ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

M. Tech.
COMPUTER NETWORKS AND INFORMATION SECURITY

(Applicable for the batches admitted from 2015-2016)

VALLURUPALLI NAGESWARA RAO VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

An Autonomous Institute, Accredited by NAAC with 'A' Grade
NBA Accreditation for CE, EEE, ME, ECE, CSE, EIE, IT B.Tech. Programmes
Approved by AICTE, New Delhi, Affiliated to JNTUH
Recognized as "College with Potential for Excellence" by UGC
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VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
HYDERABAD
An Autonomous Institute

Academic Regulations - M.Tech. Programme
(Applicable for the batches admitted from the academic year 2015-2016)

1. Introduction

Academic programmes of the institute are governed by rules and regulations as approved by the Academic Council of the institute.

These academic rules and regulations are effective from the academic year 2015-16, for the students admitted into two year post graduate programme offered by the college leading to Master of Technology (M. Tech.) degree in different specializations offered by the departments of Civil Engineering, Electrical and Electronics Engineering, Mechanical Engineering, Electronics and Communication Engineering, Computer Science and Engineering, Information Technology and Electronics and Instrumentation Engineering.

The M.Tech. degree of Jawaharlal Nehru Technological University Hyderabad shall be conferred on students who are admitted to the programme after fulfilling all the requirements for the award of the degree.

1.1 Eligibility for Admissions

Admission to the above program shall be made subject to the eligibility and qualifications prescribed from time to time. Admissions shall be made on the basis of GATE Rank and merit rank obtained at an Entrance Test conducted by the TSSCHE or as decided by TSSCHE subject to reservations prescribed by the university/ State Government from time to time.

2. Programmes of study

The following two year M.Tech. degree programmes of study are offered by the departments at VNR VJIET.

Department	Specializations
ME	1. Advanced Manufacturing Systems 2. Automation 3. CAD/CAM
CE	1. Highway Engineering 2. Structural Engineering 3 Geotechnical Engineering
EEE	1. Power Electronics 2. Power Systems
CSE	1. Software Engineering 2. Computer Science and Engineering
ECE	1. VLSI System Design 2. Embedded Systems
EIE	Electronics and Instrumentation
IT	Computer Networks and Information Security

- **'ENGLISH'** language is used as the medium of instruction in all the above programmes.

3. Attendance requirements

Each academic year shall be divided into two semesters, each of 90 Instructions days, excluding examination, evaluation, declaration of results etc.

3.1 A student shall be eligible to appear for the semester end examinations in subject if he / she acquire a **minimum of 75% of attendance in that subject.**

3.2 Shortage of attendance up to 10% in any subject (i.e., attendance of 65% and above and below 75%) in a semester may be condoned by the Institute Academic Committee based on the rules prescribed by the Academic Council of the Institute from time to time.

3.3 A student shall get **minimum required attendance in at least three (03) theory subjects** in the present semester to get promoted to the next semester. In order to qualify for the award of the M.Tech. degree, the student shall complete all the academic requirements of the subjects, as per the course structure.

3.4 Shortage of **attendance below 65% shall in NO case be condoned**.

3.5 A stipulated fee shall be payable towards condonation of shortage of attendance.

3.6 In case the student secures less than the required attendance in any subject(s), he shall not be permitted to appear for the semester end examination in that subject(s). He shall re-register for the subject when offered next.

4. Evaluation

i. The performance of a student in each semester shall be evaluated subject–wise with a maximum of **100 marks for theory** and **100 marks for practical subjects**. In addition, **mini-project** and **comprehensive viva-voce** shall be evaluated for **100 marks** respectively.

ii. For theory subjects, the distribution shall be **40 marks for mid-term evaluation** and **60 marks for the semester end examination**.

❖ **Mid-Term Evaluation (40 M):**

Mid-term evaluation consists of **mid-term examination (30 M)** and **assignment/objective test/ case study/course project (10 M).**

➢ **Mid-term examination (30 M):**

- For theory subjects, two mid-term examinations shall be conducted in each semester as per the academic calendar. Each mid-term examination shall be evaluated for 30 marks.
- Pattern of Mid-term examination:
  3 X 10M = 30 M (three internal choice questions one from each UNIT shall be given, the student has to answer ONE question from each UNIT)
- There shall be TWO mid-term examinations for each subject and the average of two mid-term examinations shall be considered for calculating final mid-term examination marks in that subject.

- **Assignment/objective exam/ case study/course project (10 M):**

- Two assignment/objective exam/ case study/course project shall be given to the students covering the syllabus of first mid-term and second mid-term examinations respectively and evaluated for 10 marks each.
- The first assignment/objective exam/ case study/course project shall be submitted before first mid-term examination and the second one shall be submitted before second mid-term examination.
- The average of 2 assignments shall be taken as final assignment marks.

iii. For practical subjects, there shall be a **continuous evaluation during the semester for 40 marks and 60 marks for semester end examination**. Out of the 40 marks, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and **15 marks for practical examination** and **15 marks for laboratory record.**

- **Semester End Examination (60 M):**

(a) Theory Courses

Question paper pattern for semester end examination (60 Marks)

- Paper shall consist of 05 questions of 10 marks each. (05X12M = 60 M)
- There shall be 01 question from each unit with internal choice.

(b) Practical Courses

Each laboratory course shall be evaluated for 60 marks. The semester end examination shall be conducted by two examiners, one Internal and other external concerned with the subject of the same / other department / Industry. The evaluation shall be as per the standard format.

4.1. **Evaluation of Mini-Project:** There shall be two presentations during the first year, one in each semester. For mini-project 1 and mini-project 2, a student under the supervision of a faculty member, shall collect the literature on a topic, critically review the literature, carry out the mini-project, submit it to the department in a report form and shall make an oral presentation before the departmental Project Review Committee (PRC). The Departmental PRC consists of Head of the Department, supervisor and one senior faculty member of the department. For each mini-project there shall be only internal evaluation of 100 marks. A student has to secure a minimum of 50% to be declared successful.

4.2. There shall be a comprehensive viva-voce in II year I semester. The comprehensive viva- Voce shall be conducted by a committee consisting of Head of the Department and two senior faculty members of the department. The comprehensive viva-voce is aimed to assess the students' understanding in various subjects studied during the M.Tech. programme of study. The comprehensive viva-voce shall be evaluated for 100 marks by the committee. There are no internal marks for the comprehensive viva-voce. A student must secure a minimum of 50% to be declared successful.

4.3. A student shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the semester end examination and a minimum aggregate of 50% of the total marks in the semester end examination and mid-term evaluation taken together.

4.4. A student shall be given one chance to re-register, after completion of the course work, for each subject, provided the internal marks secured by a student are less than 50% and he has failed in the semester end examination. In such a case student may re-register for the subject(s) and secure required minimum attendance. Attendance in the re-registered subject(s) has to be calculated separately to become eligible to write the end examination in the re-registered subject(s). Re-registration for the subjects is allowed only if that particular re-registration subjects are the hindrance for the award of Degree. Re-registration is allowed in this case provided the student doesn't have any subject(s) yet to pass other than the re-registration subjects where the internal marks are less than 50% with prior permission.

4.5. Laboratory examination for M.Tech. courses must be conducted with two examiners, one of them being laboratory class teacher and second examiner shall be a teacher of same specialization either external or a teacher from the same department other than the teacher who conducted laboratory classes for that batch.

5. Evaluation of Project / Dissertation Work.

5.1 Registration of Project Work: A student shall be permitted to register for the project work after satisfying the attendance requirement of all the subjects (theory and practical subjects).

5.2 A Project Review Committee (PRC) shall be constituted with at least four members namely HOD, PG coordinator of the M.Tech. programme, project supervisor and one senior faculty member of same specialization.

5.3 After getting permission as per 5.1, a student has to submit, in consultation with the project supervisor, the title, objective and plan of action of his project work to the Departmental PRC for its approval. Only after obtaining the approval of PRC, the student can initiate the project work.

5.4 If a student wishes to change his supervisor or topic of the project he can do so with the approval of PRC. However, the committee shall examine whether the change of topic/supervisor leads to a major change of his initial plans of project proposal. If so, the date of registration for the project work shall be the date of change of supervisor or topic as the case may be.

5.5 Internal evaluation of the project shall be on the basis of the seminars (Project reviews) conducted during the second year by the PRC. A student shall submit draft report in a spiral bound copy form.

5.6 The work on the project shall be initiated in the beginning of the second year and the duration of project is for two semesters. A student is permitted to submit Project work only after successful completion of theory and practical course with the approval of PRC not earlier than 240 days from the date of registration of the project work. For the approval of PRC the student shall submit the draft copy of thesis to the Head of the Department (Through project supervisor and PG coordinator) and shall make an oral presentation before the PRC.
The student is eligible to submit project work if he has published at least one paper covering 70% of the project work and presented his project work in Show and Tell activity.

5.7 After approval of PRC, every student has to submit three copies of the project dissertation certified by the supervisor to the Department.

5.8 The dissertation shall be adjudicated by one examiner selected by the Chief Superintendent. For this, HOD shall submit a panel of 3/ 5 examiners, who are eminent in that field with the help of the concerned guide.

5.9 If the report of the examiner is not favourable, the student shall revise and resubmit the Dissertation, within the time frame as prescribed by PRC. If the report of the examiner is unfavourable again, the dissertation shall be summarily rejected.

5.10 If the report of the examiner is favorable, viva-voce examination shall be conducted by a board consisting of the project supervisor, Head of the Department and the external examiner who adjudicated the Thesis. The Board shall jointly report students work as:

A. Excellent
B. Good
C. Satisfactory
D. Unsatisfactory

Head of the Department shall coordinate and make arrangements for the conduct of viva-voce examination. The student has to secure any one of the grades as Excellent, Good or Satisfactory on his dissertation and viva-voce. If the report of the viva-voce is unsatisfactory, the student shall retake the viva-voce examination after three months, making modifications as suggested. If he fails to get a satisfactory report at the second viva-voce examination, he has to re-register for the project work as mentioned in clause 5.1. However, the student may select a new guide or new topic or both with the approval of the PRC and submit the project dissertation with a minimum of 240 days from the date of re-registration. Of course, this shall not prejudice the clause 6.1 below.

6. Award of Degree and Class

A student shall be declared eligible for the award of the M.Tech. degree, if he pursues a course of study and complete it successfully for **not less than two academic years** and **not more than four academic years**.

