GONDWANA UNIVERSITY, GADCHIROLI

TEACHING AND EXAMINATION SCHEME (SEMESTER PATTERN CHOICE BASED CREDIT SYSTEM)

PROGRAM : MASTER OF TECHNOLOGY IN COMPUTER SCIENCE & ENGINEERING
PROGRAM CODE : PCS
FACULTY : ENGINEERING & TECHNOLOGY
DURATION : TWO YEARS

I– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max .Marks	Max. Marks		Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks
									Sessional							
								ESE	MSE	IE			TW	PE		
PCSS11	**C**	Advanced Computer Architecture	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
PCSS12	**C**	Advances in Operating System Design	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
PCSS13	**C**	Object Oriented Software Engineering	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
PCSS14x	**P**	Elective – I	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
Laboratories/ Practical																
PCSS15	**C**	ComputerSystem Lab – I	-	-	2	1	-	-	-	-	-	-	50	50	**100**	50
PCSS16	**E**	Seminar	-	-	2	1							50	-	**50**	25
		TOTAL	12	08	4	18	-	**400**					**150**			
SEMESTER TOTAL			**24**			**18**	**550**									

Elective – I (x) : (A) Data Warehousing and Data Mining (B) Information Retrieval
(C) Soft Computing

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II – SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PCSS21	**C**	Advances in Algorithms	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
PCSS22	**C**	Advanced Databases	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
PCSS23	**C**	Advanced Digital Image Processing	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
PCSS24x	**P**	Elective – II	3	2	-	3+1	3	70	10	20	**100**	50	-	-	-	-
Laboratories/ Practical																
PCSS25	**C**	Computer System Lab – II	-	-	2	1	-	-	-	-	-	-	50	50	**100**	50
PCSS26	**E**	Seminar	-	-	2	1							50	-	**50**	25
TOTAL			12	08	4	18	-	**400**					**150**			
SEMESTER TOTAL			**24**			**18**	**550**									

Elective – II (x) :(A) Pattern Recognition (B) Statistical Machine Learning
(C) Network Security & Cryptography

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PROGRAM CODE : PCS
FACULTY : ENGINEERING & TECHNOLOGY
DURATION : TWO YEARS

III– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PCSS31x	**P**	Elective-III	3	2	-	3+1	3	70	10	20	**100**	50				
PCSS32	**E**	Study of Soft Computing and Data Analysis Tools	-	8	-	5				100	**100**	50	-	-	-	-
PCSS33	**E**	Grand Seminar	-	6	-	4				100	**100**	50	-	-	-	-
Laboratories/ Practical																
PCSS34	**E**	Pre-Dissertation	-	8	-	5							150	-	**150**	75
TOTAL			-	24	-	18	-	**300**					**150**			
SEMESTER TOTAL			**24**			**18**	**450**									

Elective – III (x) :(A)Wireless Sensor Networks (B)VLSI Technology (C) CNC & Robotics
(D) Total Quality Systems & Engineering

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TEACHING AND EXAMINATION SCHEME (SEMESTERPATTERN CHOICE BASED CREDIT SYSTEM)

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PROGRAM CODE : PCS
FACULTY : ENGINEERING & TECHNOLOGY
DURATION : TWO YEARS

IV– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
									Sessional							
								ESE	MSE	IE			TW	PEE		
PCSS41	**E**	Final Dissertation	-	24	-	18	-	-	-	-			200	250	**450**	225
SEMESTER TOTAL			**24**			**18**	**450**									

GONDWANA UNIVERSITY, GADCHIROLI
SYLLABUS (SEMESTER PATTERN CHOICE BASED CREDIT SYSTEM)

M.Tech. (Computer Science & Engineering)

Semester-I

Course Code: **PCSS11**
Title of the Course: **Advanced Computer Architecture**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design

Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set instructions for control flow- encoding an instruction set.-the role of compiler

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP

ILP software approach- compiler techniques- static branch protection- VLIW approach- H.W support for more ILP at compile time- H.W verses S.W solutions

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading.

Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device designing a I/O system.
Inter connection networks and clusters- interconnection network media – practical issues in interconnecting networks- examples – clusters- designing a cluster

Text Book:

1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

Reference Books:

1. "Computer Architecture and parallel Processing" Kai Hwang and A.Briggs International Edition McGraw-Hill.
2. Advanced Computer Architectures, DezsoSima, Terence Fountain, Peter Kacsuk,Pearson.

Course Code: **PCSS12**
Title of the Course: **Advances in Operating System Design**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
Theory and implementation aspects of distribute operating system. Process synchronization in multiprocessing / multiprogramming system. Inter-process communication and co-ordination in large distributed systems. Distributed resource management. Fundamentals of real time operating systems. Case studies, Information management in distributed systems, security, integrity and concurrency problems. Fault tolerance issues. OS issue, related to the internet, intranets, pervasive computing, embedded systems, mobile systems and wireless networks. Case studies of contemporary operating systems.

Reference Books:

1. Advanced Concepts in Operating Systems by MukeshSinghal and Niranjan G. Shivratri, A McGraw Hill Publications.
2. Charles Crowley, "Operating Systems - A Design Oriented approach", McGraw Hill 1997.

Course Code: **PCSS13**
Title of the Course: **Object Oriented Software Engineering**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Standards for developing life cycle models. Object Methodologies and Requirement Elicitation: Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation. Architecture: Introduction, System development is model building, model architecture, requirements model, analysis model, the design model, the implementation model, test model. Modeling with UML, Basic building blocks of UML, a conceptual model of UML, basic structural modeling, UML- diagrams System Analysis and Design: Analysis model- dynamic modeling and testing-system design: design concepts and activities- Design models-Block design-Testing. Testing Object Oriented Systems: Introduction-Testing activities and techniques, The testing process-Managing Testing-State based Testing and Data Flow Testing for Classes-Case Studies.

Reference Books:

1. Stephen R. Scach "Classical and Object Oriented Software Engineering. With UML and Java", 4th edition, Tata McGraw Hill, 2001
2. Ivar Jacobson and Magnus Christenson "Object Oriented Software Engineering: A use case driven approach", Addison Wesley 1992.
3. Bernd Bruegge and Alen H. Dutoit, "Object Oriented Software Engineering", 2nd edition Pearson Education 2004
4. Timothy C. Lethbrige and Robert Laganiere, "Object Oriented Software Engineering: Practical Software Development using UML and Java", Tata McGraw Hill 2004.

Course Code: **PCSS14A**
Title of the Course: **Data Warehousing& Data Mining**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Data Mining & Data Warehousing : Introduction to data mining, data Warehousing , Introduction to KDD process, Classifications and algorithms, Data mining tasks, Machine Learning- Basic-Concept, Data Warehouse Architecture , Data modeling.

Data marts &olap: Data Mart Designing, data mart builder, Data Mart Discovery, On-line analytical processing, OLTP VS. DW Environment.

Relationship of data mining and data warehousing : Application of Data Mining, Application of Data Ware housing, A relation between Data Mining and Data Warehousing according to need of business.

Stastical analysis and cluster analysis: What is statistics? Difference between statistics and data mining, Histograms, Statistic for predictions, clustering for clarity, Hierarchical and Non-Hierarchical clusters, Choosing classics.

Neural networks & mining complex: What are neural Networks? Where to use these Networks?
Benefits and features of Networks, Rule Induction, various mining complexities.

Next generation of informatics mining & knowledge discovery : Business Intelligence and Information Mining .Text mining, Knowledge Management, Benefits and Products of Text Mining, Customer Relationship Management in the e-Business World.

Reference Books:

1. Data Mining. By Pieter Adriaans
2. Data mining Technology for Marketing, Sales and Customer Support. By Michel Berry.
3. Data Warehousing & Data Mining for Telecommunication by Rob Maltison
4. Distributed Data Warehousing using Web Technology by R.A. Moeller.
5. Building Data Mining Application for CRM by Alex Berson

Course Code: **PCSS14B**
Title of the Course: **Information Retrieval**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
Boolean retrieval, The term vocabulary and postings lists, Dictionaries and tolerant retrieval, Index construction, Index compression. Scoring, Term weighting and the vector space model Computing scores in a complete search system, Evaluation in information retrieval. Relevance feedback and query expansion, XML retrieval, Probabilistic information retrieval Language models for information retrieval, Text classification and Naive Bayes, Vector space classification, Support vector machines and machine learning on documents. Flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic indexing, Web search basics, Web crawling and indexes, Link analysis.

