Lecture-wise Breakup					
Course Code	10B1NPH732	Semester: ODD		Semester: ODD Semester: 7 th Session: 2019 -2020	
				Month	from July 19 to December 19
Course Name	Nanoscience and Technology				
Credits	3 Contact Hours 3				

Faculty (Names)	Coordinator(s)	Navendu Goswami
	Teacher(s) (Alphabetically)	Navendu Goswami

COURSE O	UTCOMES	COGNITIVE LEVELS
C401-4.1	Define the Nanoscience and Technology and to know about various other terminologies and developments involved with Nanoscience and Technology	Remembering (C1)
C401-4.2	Classify the nanomaterials depending on the nature of dimensionalities, type of materials classes and explain the basic concepts of nanomaterials	Understanding (C2)
C401-4.3	Apply the concepts of Nanoscience for solving the theoretical and numerical problems	Applying (C3)
C401-4.4	Determine the properties of nanomaterials through suitable characterization tools	Analyzing (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Development of nanoscience and nanotechnology, naturally occurring nanomaterials, Crystallinity of nanomaterials, Metallic nanostructures, Semiconductor nanostructures Magnetic nanomaterials, Chemically assisted nanostructures, Growth in 2-D nanostructures, Carbon nanomaterials	10
2.	Properties of Nanomaterials	Surface to volume ratio, Surface states and energy, Nanoscale oscillators, Confinement in nanostructures, Density of States and number of states of 0-, 1-, 2-, 3- dimensional systems, Change in Band structure and gap, Energy levels, confinement energy and emission in nano,	5

		Fluorescence by QDs, Concept of Single electron transistor	
3.	Nanomaterials Synthesis	Introduction to synthesis techniques, Top down and bottom up approach, Biological methods, Sol-gel method, Nucleation and growth, Ball Milling technique, Chemical vapor deposition, Physical Vapor deposition: Concept of Epitaxy and sputtering, Basics of Photolithography and its limitations, Soft Lithography and Nanolithography	10
4.	Characterization of Nanomaterials	Resolving power (Rayleigh and other criteria) of microscopes and their limitations for nanostructure measurements, Concept of Far and Near field and modification by NSOM, Basic principle, Design of setup, Theory and working, Characterization procedure, result analysis, Merits/demerits of SEM, TEM, STM, AFM	5
5.	Application of Nanomaterials	Nanoelectronics, Nanobiotechnology, Catalysis by nanoparticles, Quantum dot devices, Quantum well devices, High T _c nano-Superconductors, Nanomaterials for memory application, CNT based devices, MEMS and NEMS	10
		Total number of Lectures	40
Evaluation	Criteria		
Components T1 T2 End Semester Examination TA Total		Maximum Marks 20 20 35 25 [2 Quiz (10 M), Attendance (10 M) and Cass performance 100	(5 M)]

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Nanostructures and nanomaterials: synthesis properties and application, Guozhong Cao, Imperial college press, London.
2.	Introduction to nanotechnology, Charles Poole et al J John Wiley & Sons, Singapore.
3.	

The Handbook of Nanotechnology: Nanometer Structures, Theory, Modeling, and Simulation, A.

	Lakhtakia, Spie Press USA.
4.	Springer Handbook of Nanotechnology, Edited by B. Bhushan, Springer Verlag.

Subject Code	15B1NCI738	Semester :odd	Semester VII Session 2019-2020 Month from July to December
Subject Name	Social Network Anal	ysis	<u> </u>
Credits	4	Contact Hours	3-1-0

Faculty (Names)	Coordinator(s)	1. Anuradha Gupta, Somya Jain
	Teacher(s) (Alphabetically)	1. Anuradha Gupta 2. Somya Jain

COURSE OUTCOMES		COGNITIVE LEVELS
C431-2.1	Define social network growth models and their characteristics.	Remember Level (level 1)
C431-2.2	Compare and interpret social network structure, size and its connectivity pattern using degree distribution, clustering coefficient, centrality, motifs, density, etc.	Understand Level (level 2)
C431-2.3	Apply link prediction techniques like Jaccard Coefficient, Adamic Adar, Preferential attachment, Katz score, etc. to discover new links in the social network	Apply Level (level 3)
C431-2.4	Discover community structure in complex network using statistical techniques like Newman Girvan, Clique Percolation Method, Ford Fulkerman etc.	Analyze Level (level 4)
C431-2.5	Model the cascading/flow of information in social network for maximizing the cascade, locating the seed nodes and influential nodes.	Apply Level (level 3)

