SHRI VENKATESHWARA UNIVERSITY

Syllabus

B.Tech
Computer Science and Engineering

VI Semester

(Four Years Programme)
(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Computer Science and Engineering
VI - SEMESTER

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	SCS- 601	Complier Design	3	0	0	20	10	30		70		100	3
2	SCS- 602	Computer Networks	3	0	0	20	10	30		70		100	3
3	SCS-603	Cryptography & Network Security	3	0	0	20	10	30		70		100	3
4	SCS-604	Internet-of-Things	3	0	0	20	10	30		70		100	3
5	SOE-061	Sociology,Society and Culture	3	0	0	20	10	30		70		100	3
6	SCS-611	Complier Design Lab	0	0	4				50			50	2
	SCS-612	Computer Networks Lab	0	0	4				50			50	2
7	SCS-613	Project Stage -I	0	0	6				50		50	100	3
												700	22

SCS-601	Complier Design	3L:0T: 0P	3 Credits

Pre-requisites	PCC-CS 302, PCC-CS 502

Objectives of the course
- To understand and list the different stages in the process of compilation.
- Identify different methods of lexical analysis
- Design top-down and bottom-up parsers
- Identify synthesized and inherited attributes
- Develop syntax directed translation schemes
- Develop algorithms to generate code for a target machine

Detailed   contents
Module 1:

The aim is to learn how to design and implement a compiler and also to study the underlying theories. The main emphasis is for the imperative language. Introduction: Phases of compilation and overview. Lexical Analysis (scanner): Regular languages, finite automata, regular expressions, from regular expressions to finite automata, scanner generator (lex, flex).Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) gram-mars and top-down parsing, operator grammars, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc, bison)Semantic Analysis: Attribute grammars, syntax directed definition, evaluation and flow of attribute in a syntax tree. Symbol Table: Its structure, symbol attributes and management. Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope. Intermediate Code Generation: Translation of different language features, different types of intermediate forms. Code Improvement (optimization): Analysis: control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc. Architecture dependent code improvement: instruction scheduling (for pipeline), loop optimization (for cache memory) etc. Register allocation and target code generation Advanced topics: Type systems, data abstraction, compilation of Object Oriented features and non-imperative programming languages.

Course Outcomes
1. For a given grammar specification develop the lexical analyser
2. For a given parser specification design top-down and bottom-up parsers
3. Develop syntax directed translation schemes
4. Develop algorithms to generate code for a target machine

- -

SCS602	Computer Networks	3L:0T: 0P	3 Credits

Pre-requisites	PCC-CS - 402 PCC-CS - 403

Objectives of the course
- To develop an understanding of modern network architectures from a design and performance perspective.
- To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
- To provide an opportunity to do network programming
- To provide a WLAN measurement ideas.

Detailed   contents
Module 1:
Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

Module 2:
Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA

Module 3:
Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

Module 4:
Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

Module 5:
 Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

Suggested books
1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson PrenticeHall India.

Suggested reference books
1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New InternationalEdition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, PrenticeHall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, UnitedStates of America.

Course Outcomes
1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component
4. For a given problem related TCP/IP protocol developed the network programming.
5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

SCS -603 CRYPTOGRAPHY & NETWORK SECURIT

Unit-I   **10**
Introduction to security attacks, services and mechanism, Classical encryption techniques-substitutionciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers.
Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, fiestalstructure, Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES

Unit-II   **10**
Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative primenumbers, Extended Euclidean Algorithm,
Advanced Encryption Standard (AES) encryption and decryptionFermat's and Euler's theorem, Primarilytesting, Chinese Remainder theorem, Discrete Logarithmic Problem,Principals of public key crypto systems, RSA algorithm, security of RSA

Unit-III   **10**
Message Authentication Codes: Authentication requirements, authentication functions, message

authentication code, hash functions, birthday attacks, security of hash functions, Secure hash algorithm(SHA)

Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards(DSS), proof of digital signature algorithm,

Unit-IV   **10**

Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Publickey distribution, X.509 Certificates, Public key Infrastructure.

Authentication Applications:

Kerberos, Electronic mail security: pretty good privacy (PGP), S/MIME.

Unit-V   **10**

IP Security: Architecture, Authentication header, Encapsulating security payloads, combining securityassociations, key management.

