Processes, Dynamic Programming, Monte Carlo Methods,

Unit –V: Machine Learning Use-cases

(Lectures: 08)

Machine learning in business, Use cases of machine learning implementation in various industry domains: Banking, Finance, Retail, Healthcare, Manufacturing, E-commerce, Human Resource.

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- Concept of Machine Learning and Designing a learning system
- Supervised Machine Learning Algorithms
- Unsupervised Machine Learning Algorithms
- Reinforcement Machine Learning Algorithms
- Machine learning in business

Text books:

1. Machine Learning by Tom M. Mitchell. 2014 Reprint. McGraw-Hill Science
2. Data Mining: Practical Machine Learning Tools and Techniques by Ian H Witten, Eibe Frank, Mark A Hall, Christopher J Pal. Third Edition. Morgan Kaufmann Series in Data Management Systems
3. Reinforcement Learning: An Introduction by Richard S Sutton and Andrew G. Barto. (2016). MIT Press.

Reference books:

1. Understanding Machine Learning: From Theory To Algorithms by Shai Shalev-Shwartz (2015).
2. Simpler: Using Machine Learning Algorithms in R by Darrin Thomas (2017)

***Latest editions of all the suggested books are recommended.**

SEMESTER VIII

ELECTIV – V: HIGH PERFORMANCE COMPUTING

Course Code: ICS805

L	T	P	C
3	1	0	4

Objective:

- To familiarize about Modern Processors.
- To understand concept of optimization
- To learn about Parallel Computers and Programming
- To create and solve Memory Parallel Programming using OpenMP and MPI

Course Contents-

Unit I MODERN PROCESSORS

(Lectures 08)

Stored Program Computer Architecture-General purpose cache-based microprocessor-Performance based metrics and benchmarks- Moore's Law- Pipelining- Superscalarity-SIMD-Memory Hierarchies Cache- mapping-prefetch

Processor Types-Multicore processors-Multithreaded processors- Vector Processors- Design Principles- Maximum performance estimates- Programming for vector architecture.

Unit II - BASIC OPTIMIZATION TECHNIQUES FOR SERIAL CODE

(Lectures 08)

Scalar profiling- Function and line based runtime profiling- Hardware performance counters- Common sense optimizations- Simple measures, large impact - Elimination of common sub expressions- Avoiding branches- Using SIMD instruction sets

Role of compilers - General optimization options- Inlining - Aliasing- Computational Accuracy- Register optimizations- Using compiler logs- C++ optimizations - Temporaries- Dynamic memory management- Loop kernels and iterators

Data Access Optimization: Balance analysis and lightspeed estimates- Storage order- Case study: Jacobi algorithm and Dense matrix transpose.

UNIT III-PARALLEL COMPUTERS

(Lectures 08)

Parallel computing - paradigms- Shared memory computers- Cache coherence- UMA - ccNUMA- Distributed-memory computers- Hierarchical systems- Networks- Basic performance characteristics- Buses- Switched and fat-tree networks- Mesh networks- Hybrids

Parallelization - Basics - Why parallelize - Data Parallelism - Function Parallelism - Parallel Scalability- Factors that limit parallel execution- Scalability metrics - Simple scalability laws- parallel efficiency - serial performance versus Strong scalability- Refined performance models- Choosing the right scaling baseline - Case Study: Can slow processors compute faster- Load balance.

UNIT IV - SHARED MEMORY PARALLEL PROGRAMMING WITH OPENMP

(Lectures 08)

OpenMP - Introduction - Parallel execution - Data scoping- OpenMP work sharing for loops- Synchronization - Reductions - Loop Scheduling - Tasking – Case Study: OpenMP: Parallel Jacobi algorithm- Advanced OpenMP : Wavefront parallelization

Efficient OpenMP programming: Profiling OpenMP programs - Performance pitfalls- Case study: Parallel Sparse matrix-vector multiply.

UNIT V - DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI (Lectures 08)

Message passing - Introduction to MPI- Example- Messages and point-to-point communication Collective communication- Nonblocking point-to-point communication- Virtual topologies - MPI parallelization of Jacobi solver- MPI implementation - performance properties

Efficient MPI programming: MPI performance tools- communication parameters - Synchronization, serialization, contention- Reducing communication overhead - optimal domain decomposition- Aggregating messages - Nonblocking versus Asynchronous communication- Collective communication- Understanding intranode point-to-point communication

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- Modern Processor and Stored Program Computer Architecture
- Basic optimization techniques for serial code
- Parallel computing and Parallelization
- Shared memory parallel programming with OPENMP
- Distributed-memory parallel programming with mpi

Text Books-

1. Georg Hager, Gerhard Wellein, "Introduction to High Performance Computing for Scientists and Engineers", Chapman & Hall / CRC Computational Science series, 2011.

Reference Books-

1. Charles Severance, Kevin Dowd, "High Performance Computing", O'Reilly Media, 2nd Edition, 1998.
2. Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar, 2nd edition, Addison-Wesley, 2003.
3. Kai Hwang, Faye Alaye Briggs, "Computer Architecture and Parallel Processing", McGraw Hill, 1984.

***Latest editions of all the suggested books are recommended.**

SEMESTER VIII

ELECTIVE V - LINUX SECURITY AND FORENSICS

Course Code: ICS806

L	T	P	C
3	1	0	4

Objective: Students are taught about Security features of Linux, risks therein and the countermeasures.