	Develop secured social netwo	orks by applying mechanisms		
C431-2.6	like K-anonymity, L-diversity, T-closeness, etc. to ensure			
	privacy and security. Apply Leve		el (level 3)	
Module No.	Subtitle of the Module	Topics in the module		No. of Lectures for the module
1.	Introduction	Concepts: how services Facebook, LinkedIn, Twitter using SNA to understand th and improve their functionali	such as , etc. are neir users ty.	2
2.	Network Concept	Introduction: Graphs, Pai components, Adjacency Ways and Modes, Matrix node degree, types of nodes of ties, actor atributes	ths and Matrices, Product, and types	4
3.	Random network models	Erdos-Renyi , Barabasi-Albert , Watts- Strogatz small-world model, shortest path, six degree of separation		5
4.	Social Network Visualization	Tools: Gephi, NetLogo, Pajek,	EgoNet	2
5.	Characterizing whole network	Cohesion, reciprocity, Transiti clustering Coefficient, Triad c	ivity and ensus	2
6.	Network centrality	Undirected Non-valued netwo Degree, Eigenvector, betweeness.Directed Non-val Networks: Degree, Eigenvecto closeness. Valued Networks,N tie Networks, subgroup: Cliqu groups	orks: ued or, Negative es and	5
7.	Community Detection	clustering, community structor modularity, overlapping comm	ure, nunities	5
8.	Link Prediction	The Katz Score, Hitting & Com Time, Rooted PageRank, SimR	imute ank,	5

		Predictors Summary, Meta-measures	
9.	Information Diffusion	Cascading Behavior: Herd Behaviour, Information Cascade Model, Threshold Model, Cascade Maximization, Epidemic Modeling	5
10.	Security and Privacy in Social Network	Introduction, K-Anonymity, L-Diversity, Q-Anon, T- Closeness	6
		Total number of Lectures	41
Evaluation Crite	eria		
Components T1 T2 End Semester E TA Total	Maximum Ma 20 20 35 25 (Attendan 100	arks ce(5), Assignments (5), Project (10), Tutorial(5	5))

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	Liu, Bing. Web data mining. Springer-Verlag Berlin Heidelberg, 2007.			
2.	Chakrabarti, Soumen. Mining the Web: Discovering knowledge from hypertext data. Morgan Kaufmann, 2003.			
3.	Scime, Anthony, ed. Web mining: applications and techniques. IGI Global, 2005.			
4.	Hitzler, Pascal, Markus Krotzsch, and Sebastian Rudolph. Foundations of semantic web technologies. CRC Press, 2011.			
5.	King, Andrew B. Website optimization. " O'Reilly Media, Inc.", 2008.			
6.	Segaran, Toby. Programming collective intelligence: building smart web 2.0 applications. " O'Reilly Media, Inc.", 2007.			
7.	Charu.C. Aggarwal, Social Network Data Analytics, Springer Science+Business Media, LLC 2011			
8.	Easley, David, Jon Kleinberg. <i>Networks, Crowds, and Markets: Reasoning about a Highly Connected</i> World. New York, NY: Cambridge University Press, 2010.			

9.	Jackson, Matthew O. Social and Economic Networks. Princeton, NJ: Princeton
	University Press, 2008

Course Code 15B1NHS731 Se		Semester ODD Semes		Semester	Semester 7 th Session 2019 -2020	
				Month from July 2019 to December 2019		
Course Name	DISASTER MANAGEN	MENT				
Credits	3		Contac	t Hours	3-0-0	

Faculty (Names)	Coordinator(s)	Dr Nilu Choudhary
	Teacher(s) (Alphabetically)	Dr Nilu Choudhary