Introduction to Secure Socket Layer, Secure electronic, transaction (SET)

System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, firewalls

TOTAL: 45 PERIODS

REFERENCES:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", PearsonEducation.
2. Behrouz A. Frouzan: Cryptography and Network Security, Tata McGraw Hill
3. C K Shyamala, N Harini, Dr. T.R.Padmnabhan Cryptography and Security ,Wiley
4. Bruce Schiener, "Applied Cryptography". John Wiley & Sons
5. Bernard Menezes," Network Security and Cryptography", Cengage Learning.
6. AtulKahate, "Cryptography and Network Security", Tata McGraw Hill

SCS 604 Internet of Things

Learning Objectives:

Students will understand the concepts of Internet of Things and can able to build IoTapplications.

Detailed Syllabus:

Sr. No	Topic	Lecture Hours	
1	**Introduction to IoT** Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs	6	
2	**IoT & M2M** Machine to Machine, Difference between IoT and M2M, Software define Network	6	
3	**Network & Communication aspects** Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination	16	

4	**Challenges in IoT** Design challenges, Development challenges, Security challenges, Other challenges	10	
5	**Domain specific applications of IoT** Home automation, Industry applications, Surveillance applications, Other IoT applications	6	
6	**Developing IoTs** Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python	16	
		60	

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

STUDENTS LEARNING OUTCOMES:

On successful completion of the course, the student will:
- Understand the concepts of Internet of Things
- Analyze basic protocols in wireless sensor network
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform

Reference Books:
1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks:Theory and Practice"

SOE-061   SOCIOLOGY, SOCIETY AND CULTURE

1. OBJECTIVE:

This is one of the foundation course of Humanities (in Foundation Area 1). It strengthens the interest of the student in social issues and demonstrate both the process and challenge of scientific observation and analysis of social behaviour and social data. It focuses on the understanding of basic concepts anddescriptive materials of sociology which is considered a tool for identifying the process of idea and a scientific approach for continuing social observation and analysis.

2. COUSE TOPICS:

2.1 Unit I:Sociology as a Science   (7 hours)
1. Sociology and common Sense
2. Sociology and current affairs
3. Sociology as a science
4. Logic in sociological inquiry
5. Sociology of action
6. The field and relevance of sociology
7. Positivism

2.2 Unit II: Society and Culture   (12 hours)
1. Culture and society
2. The structure of culture
- Cultural Traits and complexes
- Subcultures and counter cultures
- Cultural integration
- Cultural relativism
- Real and Ideal culture

- Ethnocentrism
- Xenocentrism
- Cultural lag

2.3 Unit III: Social Institutions   (17 hours)

1. The concept of varna.
2. The Caste system:
- Origin and characteristics (of caste) as a system
- Hierarchy based on birth

Religious sanctions on social participation

- Caste and subcaste
- Caste conflicts
- Caste councils
- An appraisal of caste system
- Prospects of caste in modern India

3. The Class system:
- What is social class?
- Development of class
- Self-identification and class consciousness
- Class in itself and class for itself
- Class having blue collar status and white collar status
- Industrial class
- Significance of social class
- The future of social classes: From Proletariat to status seekers

2.4 Unit IV: Environment and Ecology (10 hours)

1. Conceptualising environment
2. Forest, ecology and society
3. Common Property Resources and its management
4. Significance of forest and environment in modern life
5. Environmental movement with reference to forest and water management

2.5 Unit V: Issues of modernity (14 hours)

1. Concept of modernity
2. Tradition Vs Modernity
3. Globalization
   - Is globalization new and real?
   - Has globalization weakened the state?
   - Has globalization led to cultural homogenisation?
   - Does globalization lead to a clash of cultures?

3. READINGS:

3.1 Reference Books:

- Gisbert, P. (2011), Fundamental of Sociology, Orient Blackswan Private Ltd.
- Horton, Paul B. and Hunt, Chester L. (Sixth edition), Sociology, Mc Graw Hill Book Company.
- Haralambos, M. and Heald, R.M. (26th impression, 2004), Sociology: Themes and Perspectives, Oxford University Press, New Delhi.
- Betteille, Andre (2014), sociology: essays on Approach & Method, Oxford Uninversity Press, New Delhi.