6.1 A student, who fails to fulfil all the academic requirements for the award of the degree within four academic years from the year of his admission, for any reason whatsoever, shall forfeit his seat in M.Tech. Course.

6.2 A student shall register and put up **minimum academic requirement in all 84 credits** and earn **84 credits.** Marks obtained in all 86 credits shall be considered for the calculation of Cumulative Grade Point Average (CGPA).

6.3 CGPA System:

Method of awarding absolute grades and grade points in two year M.Tech. degree programme is as follows:

- Absolute Grading Method is followed, based on the total marks obtained in mid-term evaluation and semester end examinations.

- Grades and Grade points are assigned as given below.

Marks Obtained	Grade	Description of Grade	Grade Points(GP) Value Per Credit
>=90	O	Outstanding	10.00
>=80 and <89.99	A	Excellent	9.00
>=70 and <79.99	B	Very Good	8.00
>=60 and <69.99	C	Good	7.00
>=50 and <59.99	D	Pass	6.00
<50	F	Fail	
Not Appeared the Exam(s)	N	Absent	

The student is eligible for the award of the M.Tech degree with the class as mentioned in the following table.

CGPA	Class
>= 8.0	First Class with Distinction
>= 7.0 and <8.0	First Class
>= 6.0 and < 7.0	Second Class

- **Calculation of Semester Grade Points Average (SGPA):**

- The performance of each student at the end of the each semester shall be indicated in terms of SGPA. The SGPA shall be calculated as below:

$$\mathbf{SGPA} = \frac{\textbf{Total earned weighted grade points in a semester}}{\textbf{Total credits in a semester}}$$

$$\mathbf{SGPA} = \frac{\sum_{i=1}^{p} C_i * G_i}{\sum_{i=1}^{p} C_i}$$

Where Ci = Number of credits allotted to a particular subject 'i'

Gi = Grade point corresponding to the letter grade awarded to the subject 'i'

i = 1,2,…..p represent the number of subjects in a particular semester

Note: SGPA is calculated and awarded for the students who pass all the courses in a semester.

- **Calculation of Cumulative Grade Point Average (CGPA):**

The CGPA of a student for the entire programme shall be calculated as given below:

- Assessment of the overall performance of a student shall be obtained by calculating Cumulative Grade Point Average (CGPA), which is weighted average of the grade points obtained in all subjects during the course of study.

$$\mathbf{CGPA} = \frac{\textbf{Total earned weighted grade points for the entire programme}}{\textbf{Total credits for the entire programme}}$$

$$\mathbf{CGPA} = \frac{\sum_{j=1}^{m} C_j * G_j}{\sum_{j=1}^{m} C_j}$$

Where Cj = Number of credits allotted to a particular subject 'j'

Gj = Grade Point corresponding to the letter grade awarded to that subject 'j'

j = 1,2,….m represent the number of subjects of the entire program.

- Grade lower than D in any subject shall not be considered for CGPA calculation. The CGPA shall be awarded only when the student acquires the required number of credits prescribed for the program.

➢ **Grade Card**

The grade card issued shall contain the following:

a) The credits for each subject offered in that semester

b) The letter grade and grade point awarded in each subject

c) The SGPA/CGPA

d) Total number of credits earned by the student up to the end of that semester.

7. Withholding of Results

If the student has not paid dues to the Institute, or if any case of indiscipline is pending against him, the result of the student may be withheld and he shall not be allowed into the next higher semester. The award or issue of the provisional certificate and the degree may also be withheld in such cases. This delay shall not prejudice clauses Nos.6.0 and 6.1.

8. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subjects in place of repeated subjects as decided by the Chairman of the BoS of the respective departments. He/She shall be admitted under the regulation of the batch in which he/she is readmitted.

9. Minimum Instruction Days

The minimum instruction days for each semester shall be **90 instruction days.**

10. General

10.1 The academic regulations should be read as a whole for purpose of any interpretation.

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

10.3 The Institute may change or amend the academic regulations and syllabi at any time and the changes and amendments made shall be applicable to all the students with effect from the date notified by the Institute.

10.4 Wherever the words he, him or his occur, they shall also include she, her and hers.

11. Supplementary Examination

Supplementary examinations shall be conducted along with regular semester end examinations. (During even semester regular examinations, supplementary examinations of odd Semester and during odd semester regular examinations, supplementary examinations of even semester shall be conducted).

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

To impart quality technical education that fosters critical thinking, dynamism and innovation to transform students into globally competitive IT professionals.

MISSION

- To provide quality education through innovative teaching and learning process that yields advancements in state-of-the-art information technology.
- To provide a learning environment that promotes quality research.
- To inculcate the spirit of ethical values contributing to the welfare of the society.

Program Educational Objectives (PEOs):

IT with specialization in Computer Networks & information security will be able to

1. Apply the necessary mathematical tools and fundamental & advanced knowledge of computer science & engineering and computer networks
2. Develop computer network & security systems understanding the importance of social, business, technical, environmental, and human context in which the systems would work
3. Articulate fundamental concepts, design underpinnings of network & security systems, and research findings to train professionals or to educate post engineering students
4. Contribute effectively as a team member/leader, using common tools and environment, in computer networks & security projects, research, or education
5. Pursue life-long learning and research in computer networks and contribute to the growth of that field and society at large

Program Outcomes (POs):

1. **Scholarship of knowledge**: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the conceptualization of Network & security models.
2. **Critical thinking:** Identify, formulate, research literature and solve complex Network & security problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
3. **Problem solving**: Design solutions for complex real time problems and design systems, components or processes that meet specified needs with appropriate consideration for Network & security
4. **Research skill**: Conduct investigations of complex Network & security problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
5. **Modern tool usage** : Create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.
6. **Collaborative and multidisciplinary work**: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
7. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
8. **Independent and reflective learning**: Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.
9. **Ethical practices and social responsibility**: Understand and commit to professional ethics and responsibilities and norms of engineering practice. Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.
10. **Project management:** Ability to undertake problem identification, formulation and providing optimum solution
11. **Lifelong learning**: Recognize the need for, and have the ability to engage in independent and life-long learning.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY

M.TECH. (COMPUTER NETWORKS & INFORMATION SECURITY)
(R15 Regulation)

I Year I Semester **COURSE STRUCTURE**

Code	Group	Course	L	P	Credits
CNS01	Core	Data Structures and Algorithms	3	1	4
CNS02		Advanced Computer Networks	3	1	4
CNS03		Principles of Information Security	3	1	4
CNS11	Elective – I & Elective – II Basket	Advanced Databases	3	0	3 + 3
CNS12		Network Programming	3	0	
CNS13		Data Mining and Machine Learning	3	0	
CNS14		Distributed Systems	3	0	
CNS15		Operating Systems Security	3	0	
SWE16		Cloud Computing	3	0	
SWE31	Open Elective-I	Scripting Languages	3	0	3
CNS31		Security in E-Commerce			
ENG32		Professional and Technical Communication			
CNS51	Lab	Information Security and Networks Laboratory	0	3	2
CNS61		Mini Project-1	0	0	4
Total			**18**	**6**	**27**

I Year II Semester **COURSE STRUCTURE**

Code	Group	Course	L	P	Credits
CNS04	Core	Wireless Networks and Mobile Computing	3	1	4
CNS05		Applications of Network Security	3	1	4
CNS06		Information Security Management and Standards	3	1	4
CNS21	Elective – III & Elective – IV Basket	Ethical Hacking	3	0	3 + 3
CNS22		Computer Forensics &Cyber Security	3	0	
CNS23		Adhoc and Sensor Networks	3	0	
CNS24		Network Management Systems	3	0	
CNS25		Secure Software Engineering	3	0	
CNS26		Software Reliability & Metrics	3	0	
SWE41	Open Elective-II	Advanced Unix Programming	3	0	3
CNS41		Android Application Development			
SWE42		Soft Skills			
CNS52	Lab	Wireless Networks Simulation Laboratory	0	3	2
CNS62		Mini Project-2	0	0	4
Total			**18**	**6**	**27**

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY

M.TECH. (COMPUTER NETWORKS & INFORMATION SECURITY)
(R15 Regulation)

II Year I Semester **COURSE STRUCTURE**

Code	Course	L	P	Credits
CNS63	Comprehensive Viva-Voce	0	0	4
CNS71	Internship/Dissertation Phase – I	0	0	8
Total		**0**	**0**	**12**

II Year II Semester **COURSE STRUCTURE**

Code	Course	L	P	Credits
CNS72	Dissertation Phase – II	0	0	18
Total		**0**	**0**	**18**

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY, HYDERABAD

I - I Sem. M.Tech (Computer Networks & Information Security)	**L**	**T/P/D**	**C**
	3	**1**	**4**

(CNS01) DATA STRUCTURES AND ALGORITHMS

Course Objectives:

- **Analyze** algorithms and know abstract data types
- **Experiment** and **Discriminate** stack, queue and their applications.
- **Illustrate, Evaluate** Searching and sorting techniques in real-world scenarios.
- **Summarize** the knowledge of graphs and trees and their applications.

Course Outcomes:

After completion of the course the student is able to

- **Demonstrate** how to find the complexity of an algorithm
- **Apply** fundamental knowledge of Data Structures in Real time scenarios
- **Memorize** and **apply** the techniques in Software Development Life cycle.
- **Design** and implement various algorithms on graph /tree data structures, including finding the minimum spanning tree and shortest path, Encoding and Decoding.

UNIT I:

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation- Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and nonlinear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, singly linked lists – insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists.

UNIT II:

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap.

UNIT III:

Searching–Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hash table.

Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV:

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT , representations, recursive and non-recursive traversals, Java code for traversals, Threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-DFS and BFS, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT V:

Search trees- Binary search tree-Binary search tree ADT ,insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees – Definition and examples only, B-Trees-definition, insertion and searching operations, Comparison of Search trees. Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

Text Books:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.

2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).

References:

1. Data structures and Algorithms in Java, R.Lafore, Pearson education.
2. Java: The Complete Reference, 8th Editon, Herbert Schildt, TMH.
3. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.