COURSE OUT	COGNITIVE LEVELS	
C4O1-2.1	Understand disasters, their hazards and natural and social phenomena related to them.	Understanding level(C2)
C4O1-2.2	Analyse information on risks and relief	Analyzing level(C4)
C4O1-2.3	Make use of disaster management principles and community involvement methods in Disaster Risk Reduction.	Apply level(C3)
C4O1-2.4	Evaluate the role of different approaches and Humanitarian Assistance needed to manage pre and post- disaster periods	Evaluate level(C5)
C4O1-2.5	Formulate strategies for mitigation in future scenarios by applying technological innovations and learning lessons from past.	Creating level(C6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Disasters	Concepts and definitions of Disaster, Hazard, Vulnerability, Resilience, Risks	4
2.	Disasters: Types	Natural and manmade disasters, their Impacts, Hazards.	4

	Of Disaster		
3.	Disaster :Caste, Class and Gender	Caste and disaster, Disaster discrimination, Social class, Differential impacts of disaster - in terms of caste, class, gender, age location, Role of Women's in Disaster.	5
4.	Approaches to Disaster Risk reduction	Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural - nonstructural measures roles and responsibilities of community	5
5.	Inter-relationship between Disasters and Development:	Factors affecting Vulnerabilities, differential impacts, impact of appropriate technology and local resources.	5
6.	Disaster Risk Management in India:	Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, and Health	5
7.	Risk Society	Risk Society in 1992, Ulrick Beck, Processes of Modernization, The new paradigm of risk society	4
8	Disaster Management Act(2005)	DM Act and Policy, Other related policies, plans, programmes and Legislation).	2
9	Global trends in disasters, Urban Disaster, Pandemics, Climatic Change and Complex Emergencies	MDG and Disaster, Agenda 21: For Local actions, Global trends in disasters, urban disasters, pandemics, Epidemics, complex emergencies, Climate change.	4
10	Disaster, Environment and Development	Environment Management, Importance of Waste Management, Types of Disaster Waste, Sources of Waste	4
		Total number of Lectures	42
Evaluation Criteria			
Components T1 T2 End Semester Examination		Maximum Marks 20 20 35	

ТА	25 (Project, Assignment, Attendance)
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	National Disaster Management Policy. Government of India, 2009.			
2.	Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi. 2011			
3.	Indian Journal of Social Work. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April. 2002			
4.	Alexander David, Introduction in "Confronting Catastrophe", Oxford University Press, 2000			
5.	Coppola P Damon, Introduction to International Disaster Management, Elsevier. 2007			
6.	Ulrich Ranke, Natural Disaster Risk Management, Springer International Publishing, Edition 1, 2016.			

Course Code	15B19CI791	Semester ODD (specify Odd/Even)		Semeste Month fr	er VII Session 2019-2020 rom July to Dec 2019
Course Name	Project Part – 1 (CSE)				
Credits	12		Contact Hours		

Faculty (Names)	Coordinator(s)	Dr. Mukta Goyal Prashant Kaushik
	Teacher(s) (Alphabetically)	Entire Department

COURSE O	UTCOMES	COGNITIVE LEVELS
C450.1	Summarize the contemporary scholarly literature, activities, and explored tools for hands-on in the respective project area	Understand Level (Level 2)
C450 .2	List out the specific requirements to develop the workable solution for the identified computing problem.	Analyze Level (Level 4)
C450.3	Develop a workable computing solutions for the identified problem	Apply Level (Level 3)
C450 .4	Evaluate the performance of the developed solution	Evaluate Level (Level 5)
C450 .5	Compile the results and findings of the project in written and verbal formats	Create Level (Level 6)

Module No.	Title of the Module	List of Experiments	со
1.			
2.			
3.			
4.			

5.					
•••					
n.					
Evaluation Criteria					
Component	Components Maximum Marks				
Mid Semest	er Viva	20			
Final Viva		30			
Project Repo	ort	20			
Day to Day Work		30			
Total]	100			
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books,					

Reference Books, Journals, Reports, Websites etc. in the IEEE format)

Course Code	15B29CI792	Semester ODD (specify Odd/E	ven)	Semeste Month fi	er VII Session 2019 -2020 rom July to Dec 2019
Course Name	Term Paper (CSE)				
Credits	4		Contact H	ours	

Faculty (Names)	Coordinator(s)	Indu Chawla, Somya Jain , Gaurav Kumar Nigam
	Teacher(s) (Alphabetically)	Entire Department

COURSE O	UTCOMES	COGNITIVE LEVELS
C460.1	Infer the research problem stated along with the research methodologies used and their significance.	Understand level (level 2)
C460 .2	Appraise technical writing skills to compare and summarize the nature of work done so far in that area.	Evaluate level (level 5)
C460 .3	Develop effective communication skills to confidently justify theoretical propositions, methodologies, conclusions and limitations by preparing and presenting a seminar	Create level (level 6)

Module No.	Title of the Module	List of Experiments	со
1.			