Reference Books:

1. An Introduction to Information Retrieval: Christopher D. Manning, PrabhakarRaghavan, HinrichSchütze, Cambridge University Press.
2. Language Processing: Jurafsky Dan and Martin James, Pearson Publication.
3. Natural Language Understanding: Allen James, Pearson Publication.

Course Code: **PCSS14C**
Title of the Course: **Soft Computing**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
ARTIFICIAL NEURAL NETWORKS Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning - Back propagation networks - Kohnen'sself-organizing networks - Hopfield network.. **FUZZY SYSTEMS** Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition - Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making. **NEURO - FUZZY MODELING** Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering Algorithms - Rule based structure identification - Neuro-Fuzzy controls - Simulated annealing Evolutionary computation. **GENETIC ALGORITHMS** Survival of the Fittest - Fitness Computations - Cross over - Mutation -Reproduction - Rank method - Rankspace method **SOFTCOMPUTING AND CONVENTIONAL AI** AI search algorithm - Predicate calculus - Rules of interference – Semantic networks - Frames - Objects - Hybrid models - Applications.

Reference Books:

1. Jang J.S.R., Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Pearson Education 2003.
2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill, 1997.
3. LaureneFausett, "Fundamentals of Neural Networks", Pearson Education, 2003.
4. George J. Klir and Bo Yuan, "Fuzzy sets and Fuzzy Logic", Prentice Hall, USA 1995.
5. NihJ.Nelsson, "Artificial Intelligence - A New Synthesis", Harcourt Asia Ltd., 1998.
6. D.E . Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley,N.Y, 1989.

Course Code: **PCSS15**
Title of the Course: **Computer System Lab-I**

Course Scheme					Evaluation Scheme (Lab)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	PEE	Total
-	-	02	02	01	50	50	100

Contents
Student is expected to perform at least eight Experiments/Practical's based on the prescribed syllabus of all the theory courses of first semester

Course Code: **PCSS16**
Title of the Course: **Seminar**

Course Scheme					Evaluation Scheme (Lab)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	PEE	Total
-	-	02	02	01	50	-	50

Contents
Student is expected to choose a recent technical topic of one of core areas and expected to thoroughly explore it and has to deliver a presentationand has to submit a report.

GONDWANA UNIVERSITY, GADCHIROLI

SYLLABUS (SEMESTER PATTERN CHOICE BASED CREDIT SYSTEM)

M. Tech. (Computer Science & Engineering)

Semester-II

Course Code: **PCSS21**
Title of the Course: **Advances in Algorithms**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
Algorithmic paradigms : Dynamic Programming, Greedy, Branch-and-Bound, Asymptotic complexity, Amortized analysis, Graph Algorithms, Shortest paths, Flow networks, NP-completeness, Approximation algorithms, Randomized algorithms, Linear programming, Special topics, Geometric algorithms (range searching, convex hulls, segment intersections, closest pairs), Numerical algorithms (integer, matrix and polynomial multiplication, FFT, extended Euclid's algorithm, modular exponentiation, primarily testing, cryptographic computations), Internet algorithms (text pattern matching, tries, information retrieval, data compression, Web caching).

Reference Books:

1. Introduction to Algorithms by Thomas H Coremen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Second edition, PHI, 2002.
2. Algorithm Design by Jon Kleinberg, Tremblay and Eva Tardos, Addison Wesley.

Course Code: **PCSS22**
Title of the Course: **Advanced Databases**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

DATABASE MANAGEMENT
Relational Data Model – SQL – Database Design – Entity Relationship Model – Relational Normalization – Embedded SQL – Dynamic SQL – JDBC – ODBC.