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I - I Sem. M.Tech (Computer Networks & Information Security)	**L**	**T/P/D**	**C**
	3	**1**	**4**

(CNS02) ADVANCED COMPUTER NETWORKS

Course Objectives:
The objective of this course is to build a solid foundation in computer networks concepts and design

- **Analyze** computer network architectures, protocols and interfaces.
- Categorize and **understand** the OSI reference model and the Internet architecture network applications.
- **Relate** the course and expose students to the concepts of traditional as well as modern day computer networks
- **Estimate** the key concepts and practices employed in modern computer networking

Course Outcomes:
After completion of the course the student is able to

- **Learn** about networking issues and differentiating TCP/IP and 7-Layer OSI models
- **Analyze** different routing protocols for various applications
- **Learn** about various switching protocols
- **Analyze** different WAN protocols and to implement networking concepts through JAVA programming

Suggested Simulator tools: NS-2/*NS-3, OPNET, Packet Tracer, Boson, Wireshark.*

UNIT I:
Review:
Computer Networks and the Internet: History of Computer Networking and the Internet, Networking Devices, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones.
Networking Models: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.

UNIT II:
Network Routing:
Routing and its Concepts: Structure of a Router, Basic Router Configuration, Building a Routing Table, Static Routing, Dynamic Routing – Distance Vector Routing Protocol (RIPv1, RIPv2, EIGRP),Link State Routing Protocols (OSPF).

UNIT III:
LAN Switching:
Switching and its Concepts: Structure of a Switch, Basic Switch Configuration, Virtual LANs (VLANs), VLAN Trunking Protocol (VTP), Spanning Tree Protocol (STP), Inter-VLAN Routing.

UNIT IV:
Wide Area Networks (WANs): Introduction to WANs, Point-to-Point Protocol (PPP) concepts, Frame Relay concepts, Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), IPv6.

UNIT V:
Network Programming using Java: TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI) -Basic RMI Process, Implementation details - Client-Server Application.

Text Books:

1. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W.Ross, Fifth Edition, Pearson Education, 2012.
2. Network Fundamentals, Mark Dye, Pearson Education.
3. Routing Protocols & Concepts, Rick Graziani, Pearson Education.
4. LAN Switching & Wireless, Wayne Lewis, Pearson Education.
5. Accessing the WAN, Bob Vachon, Pearson Education.
6. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.

References:

1. Computer Networks: A Systems approach, Larry L. Peterson & Bruce S. Davie, Fifth edition, Elsevier, rp2012.
2. Computer Networks: A Top-Down Approach, Behrouz A. Forouzan, Firoz Mosharaf, Tata McGraw Hill, 2012.
3. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)
4. An Engineering Approach to Computer Networking, S.Keshav, Pearson Education, 1997.
5. Computer Networks: Principles, Technologies and Protocols For Network Design, Natalia Olifer, Victor Olifer, Wiley India, 2006.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY, HYDERABAD

I – I Sem. M.Tech (Computer Networks & Information Security)	**L**	**T/P/D**	**C**
	3	**1**	**4**

(CNS03) PRINCIPLES OF INFORMATION SECURITY

Course Objectives:

- **Understand** the computer security concepts
- **Differentiate** symmetric / asymmetric cryptographic techniques.
- **Analyse** various security mechanisms using cryptographic primitives
- **Discriminate** of security mechanism at various levels of computer networking and to be familiar with security defensive devices e.g. firewalls, intrusion detection etc.

Course Outcomes:

After completion of the course the student is able to

- **Describe** and **understand** the overview of security principles
- **Understanding** of network security related issues and mitigating mechanisms
- **Analyse** different malwares and security tools
- **Interpret** networking and security skills to industrial need

UNIT I:

Information Security: Introduction, History of Information security, What is Security, Security Goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, CNSS Security Model, Components of Information System, Balancing Information Security and Access, Approaches to Information Security Implementation, The Security Systems Development Life Cycle.

UNIT II:

Cryptography: Concepts and Techniques, symmetric and asymmetric key cryptography, steganography,
Symmetric Key Ciphers: DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation , AES structure, Analysis of AES , Key distribution
Asymmetric Key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange

UNIT III:

Message Authentication and Hash Functions: Authentication requirements and functions, MAC and Hash Functions,
MAC Algorithms: Secure Hash Algorithm, HMAC, Digital signatures, X.509, Kerberos

UNIT IV:

Security at Layers (Network, Transport, Application): IPSec, Secure Socket Layer(SSL), Transport Layer Security (TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME

UNIT V:

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls

Text Books:

1. Principles of Information Security : Michael E. Whitman, Herbert J.Mattord, CENGAGE Learning, 4th Edition.
2. Cryptography and Network Security: William Stallings, Pearson Education, 4th Edition
3. Cryptography and Network Security: Forouzan Mukhopadhyay, McGraw Hill, 2nd Edition

References:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
3. Cryptography and Network Security: Atul Kahate, McGraw Hill, 2nd Edition
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH.
5. Handbook of Security of Networks, Yang Xiao, Frank H Li, Hui Chen, World Scientific, 2011

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Elective - I	**3**	**0**	**3**

(CNS11) ADVANCED DATABASES

Course Objectives:

- **Learn** the modelling and design of databases.
- **Acquire** knowledge on parallel and distributed databases and its applications.
- **Study** the usage and applications of Object Oriented database
- **Understand** the principles of intelligent databases.

Course Outcomes:

After completion of the course the student is able to

- **Demonstrate** the emerging databases such as XML, Cloud and Big Data.
- **Estimate** the inquisitive attitude towards research topics in databases.
- **Apply** the knowledge of XML in designing the data bases.
- **Develop** the databases that are used in cloud and bigdata.

UNIT I:

Parallel and Distributed Databases: Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems- Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies.

UNIT II:

Object and Object Relational Databases: Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies.

UNIT III:

Intelligent Databases: Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications Design Principles for Active Rules- Temporal Databases: Overview of Temporal DatabasesTSQL2- Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships Spatial Data Structures- Spatial Access Methods- Spatial DB Implementation.

UNIT IV:

Advanced Data Models: Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management -Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing Data Mining- Text Mining.

UNIT V:

Emerging Technologies: XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages Introduction to Big Data-Storage-Analysis.

Text Books:

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.

References:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database SystemConcepts”, Fifth Edition, McGraw Hill, 2006.
2. C.J.Date, A.Kannan and S.Swamynathan, ”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
3. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004.

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Elective - I	**3**	**0**	**3**

(CNS12) NETWORK PROGRAMMING

Course Objectives:

- **Understand** the working principle of networks, and topologies and understand the architecture of client-server, and socket programming
- **Recognize** the deferent protocols like TCP, UDP, and RPC and their applications and an understanding of the design considerations in building of network applications
- **Analyze** the in-depth knowledge of Berkley sockets, and the system calls needed to support network programming
- **Understanding** of Multi-threading

Course Outcomes:

After completion of the course the student is able to

- **Underlay** the network hardware, network topologies, and protocols
- **Design** experiment WIN32 and/or UNIX system calls applications, multi- threading, access controls, signal processing, and inter-process communication.
- **Design** considerations in creating network applications.
- **Design** client server application to support communication interfaces.

UNIT I:

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities. Bourne again shell (bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell Meta characters, file name substitution, shell variables, command Substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples. Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

UNIT II:

Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lockf and fcntl functions, file permissions-chmod, fchmod,file ownership-chown,lchown,fchown, links-soft links and hard links – symlink, link, unlink.
File and Directory management – Directory contents, Scanning Directories- Directory file APIs.
Process- Process concept, Kernel support for process, process attributes, process control – process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT III:

Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation,IPC between related processes using unnamed pipes, FIFOs-creation,IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes,popen and pclose library functions,Introduction to message queues, Semaphores and shared memory.
Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example. Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT IV:

Shared Memory- Kernel support for shared memory, Unix system V APIs for shared memory, client/server example.

Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model ,Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented - Communication ,Socket system calls for Connectionless - Communication,
Example- Client/Server Programs- Single Server-Client connection, multiple simultaneous clients, Socket options - setsockopt, getsockopt, fcntl.

UNIT V:
Network Programming in Java-Network basics, TCP sockets, UDP sockets(datagram sockets),Server programs that can handle one connection at a time and multiple connections(using multithreaded server),Remote Method Invocation(Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

Text Books:

1. Unix System Programming using C++, T.Chan, PHI.(Units II,III,IV)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
3. An Introduction to Network Programming with Java, Jan Graba,Springer,rp 2010.(Unit V)
4. Unix Network Programming, W.R. Stevens, PHI.(Units II,III,IV)

References:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, and Wiley India Edition.
5. Unix Network Programming the Sockets Networking API, Vol.-I, W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
6. Unix Internals, U.Vahalia, Pearson Education.
7. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.

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Elective - I	**3**	**0**	**3**

(CNS13) DATA MINING AND MACHINE LEARNING

Course Objectives:

- **Learn** the concepts of knowledge discovery in databases and apply statistical methods to raw data.
- **Discover** interesting patterns from large amounts of data to analyse and extract patterns to solve the real-world applications.
- **Apply** the data mining & machine learning algorithms to build analytical applications.
- **Develop** a deeper understanding of several major topics in machine learning and Evolutionary algorithms.

Course Outcomes:

After completion of the course the student is able to

- **Identify** the key elements of data mining & machine learning
- **Understand** the principles, advantages, limitations and possible applications of machine learning
- **Discriminate** supervised and unsupervised learning to data analysis problems.
- **Evaluate** the performance of algorithms, as well as formulate and test hypotheses.

UNIT I:

Introduction: Fundamentals of data mining, what is machine Learning, Data Mining and Machine Learning Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task primitives, Integration of a Data mining System with a Database or a Data warehouse systems, Major issues in Data Mining.

Data Preprocessing: Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

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UNIT II:

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent item sets using candidate generation, Generating association rules from frequent item sets, mining frequent item sets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis

UNIT III:

Classification: Introduction, The problem of classification, Decision Trees: Splitting criteria, Overfitting, Pruning, missing values and continuous attributes. Specific algorithms: ID3, CART, C4.5. Assessing classifier accuracy, Cross-validation, Confidence intervals for the error, Limitations of Decision Trees and Decision Rules, ROC/AUC metrics.

UNIT IV:

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modelling, clustering based on density distribution function, wavelet transformation based clustering, conceptual Clustering, Constraint-Based Cluster Analysis, Outlier Analysis..

UNIT V:

Machine Learning and Advanced Topics: Machine Learning and Statistics, Learning Machine, Types of Learning Methods, Support vector machines, k-Nearest Neighbour method. Evolutionary algorithm: Fundamentals of genetic algorithms, Optimization using genetic algorithms, Machine Learning using genetic algorithms, genetic algorithm for clustering.

Text Books:

1. Data Mining – Concepts and Techniques - Jiawei Han, Micheline Kamber and Jian Pei,3rd edition, Morgan Kaufmann Publishers, ELSEVIER.