2.					
3.					
4.					
5.					
n.					
Evaluation	Criteria				
Components Maximum Marks					
Day to da	y work done prior t	o Midterm		20	
Midterm seminar and report			20		
Day to day work done after Midterm & upto End Term seminar		lidterm	20		
End term report			20		
End term Total	seminar		20 100		

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

Course Code	16B1NCI733	Semester OddSemester VIISession2019 - 2020Month from July'19 to December'19		r VII Session 2019-2020 From July'19 to December'19	
Course Name	Data Compression Algorithms				
Credits	4	Contact Hours 3-1-0		3-1-0	

Faculty (Names)	Coordinator(s)	Dr. TRIBHUWAN KUMAR TEWARI/ Dr. SHRUTI JAISWAL
	Teacher(s) (Alphabetically)	Dr. SHRUTI JAISWAL Dr. TRIBHUWAN KUMAR TEWARI

COURSE O	UTCOMES	COGNITIVE LEVELS
CO 430- 3.1	Explain and summarize theoretical and practical significance of various mathematical concepts of data compression	Understand Level (Level 2)
CO 430- 3.2	Demonstrate lossless and lossy compression techniques for images, videos, audios, etc	Understand Level (Level 2)
CO 430- 3.3	Applying different data compression algorithms for solving complex problems	Apply Level (Level 3)
CO 430- 3.4	Analyze the techniques for compression of binary data, image, audio and video	Analyze Level(Level 4)
CO 430- 3.5	Elaborate new trends and possibilities of data compression for redesigning of algorithms.	Create Level(Level 6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction: Importance of data compression, Brief	3

		history, Compression principles, Compression Performance metrics, Lossless and lossy data compression.	
2	Main compression techniques	Data compression classification, lossless compression algorithms, Run length encoding (RLE), Statistical methods-Huffman, Extended Huffman, Adaptive Huffman, Canonical Huffman, length limited Codes, Arithmetic Coding, Dictionary-based methods, Transforms.	10
3.	Image compression	Lossless image compression, Predictive encoding, JPEG lossless coding, Lossy compression, Distortion measures, Progressive image compression, Karhunen-Loeve Transform (KLT), Singular Value decomposition (SVD), JPEG (Still) Image Compression Standard ,Transform-based coding.	8
4.	Video compression	Video compression techniques, predictive coding. MPEG video coding, MPEG-1, B-frame predictive coding, MPEG-2, Supporting interlace video. MPEG-2 scalabilities. MPEG video coding -2, MPEG-4, object based video coding, 3D mesh coding. MPEG-4 part 10/ H.264.	10
5.	Audio compression	Introduction Audio compressions. Quantization and transmission of audio, pulse code modulation (PCM), Differential coding of audio, lossless predictive coding, DPCM, DM. MPEG audio compression , Psychoacoustics, frequency masking, temporal masking, MPEG layers 1-2- 3(MP3), MPEG compression algorithm. MPEG-2 advance coding system (AAC), MPEG-4 audio compression.	8
6.	Compression problems & Algorithmic solutions	Compression performance, Limits on lossless compression, Hardware data compression (HDC).	3
		Total number of Lectures	42
Evaluation	Criteria		
Components T1 T2 End Semester Examination TA Total		Maximum Marks 20 20 35 25 (Attendance(10), Assignments (5), Implementation of Alge 100	orithms (10))

Reco Refei	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)			
1	Salomon, David A Guide to Data Compression Methods. (London:			
	Springer, 2001) [ISBN 0-387-95260-8].			
2	Fundamentals of multimedia by Ze-Nian Li and Mark S. Drew Pearson Education -PHI learning 2004			
3	Wayner, Peter Compression Algorithms for Real Programmers. (London: Morgan Kaufmann, 2000) [ISBN 0-12-788774-1].			
4	Sayood, Khalid Introduction to Data Compression. 2nd edition (San Diego: Morgan Kaufmann, 2000) [ISBN 1-55860-558-4].			
5.	Chapman, Nigel and Chapman, Jenny Digital Multimedia. (Chichester:			
	John Wiley & Sons, 2000) [ISBN 0-471-98386-1].			
т.				