ADVANCED DATABASES
Object Databases – Conceptual Object Data Model – XML and Web Data – XML Schema – Distributed Data bases – OLAP and Data Mining – ROLAP and MOLAP

QUERY AND TRANSACTION PROCESSING
Query Processing Basics – Heuristic Optimization – Cost Size Estimation – Models of Transactions – Architecture – Transaction Processing in a Centralized and Distributed System – TP Monitor.

IMPLEMENTING AND ISOLATION
Schedules – Concurrency Control – Objects and Semantic Commutativity – Locking – Crash – Abort and Media Failure – Recovery – Atomic Termination – Distributed Deadlock – Global Serialization – Replicated Databases – Distributed Transactions in Real World.

DATABASE DESIGN ISSUES
Security – Encryption – Digital Signatures – Authorization – Authenticated RPC – Integrity – Consistency – Database Tuning – Optimization and Research Issues.

Text Books:
1. Philip M. Lewis, Arthur Bernstein, Michael Kifer, "Databases and Transaction
2. Processing An Application Oriented Approach", Addison, Wesley, 2002.

Reference Books:
1. R.Elmasri and S.B. Navathe, "Fundamentals of Database Systems", 3rd Edition,Addison Wesley, 2004.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharsan, "Database System Concepts", 4th Edition., Tata McGraw Hill, 2004.
3. Raghu Ramakrishnan& Johannes Gehrke, "Database Management Systems", 3rd Edition, TMH, 2003.

Course Code: **PCSS23**

Title of the Course: Advanced Digital Image Processing

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Image Enhancement in the Spatial Domain: Spatial and Frequency methods, Basic Gray Level Transformations, Histogram Equalization, Histogram Processing, Local Enhancement, Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

Transforms: Introduction to the Fourier Transformation, Discrete Fourier Transformation, Fast Fourier Transformation, Fourier Properties, 2D FT, inverse Fourier transform, Wavelet transform and multi resolution processing.

Image Enhancement in the frequency Domain: Filtering in the Frequency Domain, Correspondence between Filtering in the Spatial and Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering, Implementation.

Image Compression: Image compression models, lossy& loss less compression, image compression standards.

Image Restoration, Color Image Processing,

Morphological Image Processing: Preliminaries, Dilation and Erosion, Opening and Closing, hit-or-miss Transformation, Some Basic Morphological Algorithms, Extension to Gray-Scale Images.

Image Segmentation: Point Detection, Line Detection, Edge Detection, Gradient Operator, Edge Linking and Boundary Detection, Thresholding, Region-oriented Segmentation.

Representation: Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeleton of a Region.

Description: Boundary Descriptors, Shape Numbers, Fourier Descriptors, Regional Descriptors, Simple Descriptors, Topological Descriptors.

Object Recognition: Recognition based on decision theoretical methods, structural methods.

Reference Books :

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", 2nd edition, Prentice Hall, 2002.
2. A K Jain , " Fundamentals of Digital Image Processing", Prentice Hall.
3. W K Pratt , "Digital Image Processing" 3rd Edition , John Wiley and Sons, New York
4. Chanda ,Mazumdar , " Digital Image Processing" , Prentice Hall, India.

Course Code: **PCSS24A**
Title of the Course: **Pattern Recognition**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Introduction : Examples; The nature of statistical pattern recognition; Three learning paradigms; The sub-problems of pattern recognition; The basic structure of a pattern recognition system; Comparing classifiers.

Learning – Parametric Approaches: Basic statistical issues; Sources of classification error; Bias and variance; Three approaches to classification: density estimation, regression and discriminant analysis; Empirical error criteria; Optimization methods; Failure of MLE.

Parametric Discriminant Functions: Linear and quadratic discriminants; Shrinkage; Logistic Classification; Generalized Liner classifiers; Perceptrons; Maximum Margin, Error Correcting Codes.

Error Assessment: Sample error and true error; Error rate estimation; Confidence intervals, Resampling methods; Regularization; Model selection, Minimum description length; Comparing classifiers.