2. Machine Learning. , T. Mitchell. McGraw-Hill, 1997
3. Data Mining-Concepts. Models, Methods, and Algorithms- Mehmed Kantardzic, 2nd edition, IEEE press.2011.
4. Ian H. Witten, Eibe Frank and Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques (Third Edition).

References:

1. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education.
2. Data Mining Techniques – Arun K Pujari, 2nd edition, Universities Press.
3. Data Classification: Algorithms and Applications-Charu C. Aggarwal, CRC Press, Taylor & Francis Group, 2014.

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Elective - II	**3**	**0**	**3**

(CNS14) DISTRIBUTED SYSTEMS

Course Objectives:

- **Summarize** the fundamental architectures and distributed system models
- **Discriminate** conventional OS with distributed OS features
- **Understand** synchronization problems and Clock mechanisms
- **Analyse** various security issues in distributed environment cryptographic algorithms and fault tolerant mechanisms.

Course Outcomes:

After completion of the course the student is able to

- **Analyse** the problem with clock mechanisms in distributed environment
- **Understand** the concept of distributed transactions , distributed operating system
- **Remember** the concept of Fault Tolerant Mechanisms
- **Apply** various security algorithms

UNIT I:

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models- Introduction, Architectural and Fundamental models, Networking and Internetworking, Inter process Communication. Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT II:

Operating System Support: Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems- Introduction, File Service architecture, case study- SUN network file systems. Name Services-Introduction; Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT III:

Peer to Peer Systems: Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, Ocean Store. Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement - Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT IV:

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency controls. Distributed Transactions - Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V:

Security: Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 WiFi.Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study-Introduction, CORBA RMI,CORBA Services.

Text Books:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor& Francis Group, 2010.

References:

1. Distributed Computing, S.Mahajan and S.Shah, OxfordUniversity Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, and Tata McGraw- Hill Edition.
4. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
5. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani & MukeshSinghal, Cambridge, rp 2010

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Elective - II	**3**	**0**	**3**

(CNS15) OPERATING SYSTEMS SECURITY

Course Objectives:

- **Understand** the need for security in Operating Systems.
- **Knowledge** of the state of the art of operating systems security.
- **Analyze** security vulnerabilities, exploits and defence mechanisms.
- **Design** various Operating Security Mechanisms

Course Outcomes:

After completion of the course the student is able to

- **Describe** the typical uses of different operating systems in the enterprise and how they interact with other components of an organization's core IT infrastructure
- **Classify** fundamental system administration and audit operations
- **Reference** U.S. supervisory agency examination work programs
- **Perform** user administration, access control, auditing, and reporting on various operating systems

UNIT I:

Introduction to Operating System: Operating System (OS), Types of Threats, Basic OS Security Mechanisms

UNIT II:

An Overview of Malware Threats, Logging, Auditing, and Recovery
Malware Taxonomy, Viruses, Worms, Rootkits, Log Generation, Log Auditing, Log-based Recovery

UNIT III:

OS-level Memory Protection, Honeypot and Honeyfarm: Review of OS Memory Management, NX Bit, Randomization, Honeypot Taxonomy, Recent Honeypot Advances, Deployment and Liability

UNIT IV:

Virtualization Technology and Applications: Virtualization Taxonomy, Security Applications, Special Topic on Worms

UNIT V :

Assurance and Special Topic- Assurance: Introduction to Assurance, Building Systems with Assurance, Formal Methods Evaluating Systems
Rootkits: Rootkit Basics, Advanced Rootkit Techniques, Rootkit Defense, Special Topic on Botnets, Malicious Logic, Vulnerability Analysis, Auditing, Intrusion Detection

Text Books:

1. Michael Palmer Guide to Operating Systems Security, Course Technology, 2004. ISBN: 0-619-16040-3
2. Matt Bishop Computer Security: Art and Science, Addison Wesley, 2003. ISBN 0-201-44099-7

References:

1. Professional Linux Kernel Architecture, Wolfgang Mauerer.
2. Understanding the Linux Kernel, Third Edition, Daniel P. Bovet and Marco Cesati.
3. Charles P. Pfleeger and Shari Lawrence Pfleeger Security in Computing, 3rd Edition, Prentice Hall PTR, 2002. ISBN 0-130-35548-8

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Elective - II	3	0	3

(SWE16) CLOUD COMPUTING
(Elective- 1 & 2)

Course Objectives:

- **Understand** cloud computing paradigm, recognize its various forms
- Get a clear **understanding** of Cloud Computing fundamentals and its importance to various organizations.
- **Master** the concepts of IaaS, PaaS, SaaS, Public and Private clouds.
- **Understand** AWS and learn to develop applications in AWS.

Course Outcomes:

After completion of the course the student is able to

- **Articulate** the main concepts, key technologies, strengths, and limitations of cloud computing
- **Identify** the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
- **Explain** the core issues of cloud computing such as security, privacy, and interoperability.
- **Identify** problems, and explain, analyze, and evaluate various cloud computing solutions.

UNIT I:

Systems Modelling, Clustering and Virtualization: Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data Centres.

UNIT II:

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, the Enterprise Cloud Computing Paradigm.

UNIT III:

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing. Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT IV:

Monitoring, Management and Applications: An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT V:

Governance and Case Studies: Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

Text Books:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing , Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.
3. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011

References:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011

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Open Elective-I	**3**	**0**	**3**

(SWE31) SCRIPTING LANGUAGES

Course Objectives:

- To **appreciate** the nature of scripting and the role of scripting languages
- To effectively **apply** knowledge of scripting to new situations and learn from the experience
- To be able to **analyze** requirements of software systems for the purpose of determining the suitability of implementation of PERL, PHP or PYTHON
- To **design and implement** PERL, PHP or PYTHON software solutions that accommodate specified requirements and constraints, based on analysis or modeling or requirements specification

Course Outcomes:

After completion of the course the student is able to

- **Distinguish** between typical Scripting Languages & system and application programming languages
- **Apply** the syntax and semantics of languages such as PERL, PHP and PYTHON for effective scripting
- **Develop** a database driven PHP application
- **Design and implement** the appropriate software solutions using Scripting Languages

UNIT I:

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines

UNIT II:

Advance Perl: Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, security Issues.

UNITIII:

PHP Fundamentals: PHP Basics- Features Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures . Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT IV

Advanced PHP and MYSQL: PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Introducing MYSQL, Installing and Configuring MYSQL, MYSQL Storage Engines and Datatypes, PHP's MYSQL Extension-PHP's MySQL Commands, Querying MySQL, Retrieving and Displaying Data, Retrieving Database and Table Information Retrieving Field Information.

UNIT V:

Python: Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python - Building Small, Efficient Python Web Systems ,Web Application Framework.

Text Books:

1. The World of Scripting Languages, David Barren, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, press Publications (Dream tech.).

References:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHPJ.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development Julie Meloni and Matt Telles, Cengage Learning Publication
4. PHP 5.1 J.Bayross and S.Shah,The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.

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Open Elective-I	**3**	**0**	**3**

(CNS31) SECURITY IN E – COMMERCE

Course Objectives:

- **Examine** current threats facing organizations that conduct business online
- **Analyze** cryptography and related security techniques to e-commerce including secure electronic transactions
- **Discriminate** electronic payment systems, intellectual property protection
- **Understand** and **analyze** security development cycle and security services

Course Outcomes:

After completion of the course the student is able to

- **Describe** various forms of electronic commerce and explain the range of threats to e-commerce security
- **Identify** different areas susceptible to malicious activity
- **Summarize** different cryptographic techniques and their technical characteristics w.r.t e-commerce
- **Explain** how cryptography can be, and is, used to achieve security

UNIT I:

Introduction to E-Commerce: Network and E-Commerce – Types of E-Commerce – E- Commerce Business **Models:** B2C, B2B, C2C, P2P and M-commerce business models – E- Commerce Payment systems: Types of payment system – Credit card E-Commerce transactions – B2C E-Commerce Digital payment systems – B2B payment system.

UNIT II:

Security and Encryption: E-Commerce Security Environment – Security threats in E-Commerce environment – Policies, Procedures and Laws.

UNIT III:

Inter-organizational trust in E-Commerce: Need – Trading partner trust – Perceived benefits and risks of Ecommerce – Technology trust mechanism in E-Commerce – Perspectives of organizational, economic and political theories of inter-organizational trust – Conceptual model of inter-organizational trust in Ecommerce participation.

UNIT IV:

Introduction to trusted computing platform: Overview – Usage Scenarios – Key components of trusted Platform – Trust mechanisms in a trusted platform. Trusted platforms for organizations and individuals –Trust models and the E-Commerce domain.

UNIT V:

E-Commerce Security: SET for E-Commerce Transactions, Business requirements for SET, SET System Participants, Dual Signature and Signature, Authentication and Message Integrity, Payment Processing. Secure Internet Programming, Security development life cycle, Internet Security Standards and Internet Security Products, Trusted Internet Security services.

Text Books:

1. Kenneth C. Laudon and Carol Guercio Trave, “E-Commerce Business Technology Society”,, Pearson Education, 2005.
2. Pauline Ratnasingam, “Inter-Organizational Trust for Business-to-Business E- Commerce”, IRM, Press, 2005.
3. Siani Pearson, et al, “Trusted Computing Platforms: TCPA Technology in Context”, Prentice Hall, PTR, 2002

References:

1. Ravi Kalakota and Andrew Whinston –"Frontiers Electronic Commerce", 2nd Edition, Addison-Wesley, 1999.
2. P.T. Joseph, S.J, "E Commerce", Prentice Hall, 2nd Edition, 2008
3. Anup Gosh, "E-Commerce Security and Privacy", 2001,
4. Relevant research papers from the journals

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Open Elective-I	**3**	**0**	**3**

(ENG32) PROFESIONAL AND TECHNICAL COMMUNICATION

Introduction:
This course aims to offer students a practical approach to professional and technical communication; and to focus specifically on verbal and written communication. Additionally, the course is designed to build confidence and; group communication and public speaking competence. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

Course Objectives:

- To enable the students to **write** without errors in spelling, mechanics, grammar and punctuation; resume, business letters, proposals and reports to accomplish academic as well as professional goals.
- To **train** students to write clearly, cohesively, emphatically and concisely.
- To **groom** students to speak accurately and fluently and prepare them for real world activities
- To **train** students in soft skills through group discussion to improve their EQ.