Course Contents

Unit I (Lectures 08)

Introduction to Linux Security: Comprehensive Constraints, Elements of Security, Interactive Controls, Process Controls; Local Access Control-Console Access, Privilege Escalation, File Permissions and Attributes, Volatile Data.

Unit II (Lectures 08)

Data Networks Security: Network Visibility, Systems Profiling, Network Architecture, Covert Communications and Clandestine Administration; Voice over IP-VoIP Attack Taxonomy, Network Attacks, System Attacks, Signalling Attacks, Transport Attacks.

Unit III (Lectures 08)

Wireless Attacks: Wireless Networks-The State of the Wireless, Wireless Hacking Physics, RF Spectrum Analysis, Exploiting 802.11. The Hacker Way, Wireless Auditing Activities and Procedures, Bluetooth Profiles, Entities on the Bluetooth Protocol Stack.

Unit IV (Lectures 08)

Web Application Hacking: Enumeration, Access and Controls Exploitation, Insufficient Data Validation, Web 2.0 Attacks, Trust Manipulation, Man-in-the-Middle, Web Infrastructure Attacks; Mail Services-SMTP Basics, SMTP Attack Taxonomy, Alteration of Data or Integrity, Denial of Service or Availability.

Unit V (Lectures 08)

Net filter: Net Filter Enhancements, Enhanced Wireless Stack, File System Enhancement, Additional Kernel Resources, The Forensic Workstation, Live Investigation/Acquisition, Post Mortem Analysis, Handling Electronic Evidence.

Course Outcome:

On successful completion of this module the student will be able to learn and understand-

- Linux Security concepts
- Data Networks Security
- Wireless Networks and Attacks in Wireless Networks
- Web Application Hacking
- Net Filter Enhancements

Text Books

1. UNIX and Linux Forensic Analysis DVD Toolkit, Chris Pogue, Cory Altheide, Todd Haverkos, 1st Edition

***Latest editions of all the suggested books are recommended.**

SEMESTER VIII
INTERNSHIP/PROJECT

Course Code:ICS851

L	T	P	C
0	0	16	8

Objective:

Students will work on an Internship/Project, which is inclined towards practical aspects of the subject of their choice that will help them to reinforce and research further.

Course Contents

The students will undertake a project as part of their final semester. The students can do independent projects or can take up projects in groups of two or more depending on the complexity of the project. The maximum group size will be four and in case of team projects there should be a clear delineation of the responsibilities and work done by each project member. The projects must be approved by the mentor assigned to the student. The mentors will counsel the students for choosing the topic for the projects and together they will come up with the objectives and the process of the project. From there, the student takes over and works on the project.

If the student chooses to undertake an industry project, then the topic should be informed to the mentor, and the student should appear for intermediate valuations. Prior to undertaking this project the students undergo a bridge course.

Bridge Course:

The bridge course ensures that all the students have the correct prerequisite knowledge before their industry interface. The purpose of a bridge course is to prepare for a healthy interaction with industry and to meet their expectations. It would be difficult to establish standards without appropriate backgrounds and therefore to bridge this gap, students are put through a week mandatory classroom participation where faculty and other experts will give adequate inputs in application based subjects, IT and soft skills.

The Project:

Each student will be allotted a Faculty Guide and an Industry Guide during the internship/project work. Students need to maintain a Project Diary and update the project progress, work reports in the project diary. Every student must submit a detailed project report as per the provided template. In the case of team projects, a single copy of these items must be submitted but each team member will be required to submit an individual report detailing their own contribution to the project.

Each student/group should be allotted a supervisor and periodic internal review shall be conducted which is evaluated by panel of examiners.

Project Evaluation Guidelines:

The Project evaluator(s) verify and validate the information presented in the project report.

The break-up of marks would be as follows:

1. Internal Evaluation
2. External Assessment
3. Viva Voce

Internal Evaluation:

Internal Evaluator of project needs to evaluate Internal Project work based on the following criteria:

- Project Scope , Objectives and Deliverables
- Research Work, Understanding of concepts
- Output of Results and Proper Documentation
- Interim Reports and Presentations– Twice during the course of the project

External Evaluation:

The Project evaluator(s) perform the External Assessment based on the following criteria.

- Understanding of the Project Concept
- Delivery Skill
- The Final Project Report
- Originality and Novelty

The Final Project Report Details:

- The report should have a excel sheet that documents the work of every project member

Viva Voce

- Handling questions
- Clarity and Communication Skill

Marking Scheme:

1. **Internal Evaluation:** 35% of Total Marks
2. **External Evaluation:** 50% of Total Marks
3. **Viva Voce:** 15 % of Total Marks

For e.g., If the total mark for the project is 100, then

❖ Internal Evaluation = 35 marks

The break-up of marks is shown below:-

- Interim Evaluation 1: 10 marks
- Interim Evaluation 2: 10 marks
- Understanding of concepts: 5 marks
- Programming technique: 5 marks
- Execution of code : 5 marks

❖ External Evaluation = 50 marks

The break-up of marks is shown below:-

- Project Report: 15 marks
- Explanation of project working: 10 marks
- Execution of code: 10 marks – (if done in industry, a stand-alone module can be reprogrammed and submitted. Error rectification etc can be included by the evaluator)
- Participation in coding: 15 marks

❖ Viva Voce = 15 marks

The break-up of marks is shown below: -

- Questions related to project: 10 marks
- Questions related to technology: 5 marks

The Project evaluator(s) verifies and validates the information presented in the project report.