Nonparametric Classification; Histograms rules; nearest neighbor method, Kernel approaches, Local polynomial fitting; Flexible metrics, Automatic Kernels methods.

Feature Extraction: Optimal features; Optimal liner transformations; Linear and nonlinear principal components; Feature subset selection.

Reference Books:

1. Pattern Recognition principles by Julus T. Tou and Rafel C. Gonzalez, Addision –Wesley Publishing Company.
2. Pattern Recognition and Image Analysis by Earl Gose, Richard Johnsonbaugh, Prentice Hall of India Private Limited, 1999.

Course Code: **PCSS24B**

Title of the Course: **Statistical Machine Learning**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
Introduction, Types of Machine Learning, Supervised Learning, Regression and Classification, Linear discriminants, The Perceptron. Multilayer perceptron, Back Propagation of Error, Multilayer perceptron in practice, Examples using MLP, Radial Basis functions and Splines, Interpolation and basis functions. Support Vector Machine, Optimal separation, Kernels, Learning with trees, Using Decision Trees, Implementation of decision trees, Classification and Regression trees CART, Decision by committee: Ensemble Learning. Probability and learning, Turning data into probabilities, Gaussian Mixture model and nearest neighborhood model, Unsupervised learning, K-means algorithm, Vector Quantization, Self-Organized feature map. Dimensionality Reduction, Linear Discriminant analysis (LDA), Factor Analysis, Independent Component Analysis, Reinforcement Learning, Markov Chain Monte Carlo Methods, Graphical Methods.

Reference Books:

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Chapman and Hall publications
2. Pattern Recognition and Machine Learning, Bishop, Christopher M., Springer
3. Machine learning: Drew Conway and John White,Oreille publications
4. Machine Learning, Tom M.Mitchell, McGraw Hill Publication

Course Code: **PCSS24C**
Title of the Course: **Network Security & Cryptography**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Introduction:
Attacks, Services and Mechanisms, Security attacks, Security services, A Model for Internetwork security. Classical Techniques: Conventional Encryption model, Steganography, Classical Encryption Techniques.

Modern Techniques:
Symplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operations. Algorithms: Triple DES, International Data Encryption algorithm, Blowfish, RC5, CAST-128, RC2, Characteristics of Advanced Symmetric block cifers.

Conventional Encryption:
Placement of Encryption function, Traffic confidentiality, Key distribution, Random Number Generation. Public Key Cryptography: Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptograpy.

Number theory:
Prime and Relatively prime numbers, Modular arithmetic, Fermat's and Euler's theorems, Testing for primality, Euclid's Algorithm, the Chinese remainder theorem, Discrete logarithms. Message authentication and Hash functions: Authentication requirements and functions, Message Authentication, Hash functions, Security of Hash functions and MACs.

Hash and Mac Algorithms:
MD File, Message digest Algorithm, Secure Hash Algorithm, RIPEMD-160, HMAC. Digital signatures and Authentication protocols: Digital signatures, Authentication Protocols, Digital signature standards.

Authentication Applications:
Kerberos, X.509 directory Authentication service. Electronic Mail Security: Pretty Good Privacy, S/MIME.

IP Security: Overview, Architecture, Authentication, Encapsulating Security Payload, Combining security Associations, Key Management. Web Security: Web Security requirements, Secure sockets layer and Transport layer security, Secure Electronic Transaction.

Reference Book:

1. Cryptography and Network Security: Principles and Practice by William Stallings, Pearson Publications, Sixth Edition, 2014.

Course Code: **PCSS25**
Title of the Course: **Computer System Lab-II**

Course Scheme					Evaluation Scheme (Lab)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	PEE	Total
-	-	02	02	01	50	50	100

Contents
Student is expected to perform at least eight Experiments/Practical's based on the prescribed syllabus of all the theory courses of first semester

Course Code: **PCSS26**
Title of the Course: **Seminar**

Course Scheme					Evaluation Scheme (Lab)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	PEE	Total
-	-	02	02	01	50	-	50

Contents
Student is expected to choose a recent technical topic of one of core areas and expected to thoroughly explore it and has to deliver a presentation and has to submit a report.