Course Outcomes:
After completion of the course the student is able to

- **analyze** communication situations and audiences to make choices about the most effective and efficient way to communicate and deliver messages
- **write** resume, business letters, project proposals and reports
- **speak** fluently and address a large group of audience and participate in discussions.
- **navigate** through complex environments through interpersonal and collaborative skills.

UNIT I:

- Oral Communication :Self-introduction
- Applications and Covering letters
- Resume Writing
- Job Interviews

UNIT II:

- Oral Communication: Impromptu Speech
- Reading Business and Technical Texts
- Writing E-mails
- Writing Business Letters and Business Memos

UNIT III:

- Oral Communication: Group Discussions
- Summarizing and Synthesising
- Writing Abstracts

UNIT IV:

- Oral Communication : Debate
- Writing Business Proposals
- Writing Technical Proposals

UNIT V:

- Oral Communication: Making Presentations

- Interpreting Graphic Information
- Writing Business Reports
- Writing Technical Reports

Text and Materials:

1. Effective Technical Communication, Ashraf Rizvi, M (2005), Tata Mc Graw Hill Publishing Company Limited, New Delhi.
2. Technical Communication: Principles and Practices, M. Raman and S. Sharma, OUP, 2004. (Indian Edition)

References:

1. Technical Communication: A Practical Approach (7th ed.) Longman, William S. Pfeiffer, (2012)
2. Technical Communication, Burnett, Rebecca, 5th Ed., Heinle, 2001.
3. Technical Writing Process and Product, Gerson Sharon J. and Steven Gerson, 3rd edition, New Jersey: Prentice Hall 1999
4. Technical Communication: Situations and Strategies , Markel, Mike**,** (8th EDITION (2006-2007)
5. Business Correspondence and Report Writing, R. C. Sharma and K. Mohan, Third Edition, TMH, 2002. (Indian Edition)
6. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed..) (pp. 457-473). Boston: Heinle.

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I – I Sem. M.Tech (Computer Networks & Information Security)	**L**	**T/P/D**	**C**
	0	**3**	**2**

(CNS51) INFORMATION SECURITY AND NETWORKS LAB

Course Objectives:

- **Describe** about bit stuffing , character stuffing and CRC methods and to understand various routing algorithms and wireless LAN concepts
- **Understand** various algorithms to identify shortest path.
- **Classify** symmetric encryption algorithms and Analyse security aspects of symmetric and asymmetric algorithms
- **Design** and **implement** various digital signature algorithms

Course Outcomes:

After completion of the course the student is able to

- **Summarize** data link layer framing methods, CRC , Dijkstra's algorithm and routing algorithms
- **Demonstrate** and simulate Ethernet, token ring, TCP and to configure wireless LAN
- **Examine** and implement symmetric and asymmetric algorithms
- **Implement** key generation and digital signature mechanisms.

WEEK 1:

1. Implement the data link layer framing methods such as character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.

WEEK 2:

3. Implement Dijkstra's algorithm to compute the Shortest path through a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.

WEEK 3:

6. Demonstrate the operation of Ethernet.
7. Demonstrate the implementation of a token ring network.

WEEK 4:

8. Demonstrate the congestion control algorithms implemented by the Transmission Control Protocol (TCP).
9. Demonstrate the configuring a wireless LAN.

INFORMATION SECURITY

(using C, C++, Java, etc.)

WEEK 5:

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND, OR and XOR each character in this string with 127 and display the result.

WEEK 6:

3. Write a Java program to perform encryption and decryption using the following algorithms
   a) Ceaser cipher
   b) Substitution cipher

c) Hill Cipher

4. Write a JAVA program to implement the DES algorithm.

WEEK 7:

5. Implement DES-2 and DES-3 using Java cryptography package.
6. Write a Java program that contains functions, which accept a key and input text to DES encrypted/decrypted. This program should use the key to encrypt/decrypt the input by using the triple Des algorithm. Make use of Java Cryptography package.

WEEK 8:

7. Write a C/JAVA program to implement the Blowfish algorithm logic.
8. Write a C/JAVA program to implement the Rijndael algorithm logic.

WEEK 9:

9. Write C/JAVA program to implement RC4stream cipher
10. Using Java cryptography, encrypt the text "Hello world" using Blowfish. Create your own key using Java keytool.

WEEK 10:

11. Write a Java program to implement RSA algorithm.
12. Consider the end user as one of the parties (Alice) and the JavaScript application as the other party (Bob). Calculate the message digest of a text using the SHA-1 algorithm and MD5 algorithm in JAVA.

WEEK 11:

13. Write a Java program to encrypt user's passwords before they are stored in a database table, and to retrieve them whenever they are to be brought back for verification.
14. Write a program in java, which performs a digital signature on a given text using Diffie-Hellmann algorithm .

WEEK 12: Lab Internal

Text Book:

1. Build Your Own Security Lab, Michael Gregg, And Wiley India.

References:

1. Computer Networks: A Systems approach, (Network Simulation Experiments Manual) Larry L. Peterson & Bruce S. Davie, Fourth edition, Elsevier.
2. Network Fundamentals, Mark Dye, Pearson Education.
3. Routing Protocols & Concepts, Rick Graziani, Pearson Education.
4. LAN Switching & Wireless, Wayne Lewis, Pearson Education.
5. Accessing the WAN, Bob Vachon, Pearson Education.
6. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W.Ross, Fifth Edition, Pearson Education, 2012.
7. Computer Networks: A Systems approach, Larry L. Peterson & Bruce S. Davie, Fifth edition, Elsevier, RP 2012.
8. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.

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	0	**0**	**4**

(CNS61) MINI PROJECT – I

A mini project work shall be carried out on any topic of Computer Networks and Information Security and a seminar should be given on the same along with a brief report.

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	3	**1**	**4**

(CNS04) WIRELESS NETWORKS AND MOBILE COMPUTING

Course Objectives:

- **Comprehend** the differences between mobile and wireless
- **Understand** GSM Architecture, Goals of mobile IP and Ad-Hoc networks
- **Identify** Broadcast Systems
- **Analyse** WAP, Bluetooth and Secure Environment

Course Outcomes:

After completion of the course the student is able to

- **Summarize** the various Application areas of mobile and wireless devices
- **Describe** GSM Transmission Technologies and draw backs of traditional TCP
- **Understand** architecture of DAB and DVB
- **Identify** various Mark-up Languages and their advantages/disadvantages and describe Smart client security

UNIT I:

Introduction to Mobile and Wireless Landscape: Definition of Mobile and Wireless, Components of Wireless Environment, Challenges

Overview of Wireless Networks, Categories of Wireless Networks

Wireless LAN: Infra red Vs radio transmission, Infrastructure and Ad-hoc Network, IEEE 802.11

Global System For Mobile Communications (GSM): GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security

UNIT II:

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP), Mobile Ad-hoc networks: Routing, destination Sequence Distance Vector, Dynamic Source Routing.

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT III:

Broadcast Systems: Overview, Cyclical repetition of data, Digital audio broadcasting: Multimedia object transfer protocol, Digital video broadcasting: DVB data broadcasting, DVB for high-speed internet access, Convergence of broadcasting and mobile communications.

UNIT IV:

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

UNIT V:

Mobile and Wireless Security: Creating a Secure Environment, Security Threats, Security Technologies, Other Security Measures, WAP Security, Smart Client Security

Text Books:

1. Jochen Schiller, “Mobile Communications”, Pearson Education, Second Edition, 2008.

2. Martyn Mallick, “Mobile and Wireless Design Essentials”, Wiley, 2008.
3. Asoke K Talukder, et al, “Mobile Computing”, Tata McGraw Hill, 2008.

References:

1. Mobile Computing,Raj Kamal,Oxford University Press.
2. William Stallings, “ Wireless Communications & Networks”, Person, Second Edition,2007.
3. Frank Adelstein et al, “Fundamentals of Mobile and Pervasive Computing”, TMH, 2005.
4. Jim Geier, “Wireless Networks first-step”, Pearson, 2005.
5. Sumit Kasera et al, “2.5G Mobile Networks: GPRS and EDGE”, TMH, 2008.

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(CNS05) APPLICATIONS OF NETWORK SECURITY

Course Objectives:

- **Demonstrate** about security concepts, Ethics in Network Security.
- **Identify** security threats, and the security services and mechanisms to counter them
- **Classify** security services and mechanisms in the network protocol stack
- **Summarize** and apply email security services and mechanisms

Course Outcomes:

After completion of the course the student is able to

- **Recall** network security threats and determine efforts to counter them
- **Explain** a secure access client for access to a server
- **Determine** different attacks in the network
- **Examine** the different forensics on Network.

UNIT I:

IEEE 802.11 Wireless LAN Security: Background, Authentication: Pre- WEP Authentication, Authentication in WEP, Authentication and key agreement in 802.11i, Confidentiality and Integrity: Data protection in WEP, Data protection in TKIP and CCMP

UNIT II:

Cell Phone Security: Preliminaries, GSM (2G) Security, Security in UMTS (3G)

UNIT III:

Non-Cryptographic Protocol Vulnerabilities: DoS and DdoS, Session Hijacking and Spoofing, Pharming Attacks, Wireless LAN Vulnerabilities Software Vulnerabilities: Phishing, Buffer Overflow, Format String Attacks, Cross-Site Scripting(XSS), SQL Injection Access Control in the Operating System: Preliminaries, Discretionary Access Control – Case Studies: Windows/ Unix, Mandatory Access Control, Role-Based Access Control, SE Linux and Recent Trends

UNIT I V:

Intrusion Prevention and Detection: Introduction, Prevention versus Detection, Types of Intrusion Detection systems, DdoS Attack Prevention/Detection, Malware Defence Web Services Security: Motivation, Technologies for Web Services: XML, SOAP, WSDL and UDDI, SSl, WS-Security, SAML, Ws-Trust, WS-Security Policy

UNIT V:

Computer and Network Forensics: Definition, Computer Forensics: History of Computer Forensics, Elements of Computer Forensics, Investigative Procedures, Analysis of Evidence, Network Forensics: Intrusion Analysis, Damage Assessment, Forensic Tools: Computer Forensic tools, Network Forensic Tools

Text Books:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
2. Computer Network Security: Joseph Migga Kizza, Springer link

References:

1. Cyber Security: Nina Godbole, Sunit Belapure, Wiley India.
2. Network Security Hacks: Andrew Lockhart, O'Reilly, SPD.

3. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
4. Wireless Security-Models, Threats, and Solutions: Randall K.Nichols, Panos C.Lekkas, TMH
5. Computer Evidence: Collection & Preservation, Christopher L.T.Brown, Firewall Media

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(CNS06) INFORMATION SECURITY MANAGEMENT & STANDARDS

Course Objectives:

- **Explain** about management aspects of information security.
- **Summarize** security risk and associated assessment models like COBIT.
- **Distinguish** proactive security mechanisms, like firewalls, IDS/IPS etc and application audit methodology.
- **Demonstrate** various security standardizations, for example, ISO 270001 and legal issues involving information security.

