Millia Institute of Technology
Rambagh, Purnea

Affiliated to Bihar Engineering University, Patna

NAAC Accredited & ISO 9001:2015

SYLLABUS

Department of Computer Science & Engineering

6th SEMESTER

Semester VI (Third year]
Branch/Course Computer Science & Engineering

Course Code	Paper Title	L	T	P	Credits	branch
	Compiler Design	3	0	4	5	105
	Computer Networks	3	0	4	5	105
	Graduate Employability Skills and Competitive Courses (GATE, IES, etc.)	3	0	0	0	105
	Machine Learning	3	1	0	4	105
	MOOCs / SWAYAM / NPTEL Courses - 2	3	0	0	3	105
	Professional Elective Lab-I	0	0	2	1	105
	Program Elective- I	3	0	0	3	105
	Program Elective- II	3	0	0	3	105
	Project – I	0	0	4	2	105

Semester VI (Third year]
Branch/Course Computer Science & Engineering

PCC CS 601	**Complier Design**	**3L:0T: 4P**	**5 Credits**
Pre-requisites	**Formal Language & Automata Theory**		

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
- To study the underlying theories in designing of a compiler
- The study especially consider the imperative languages

Detailed contents

Module 1 **Lecture: 6 hrs.**

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).

Module 2 **Lecture: 9 hrs.**

Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) grammars 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).

Module 3 **Lecture: 10 hrs.**

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.

Module 4 **Lecture: 10 hrs.**

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.

Module 5 **Lecture: 5 hrs.**

Advanced topics: Type systems, data abstraction, compilation of Object Oriented features and non-imperative programming languages.

Suggested Books:

1. Compilers Principles Techniques And Tools by Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman. Pearson Education.

Suggested Reference Book

1. Compiler Design by Santanu Chattopadhyay. PHI
2. Modern Compiler Design by Dick Grune, E. Bal. Ceriel, J. H. Jacobs, and Koen G. Langendoen, Viley Dreamtech.

Course Outcomes

After the completion of course, students can able to able to:

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

PCC CS 601P	**Complier Design Lab**

Hands-on experiments related to the course contents of PCC CS 601.

PCC CS 602	**Computer Networks**	**3L:0T: 4P**	**5 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 **Lecture 8 hrs.**

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 **Lecture 8 hrs.**

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 **Lecture 8 hrs.**

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

Module 4 **Lecture 8 hrs.**

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 **Lecture 8 hrs.**

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 Prentice Hall India.

Suggested reference books

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

Course Outcomes

After the completion of course, students can able to able to:

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) and can able to describe the function of each block.
3. Program for a given problem related TCP/IP protocol.
4. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

PCC CS 602P	**Computer Networks Lab**

Hands-on experiments related to the course contents of PCC CS 602.

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PCC CS 603	Machine Learning	3L: 1T:0 P	4 Credits

Objectives of the course

- To learn the concept of how to learn patterns and concept from data.
- Design and analyze various machine learning algorithms and their applications in recent trends.
- Evaluate the various factors of machine learning to measure the performance.
- Understand basic of machine learning's application in recent trend of technology.

Detailed contents

Module 1 **Lecture 8 hrs.**

Introduction: Basic definitions, Linear Algebra, Statistical learning theory, types of learning, hypothesis space and Inductive bias, evaluation and cross validation, Optimization.

Module 2 **Lecture 8 hrs.**

Statistical Decision Theory, Bayesian Learning (ML, MAP, Bayes estimates, Conjugate priors), Linear Regression, Ridge Regression, Lasso, Principal Component Analysis, Partial Least Squares

Module 3 **Lecture 8 hrs.**

Linear Classification, Logistic Regression, Linear Discriminant Analysis, Quadratic Discriminant Analysis, Perceptron, Support Vector Machines + Kernels, Artificial Neural Networks + Back Propagation, Decision Trees, Bayes Optimal Classifier, Naive Bayes.

Module 4 **Lecture 8 hrs.**

Hypothesis testing, Ensemble Methods, Bagging Adaboost Gradient Boosting, Clustering, K-means, K-medoids, Density-based Hierarchical, Spectral.

Module 5 **Lecture 8 hrs.**

Expectation Maximization, GMMs, Learning theory Intro to Reinforcement Learning, Bayesian Networks.

Suggested books:

1. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997
2. Introduction to Machine Learning Edition 2, by Ethem Alpaydin