Course Outcomes:

After completion of the course the student is able to

- **Identify** security systems management
- **Understanding** organizational network security related issues and mitigating mechanisms
- **Explain** about firewall mechanism and security tools
- Ability to **apply** networking and security skills to industrial need

UNIT I:

Information Security Management in Organizations: Security Policy, Standards, Guidelines and Procedures, Criteria for selection of a policy, Information Security Management System (ISMS), Organizational responsibility for Information Security Management, Information Security Awareness Scenario in Indian Organizations, Building Blocks of Information Security, CIA model,

UNIT II:

Risk Management: Overview of Risk Management, Information/Asset classification, Risk Identification mechanisms, Risk Assessment models, Risk Control techniques, Quantitative and Qualitative Approaches, Introduction to OCTAVE and COBIT framework.

UNIT III:

Finding Networking vulnerabilities, Firewalls – Processing modes, Categorization, Architectures, Selecting the right firewall, managing the firewalls. Intrusion Detection and Prevention Systems (IDS & IPS), Protecting Remote Connections – Virtual Private Networks for security

UNIT IV:

Introduction to security audits, need for security audits, organizational roles, Auditor's roles, Types of security audits, Audit approaches, Technology based audits, Penetration testing, Business Continuity and Disaster Recovery Planning.

UNIT V:

Overview of ISO 17799/ISO 27001 Standards, System Security Engineering Capability Maturity Model (SSE-CMM). Legal, Ethical, and professional Issues in Information Security.

Text Books:

1. Information Systems Security, Nina Godbole, Wiley India, 2009
2. Principles and Practices of Information Security. Michael E. Whitman, Herbert J.Mattord, Cengage Learning,

References:

1. Microsoft Security Risk Management Guide

2. Risk Management guide for Information Technology Systems
3. Firewalls and Network Security, Micheal E.Whitman, et al. Cengage Learning, 2008
4. Information Security Management Handbook, Harold F. Tipton, CRC Press, 2012
5. Information Security Policies and Procedures, 2nd Edition, Thomas R. Peltier, Auerbach, 2004

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Elective-III	**3**	**0**	**3**

(CNS21) ETHICAL HACKING

Course Objectives:

- Ability to quantitatively **assess** and measure threats to information assets
- **Evaluate** where information networks are most vulnerable
- **Apply** security plans designed for protecting data assets against attacks
- **Perform** penetration tests into secure networks for evaluation purposes

Course Outcomes:

After completion of the course the student is able to

- **Understand** and experience in Ethical Hacking
- **Learn** to minimize the risks of attacks
- **Know** different techniques and methods applied by hackers
- **Apply** SQL injection and penetration test methods

UNIT I:

Introduction to Ethical Hacking, Ethics, and Legality: Ethical Hacking Terminology, Different Types of Hacking Technologies, Different Phases Involved in Ethical Hacking and Stages of Ethical Hacking: Passive and Active Reconnaissance, Scanning, Gaining Access, Maintaining Access, Covering Tracks, Hacktivism, Types of Hacker Classes, Skills Required to Become an Ethical Hacker, Vulnerability Research, Ways to Conduct Ethical Hacking, Creating a Security Evaluation Plan ,Types of Ethical Hacks.

Footprinting and Social Engineering: Footprinting, Information Gathering Methodology, DNS Enumeration Who is and ARIN Lookups, Trace route, Social Engineering, Common Types Of Attacks, Insider Attacks, Identity Theft, Phishing Attacks, Online Scams, URL Obfuscation, Social-Engineering Countermeasures.

UNIT II:

Scanning and Enumeration: Scanning, types of Scanning , CEH Scanning Methodology ,Ping Sweep Techniques, Nmap Command Switches, SYN, Stealth, XMAS, NULL, IDLE, and FIN Scans, Banner Grabbing and OS Fingerprinting Techniques, Proxy Servers, HTTP Tunnelling Techniques, IP Spoofing Techniques, Enumeration, Null Sessions, SNMP Enumeration, Steps Involved in Performing Enumeration

System Hacking: Understanding Password-Cracking Techniques, Password-Cracking Countermeasures, Understanding Different Types of Passwords Passive Online Attacks, Active Online Attacks, Offline Attacks Non-electronic Attacks, Understanding Key loggers and Other Spyware Technologies Understand Escalating Privileges, Executing Applications, Buffer Overflows, Understanding Rootkits Planting, Understanding How to Hide Files, NTFS File Streaming NTFS Stream Countermeasures, Understanding Steganography Technologies, Understanding How to Cover Your Tracks and Erase Evidence, Disabling Auditing, Clearing the Event Log

UNIT III:

Trojans, Backdoors, Viruses, and Worms: Trojans and Backdoors, Overt and Covert Channels, Types of Trojans, Reverse- Connecting Trojans, Netcat Trojan ,Indications of a Trojan Attack, Trojan Construction Kit and Trojan Makers , Countermeasure Techniques in Preventing Trojans, Difference between a Virus and a Worm, Types of Viruses, Understand Antivirus Evasion Techniques, Understand Virus Detection Methods

Session Hijacking: Denial of Service, Session Hijacking, Spoofing vs. Hijacking, Types of Session Hijacking, Sequence Prediction, Steps in Performing Session Hijacking, Prevention of Session Hijacking

UNIT IV:

Hacking Web Servers, Web Application Vulnerabilities, and Web-Based Password Cracking Techniques: Hacking Web Servers, Types of Web Server Vulnerabilities, Attacks against Web Servers, Web Server

Hardening Methods Web Application Vulnerabilities, Objectives of Web Application Hacking, Anatomy of an Attack, Web Application Threats, Google Hacking, Web Application Countermeasures. Web-Based Password Cracking Techniques, Authentication Types, Password Cracker, Password Attacks: Classification Password- Cracking Countermeasures

SQL Injection and Buffer Overflows: SQL Injection, Steps to Conduct SQL Injection, SQL Server Vulnerabilities, SQL Injection Countermeasures Buffer Overflows, Types of Buffer Overflows and Methods of Detection, Stack-Based Buffer Overflows, Buffer Overflow Mutation Techniques

UNIT V:

Linux Hacking: Linux Basics, Compile a Linux Kernel, GCC Compilation Commands, Install Linux Kernel Modules, Linux Hardening Methods

Penetration Testing Methodologies: Security Assessments, Penetration Testing Methodologies, Penetration Testing Steps, Pen-Test Legal Framework, Automated Penetration Testing Tools, Pen-Test Deliverables.

Text Books:

1. CEH official Certified Ethical Hacking Review Guide, Wiley India Edition
2. Certified Ethical Hacker: Michael Gregg, Pearson Education
3. Certified Ethical Hacker: Matt Walker, TMH.

References:

1. Computer Security, concepts, issues and implementation: Alfred Basta Wolf Halton, Cengage Learning
2. Hacking Exponsed Web 2.0, by Rich Annings, Himanshu Dwivedi, Zane Lackey, Tata McGraw hill Edition
3. Ethical Hacking & Network Defense, Michael T. Simpson, Cengage Learning
4. Hacking Exposed Windows, Joel Scambray, cissp, Stuart Mcclure, Cissp, Third Edition, Tata McGraw hill edition

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Elective-III	**3**	**0**	**3**

(CNS22) COMPUTER FORENSICS AND CYBER SECURITY

Course Objectives:

- **Understand** the Fundamentals of Computer Forensics.
- **Examine** various forensic tools to process the crime and incident scenes.
- **Learn** how to collect and preserve digital evidence that resides on computer storage devices.
- **Analyse** how cyber-crimes takes place and how these can be handled by LAW.

Course Outcomes:

After completion of the course the student is able to

- **Apply** appropriate skills and knowledge in solving computer forensics problems.
- **Demonstrate** various Computer forensic tools and their importance.
- **Design** and formulate new methods for collecting and preserving evidences.
- **Implement** the knowledge gained to investigate cybercrimes..

UNIT I:

Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by computer Forensics Specialists.

Types of Computer Forensics Technology: Types of Military Computer Forensics Technology, Types of Law Enforcement - Computer Forensic Technology - Types of Business Computer Forensics Technology.

UNIT II:

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case.

Current Computer Forensic Tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software.

UNIT III:

Evidence Collection and Data Seizure: Why Collection Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence- Volatile Evidence- General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The chain of Custody.

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting Preserving Computer Forensics Evidence.

Computer Image Verification and Authentication: Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation.

UNIT IV:

Introduction to Cyber Crime and Law: Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000.

UNITV:

Introduction to Cyber Crime Investigation: Firewalls and Packet Filters, password Cracking, Key loggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.

Text Books:

1. Computer forensics, computer crime investigation by John R.Vacca, Firewall Media, New Delhi.
2. Computer forensics and investigations by Nelson, Phillips Enfinger Steuart, CENGAGE Learning.
3. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.

References:

1. Real Digital Forensics by Keith J.Jones, Rechard Bejtlich, Curtis W.Rose, Addison Wesley Pearson Education.
2. Forensic compiling, A Tractitioneris Guide By Tony Sammes and Brain Jenkinson, Springer International Edition.
3. Computer Evidence Collection & Presentation by Christopher L.T.Brown, Firewall Media.
4. Software forensics Collecting Evidence from the scene of a digital crime by Robert M.Slade, TMH 2005.
5. William Stallings and Lawrie Brown, “Computer Security: Principles and Practice”, Prentice Hall, 2008.

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Elective-III	**3**	**0**	**3**

(CNS23) ADHOC AND SENSOR NETWORKS

Course Objectives:

- **Classify** mobile ad hoc networks, design and implementation issues, and available solutions.
- **Demonstrate** routing mechanisms and the three classes of approaches: proactive, on-demand, and hybrid.
- **Distinguish** clustering mechanisms and the different schemes that have been employed, e.g., hierarchical, flat, and leaderless.
- **Summarize** on sensor networks and their characteristics.

Course Outcomes:

After completion of the course the student is able to

- **Memorize** the concept of ad-hoc and sensor networks, their applications and typical node and network architectures.
- **Explain** protocol design issues (especially energy-efficiency) and protocol designs for wireless sensor networks
- **Critique** protocol designs in terms of their energy-efficiency
- **Evaluate** measurements of protocol performance in wireless sensor networks.

UNIT I:

Introduction: Fundamentals of Wireless Communication Technology. The Electromagnetic Spectrum. Radio Propagation Mechanisms. Characteristics of the Wireless Channel. Modulation Techniques. Multiple Access Techniques. Voice Coding. Error Control. Computer Networks. Computer Network Software. Computer Network Architecture. IEEE 802 Networking Standard.

Wireless LANS and PANS, Wireless WANS AND MANS

UNIT II:

Wireless Internet, Adhoc Wireless Networks, MAC Protocols in Adhoc Wireless Networks

Quality of Service: Real-time traffic support – Issues and challenges in providing QoS – Classification of QoS Solutions – MAC layer classifications – QoS Aware Routing Protocols – Ticket based and Predictive location based Qos Routing Protocols

UNIT III:

Energy Management Adhoc Networks: Need for Energy Management – Classification of Energy Management Schemes – Battery Management and Transmission Power Management Schemes – Network Layer and Data Link Layer Solutions – System power Management schemes.

UNIT IV:

Mesh Networks: Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic Routing – Self Configuration and Auto Configuration - Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

UNIT V:

Sensor Networks : Introduction – Sensor Network architecture – Data Dissemination – Data Gathering – MAC Protocols for sensor Networks – Location discovery – Quality of Sensor Networks – Evolving Standards – Other Issues – Recent trends in Infrastructure less Networks,

Recent Advances in Wireless Networks

Text Books:

1. C. Siva Ram Murthy and B.S.Manoj, "Ad hoc Wireless Networks – Architectures and Protocols', Pearson Education, 2004
2. Ad Hoc And Sensor Networks - Theory and Applications, Dharma Prakash Agrawal, Carlos De Morais Cordeiro, Cambridge University Press (2010)

References:

1. Mobile Ad Hoc Networks: Current Status and Future Trends, Jonathan Loo (Editor), Jaime Lloret Mauri (Editor), Jesús Hamilton Ortiz (Editor), CRC Press-2011
2. Ad Hoc and Sensor Networks, Cordeiro, World Scientific Publishing Company, 2013
3. Wireless Ad hoc and Sensor Networks: Protocols, Performance, and Control, Jagannathan Sarangapani, Taylor & Francis/bsp Books (2007)
4. Wireless Ad Hoc and Sensor Networks, Houda Labiod, ISTE (10 July 2007)
5. Security and Privacy in Ad-Hoc and Sensor Networks, Refik Molva (Editor), Gene Tsudik (Editor), Dirk Westhoff (Editor), Springer (9 April 2008)

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Elective - IV	**3**	**0**	**3**

(CNS24) NETWORK MANAGEMENT SYSTEMS

Course Objectives:

- **Develop** skills like Plan, install, configure, administer and manage a network
- **Demonstrate** network management architectures and protocols.
- **Illustrate** students on how to install, maintain, and manage Local Area Networks and internetworks.
- **Describe** the Automation of network management operations and making use of readily available network management systems.

Course Outcomes:

After completion of the course the student is able to

- **Explain** Directory Services and Remote Access
- **Appraise** the use of Virtual Private Network and explain Network protocols and services
- Install and **configure** Network server operating system
- **Configure** various services on Windows server platform Troubleshoot Network

UNIT I:

Directory Services: Define Directory Service, Definition of Novelle Directory, Windows Domain, MS Active Directory, X500 Directory Access Protocol, Lightweight Directory Access Proto col, Forests, Trees, Roots and Leaves.
Active Directory Architecture: Object Types, Object Naming, Canonical Names, LDAP Notation, Globally unique identifiers, User Principle Names, Domain, Trees & Forests.
Remote Network Access: Need of Remote Network Access, PSTN, ISDN, DSL, CATV
Virtual Private Network: VPN Protocols, Types of VPN, VPN Clients, SSL VPNs

UNIT II:

Dynamic Host Control Protocol (DHCP): DHCP Origins, Reverse Address Resolution Protocol (RARP), The Bootstrap Protocol (BOOTP), DHCP Objectives, IP Address assignments, DHCP Architecture
Introduction to Domain Name Systems (DNS): DNS Objectives, Domain Naming, Top Level Domains, Second Level Domains, Sub -domains, DNS Functions, Resource Records, DNS Name Resolution, Resolves, DNS Requests, Root Name Servers, Resolving a Domain Name, DNS Name Registration
Network Printing Concepts: Locally Connected Print Devices, Setting up local Print Devices, Shared Print Devices, Sharing Locally Attached Print Devices, Describe Windows Network Printing and Add print Wizard

UNIT III:

Designing Network: Accessing Network Needs, Applications, Users, Network Services, Security and Safety, Growth and Capacity Planning, Meeting Network Needs – Choosing Network Type, Choosing Network Structure, Choosing Servers
Installing and Configuring Windows Server: Preparing for Installation, Creating windows server boot disk, Installing windows server, Configuring server/ client.
Setting Windows Server: Creating Domain controller, Adding the DHCP and WINS roles, Adding file server and print server, Adding Web based Administration

UNIT IV:

Working With User Accounts -Adding a User, Modifying User Account, Deleting or Disabling a User Account. Working with Windows Security Groups –Creating Group, Maintaining Group Membership. Working with Shares – Understanding Share Security, Cresting Shares, Mapping Drives Administering Printer Shares –Setting up Network Printer Working with Windows Backup – Using Windows Servers Backup Software

UNIT V:

Understanding the Problem –Troubleshooting, Segmenting the Problem, and Isolating the Problem, Setting Priorities. Troubleshooting Tools –Hardware Tools, Software Tools, Monitoring and Troubleshooting Tools Internal Security – Account Security, File and Directory permissions, Practices and user education

Text Books:

1. The Complete Reference Networking Craig Zacker Tata McGrawHill
2. The Real World Network Troubleshooting Manual Alan Sugano Firewall Media

References:

1. Introduction to Networking Bruce Hallberg Tata McGrawHill
2. Networking + Certification Training Kit Richard A. McMahon, Sir Microsoft Press
3. MCSE Training Kit Networking Essential Plus Microsoft Press
4. Networking a Beginner's Guide Bruce Hallberg Tata McGrawHill

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Elective - IV	**3**	**0**	**3**

(CNS25) SECURE SOFTWARE ENGINEERING

Course Objectives:

- **Understand** scientific concepts of Software and Hardware Reliability approach
- **Apply** Software Reliability strategies in Software Development
- **Emphasize** Test Execution - Planning and allocating test time for the current release
- **Application** of Model based security engineering with UML

Course Outcomes:

After completion of the course the student is able to

- **Demonstrate** knowledge through experience with SRE.
- **Analyse** the ability to author a software testing procedure
- **Estimate** failure intensity to guide test - Certifying reliability.
- **Develop** Model based security engineering with UML

UNIT I:

Problem, Process, and Product - Problems of software practitioners – approach through software reliability engineering- experience with SRE – SRE process – defining the product – Testing acquired software – reliability concepts- software and hardware reliability. Implementing Operational Profiles **-** Developing, identifying, crating, reviewing the operation – concurrence rate – occurrence probabilities- applying operation profiles

UNIT II:

Engineering "Just Right" Reliability **-** Defining "failure" for the product - Choosing a common measure for all associated systems. - Setting system failure intensity objectives -Determining user needs for reliability and availability, overall reliability and availability objectives, common failure intensity objective., developed software failure intensity objectives. - Engineering software reliability strategies. Preparing for Test - Preparing test cases. - Planning number of new test cases for current release. -Allocating new test cases. - Distributing new test cases among new operations - Detailing test cases. - Preparing test procedures

UNIT III:

Executing Test - Planning and allocating test time for the current release. - Invoking test-identifying identifying failures - Analyzing test output for deviations. – Determining which deviations are failures. Establishing when failures occurred. Guiding Test - Tracking reliability growth - Estimating failure intensity. - Using failure intensity patterns to guide test - Certifying reliability. Deploying SRE - Core material - Persuading your boss, your coworkers, and stakeholders. - Executing the deployment - Using a consultant.

UNIT IV:

Using UML for Security - UM L diagrams for security requirement -security business process-physical security - security critical interaction - security state. Analyzing Model **-** Notation - formal semantics - security analysis - important security opportunities. Model based security engineering with UML - UML sec profile- Design principles for secure systems - Applying security patterns

UNIT V:

Applications - Secure channel - Developing Secure Java program- more case studies. Tool support for UML Sec - Extending UML CASE TOOLS with analysis tools - Automated tools for UML SEC. Formal Foundations - UML machines - Rely guarantee specifications- reasoning about security properties.

Text Books:

1. Security Engineering: Ross Anderson
2. Software Security Engineering: A Guide for Project Managers

References:

1. John Musa D, “Software Reliability Engineering”, 2nd Edition, Tata McGraw-Hill, 2005 (Units I, II and III)
2. Jan Jürjens, “Secure Systems Development with UML”, Springer; 2004 (Unit IV and V)
3. Software Security Engineering: A Guide for Project Managers 1st Edition by Julia H Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead

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I – II Sem. M.Tech (Computer Networks & Information Security)	**L**	**T/P/D**	**C**
Elective - IV	**3**	**0**	**3**

(CNS26) SOFTWARE RELIABILITY AND METRICS

Course Objectives:

- Students will **acquire** methods to evaluate software artefacts with a rigorous and modern approach.
- **Manage** software development projects to produce high quality software.
- **Experience** how, where and when improving real software products and processes with the application of basic mathematical concepts.
- **Analyze** software Reliability models.

Course Outcomes:

After completion of the course the student is able to

- **Understand** the objectives and general principles of measurement
- **Assess** different software products with a critical decision process based on a rigorous mathematical and deductive approach.
- **Classify** how to measure the software product.
- **Demonstrate** knowledge through experience with software reliability and metrics

UNIT I:

Introduction to Software Reliability: Basic Concepts – Failure and Faults – Environment – Availability –Modeling – uses.

UNIT II:

Software Reliability Modeling: Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markova models – General concepts – General Poisson Type Models – Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models.

UNIT III:

Comparison of Software Reliability Models: Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups – Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals.

UNIT IV:

Fundamentals of Measurement: Measurements in Software Engineering – Scope of Software metrics – Measurements theory – Goal based Framework – Software Measurement Validation.

UNIT V:

Product Metrics: Measurement of Internet Product Attributes – Size and Structure – External Product Attributes – Measurement of Quality –Reliability Growth Model – Model Evaluation

Text Books:

1. Software Metrics: A Rigorous and Practical Approach, Third Edition By Norman Fenton, James Bieman
2. John D. Musa, Anthony Iannino, Kazuhira Okumoto, “Software Reliability – Measurement,Prediction, Application, Series in Software Engineering and Technology”, McGraw Hill, 1987.

References:

1. John D. Musa, “Software Reliability Engineering”, Tata McGraw Hill, 1999.

2. Norman E . Fenton, Shari Lawrence Pfleeger, "Software metrics", Second Edition, International student Edition, 2003.
3. Metrics and Models in Software Quality Engineering 2nd Edition, Stephen H. Kan,
4. Applied Software Measurement: Assuring Productivity and Quality, C. Jones, McGraw-Hill, 1996.

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Open Elective-II	**3**	**0**	**3**

(SWE41) ADVANCED UNIX PROGRAMMING

Course Objectives:

- **Apply** the concepts of files and Directories to manage the Linux Environment.
- **Provide** knowledge in working with the core operating systems Concept, Signals in Linux Environment
- **Design** the Inter process communication by using the IPC techniques
- **Build** Client-Server Environment using sockets.

Course Outcomes:

After completion of the course the student is able to

- **Analyse** the files and directories in Linux environment.
- **Implement** system programs to control the processes using signals.
- **Develop** programs to provide Inter process communication to avoid classical IPC problems.
- **Design** a client-server application using sockets and RMI

UNIT I:

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities.

Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

UNIT II:

Files- File Concept, File types File System Structure, I nodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lockf and fcntl functions, file permissions-chmod, fchmod, file ownership-chown, lchown , fchown, links-soft links and hard links – symlink, link, unlink.

File and Directory management – Directory contents, Scanning Directories- Directory file APIs. Process- Process concept, Kernel support for process, process attributes, process control – process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT III:

Signals: Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory.

Message Queues: Kernel support for messages, UNIX system V APIs for messages, client/server example.

Semaphores: Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT IV:

Shared Memory: Kernel support for shared memory, UNIX system V APIs for shared memory, client/server example.

Network IPC: Introduction to Unix Sockets, IPC over a network, Client-Server model, Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented - Communication, Socket system calls for Connectionless-Communication, Example-**Client/Server Programs**- Single Server-Client connection, Multiple simultaneous clients, **Socket options** – setsockopt, getsockopt, fcntl.

UNIT V:

Network Programming in Java: Network basics, TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

Text Books:

1. Unix System Programming using C++, T.Chan, PHI.(Units II,III,IV)
2. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)
3. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
4. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.(Unit V)

References:

1. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)
2. Linux System Programming, Robert Love, O'Reilly, SPD.
3. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
4. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
5. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
6. Unix Network Programming The Sockets Networking API, Vol.-I,W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
7. Unix Internals, U.Vahalia, Pearson Education.
8. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
9. C Programming Language, Kernighan and Ritchie, PHI

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Open Elective-II	**3**	**0**	**3**

(CNS41) ANDROID APPLICATION DEVELOPMENT

Course Objectives:

- **Describe** the essentials of mobile apps development.
- **Examine** and illustrate J2ME, Android and SQLite databases in relevance to Mobile applications
- **Understand** how Android applications work, manifest, Intents, and using external resources
- **Learn** to develop applications for current and emerging mobile computing devices

Course Outcomes:

After completion of the course the student is able to

- **Describe** the Mobility landscape
- **Identify** Mobile apps development aspects
- **Design** and develop mobile apps, using Android as development platform, with key focus on user experience design, native data handling and background tasks and notifications.
- **Summarize** and Compose Testing, Signing, Packaging and Distribution of mobile apps

UNIT I:

Introduction to Mobile: A brief history of Mobile, The Mobile Ecosystem, Why Mobile?, Types of Mobile Applications, Mobile Information Architecture, Mobile Design, Mobile 2.0, Mobile Web development, Small Computing Device Requirements.

UNIT II:

Introduction to Android: History of Mobile Software Development, The Open Handset Alliance, The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building a Sample Android application

UNIT III:

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions, Managing Application resources in a hierarchy, Working with different types of resources

UNIT IV:

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation

UNITV:

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World

Text Books:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill
2. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)

References:

1. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd
2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd

3. Sayed Y Hashimi and Satya Komatineni, “Pro Android”, Wiley India Pvt Ltd
4. devloper.android.com (web)
5. Android Application Development All in one for Dummies by Barry Burd, Edition: I
6. Teach Yourself Android Application Development In 24 Hours, Edition:I, Publication: SAMS

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Open Elective-II	**3**	**0**	**3**

(SWE42) SOFT SKILLS

Course Objectives:

- **Develop** inter personal skills and be an effective goal oriented team player.
- **Produce** professionals with idealistic, practical and moral values.
- **Emphasize** problem solving skills and communication.
- **Reconstruct** attitude and understand its influence on behaviour.

Course Outcomes:

After completion of the course the student is able to

- **Express** what Soft Skills is
- **Discover** the significance of soft skills in the working environment
- **Employ** leadership skills and teamwork skills
- **Plan** and schedule the time and stress management

UNIT I:

Self Analysis: SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem

UNIT II:

Attitude: Factors influencing Attitude, Challenges and lessons from Attitude
Change Management: Exploring Challenges, Risking Comfort Zone, Managing Change

UNIT III:

Motivation: Factors of motivation, self talk, Intrinsic & Extrinsic Motivators.
Goal Setting: Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals

UNIT IV:

Time Management: Value of time, Diagnosing Time Management, Weekly Planner To do list, Prioritizing work.
Stress Management: Causes of Stress and its impact, how to manage & distress, Understanding the Circle of control, Stress Busters.

UNITV:

Creativity: Out of box thinking, Lateral Thinking Presentation
Leadership: Skills for a good Leader, Assessment of Leadership Skills
Team Work: Necessity of Team Work Personally, Socially and Educationally

Text Books:

1. Nitin Bhatnagar, Mamata Bhatnagar, “Effective Communication and Soft Skills”, Pearson Publications.
2. Barun K. Mithra “Personality Development and Soft Skills”, Oxford Publications.

References:

1. INSIGHT, 2012, Career Development Centre, SRM Publications.
2. Covey Sean, “Seven Habits of Highly Effective Teens”, New York, Fireside Publishers, 1998.
3. Carnegie Dale, “How to win Friends and Influence People”, New York: Simon & Schuster, 1998.
4. Thomas A Harris, “I am ok, You are ok”, New York-Harper and Row, 1972.
5. Daniel Coleman, “Emotional Intelligence”, Bantam Book, 2006.

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	0	**3**	**2**

(CNS52) WIRELESS NETWORKS SIMULATION LABORATORY

Course Objectives:

- **Understand** fundamentals of wireless networks
- **Emphasizing** the details of simulation tools for network research
- **Experiment** and design various wireless scenarios for network research
- **Analyse** different routing algorithms for MANETs.

Course Outcomes:

After completion of the course the student is able to

- **Experiment** different scenarios for wired and wireless networks on simulator
- **Illustrate** TCP,UDP connection between nodes in a network
- **Design** proactive routing algorithms in MANETs.
- **Develop** reactive routing algorithms in MANETs.

1. Write a script to create fixed wireless nodes with color and initial position
2. Write a script to create wireless nodes and change the color of nodes randomly
3. Write a script to create wireless nodes with mobility.
4. Write a script to TCP communication between wireless nodes
5. Write a script for dynamic 2-node wireless scenario with TCP connection. Check the Packets are exchanged between the nodes as they come within hearing range and drop when they are moving away.
6. Write a script to connection over a 3 node network over an area of size (500m*400m) The nodes (n0, n1, n2) position respectively At initially (5, 5) (490, 285) (150, 240) At time 10sec node1 start moving towards point (250, 250) at speed of 3m/s At time 15sec node0 start moving towards point (480, 300) at speed of 5m/s At time 20sec node1 start moving towards point (480, 3000) at speed of 5m/s Node2 is constant Take total simulation time 150sec, at time 10s a TCP connection initiated between node0 and node1
   a) Use DSDV and IEEE802.11 MAC
   b) Use AODV and IEEE802.11 MAC
7. A simple topology to illustrate the hidden node problem using the IEEE802.11a setting (Take 4 nodes as n0 to n1: CBR traffic at rate 700kb, n2 to n3: CBR traffic at rate3Mb, n1 is in the carrier sense range of n2, but n0 is not).
8. Write a script to create wireless nodes with change destination and color of nodes randomly at particular time interval.
9. For a wireless consisting of three mobile nodes (n0-n2), write a script and make an ad- hoc simulation to output in trace file. Use the routing protocol as Ad-hoc on demand vector (AODV).
10. For a wireless network consisting of three mobile nodes (n0-n2), write a script and make an ad-hoc simulation to analyze the output in the trace file. Use the routing protocol as a destination sequence distance vector (DSDV).
11. For a wireless network consisting of three mobile nodes (n0-n2), write a script and make an ad-hoc simulation to analyze the output in the trace file. Use the routing protocol as dynamic source routing (DSR).
12. Write a script for multi hop TCP communication in Wireless network with the use of MANET routing protocol AODV, DSDV, DSR.

Suggested Simulator tools: NS-2/*NS-3, OPNET, Packet Tracer, Boson, Wireshark.*

Text Books:

1. Jochen Schiller, “Mobile Communications”, Pearson Education, Second Edition, 2008.
2. Martyn Mallick, “Mobile and Wireless Design Essentials”, Wiley, 2008.
3. Asoke K Talukder, et al, “Mobile Computing”, Tata McGraw Hill, 2008.

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	0	**0**	**4**

(CNS62) MINI PROJECT – II

A mini project work shall be carried out on any topic of Computer Networks and Information Security and a seminar should be given on the same along with a brief report.

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	0	**0**	**4**

(CNS63) COMPREHENSIVE VIVA-VOCE

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II– I Sem. M.Tech. (Computer Networks & Information Security)	**L**	**T/P/D**	**C**
	0	**0**	**8**

(CNS71) INTERNSHIP / DISSERTATION PHASE- I

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	0	**0**	**18**

(CNS72) DISSERTATION PHASE - II