Course Code	16B1NCI831	Semester Odd (specify Odd/Even)		Semester 7 th Session 2019-2020 Month from July 2019 to Dec 2019		
Course Name	Machine Learning					
Credits	4		Contact Ho	ours	3-1-0	

Faculty (Names)	Coordinator(s)	Dr. Shikha Mehta
	Teacher(s) (Alphabetically)	Dr. Shikha Mehta

COURSE OU	TCOMES	COGNITIVE LEVELS
C430-11.1	To learn basic concepts of probability, statistics, linear algebra, convex optimization.	Remembering (Level 1)
C430-11.2	To understand concepts of learning system, supervised learning, unsupervised learning.	Understanding (Level 2)
C430-11.3	Apply techniques to handle issues related to learning model such as overfitting, feature scaling, and dimensionality reduction.	Applying (Level 3)
C430-11.4	Compare the different learning models using the evaluation parameters.	Analyzing (Level 4)
C430-11.5	Determine the applicability of a learning model for a given problem.	Evaluating (Level 5)
C430-11.6	Design a learning model for a specific real-world problem.	Create (Level 6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Definition of learning systems, Goals and applications of	4

		machine learning. Aspects of developing a learning system. Linear Algebra review	
2.	Supervised Learning	Linear regression, Logistic Regression, Support Vector Machine, Maximum Entropy, Hidden Markov Model, Overfitting, noisy data, and pruning, Active Learning- Bagging and Boosting.	10
3.	Unsupervised Learning	Learning from unclassified data, Hierarchical Agglomerative Clustering. Partitional clustering. Expectation maximization (EM). Semi-supervised learning with EM using labeled and unlabelled data., reinforcement learning	11
4.	Dimensionality Reduction and	Feature Extraction, PCA, LDA, Feature Scaling. Comparing learning algorithms: cross-validation, learning curves, and statistical hypothesis testing.	7
5.	Deep Learning	Perceptions: representational limitation and gradient descent training. Multilayer networks and back propagation, Convolutional Neural Networks, Recurrent Neural Networks	10
		Total number of Lectures	42
Evaluation	Criteria		
Componen T1 T2 End Semes TA Total	nts ster Examination	Maximum Marks 20 20 35 25 100	
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Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

Text Book(s):

1. Ethem Alpaydin, *Introduction to Machine Learning, Second Edition.*

2.	Stephen Marsland, Machine Learning: An Algorithmic Perspective.
Refe	rence Book(s):
3.	Christopher M. Bishop, Pattern Recognition and Machine Learning.

Course Code	16B1NCI833	Semester ODD		Semester VII Session 2019-20	
		(specify Od	d/Even)	Month 2019	from June 2019 to December
Course Name	Nature Inspired Com	puting			
Credits	4	4 Contact		Hours	4

Faculty	Coordinator(s)	Dr. Ankita Verma
(Names)	Teacher(s) (Alphabetically)	Dr. Ankita Verma, Ms. Deepti Singh

COURSE O	UTCOMES	COGNITIVE LEVELS
C430-4.1	Explain the concepts of problem solving via search, optimization and pattern recognition with various practical examples.	Understand Level (C2)
C430-4.2	Apply the NIC methods to model, learn and optimize computing problems.	Apply Level (C3)
C430-4.3	Analyze the key ideas, algorithmic steps of various nature inspired computing methods and their general applicability in various domains.	Analyze Level (C4)
C430-4.4	Compare and contrast the similarities and differences among various nature inspired computing methods.	Evaluate Level (C5)
C430-4.5	Formulate and design an efficient solution to a given problem by using the most appropriate nature inspired computing method.	Create Level (C6)

Module	Title of the	Topics in the Module	No. of
No.	Module		Lectures
			for the
			module

1.	Introduction	Introduction to Nature Inspired Computing: Need and Motivation behind Nature Inspired Algorithms; Problem solving by Search and Optimization; Optimization: Continuous vs Combinatorial optimization, Single objective vs Multi-objective optimization, Implicit vs Explicit Constraints; Pattern Recognition.	4
2.	Meta-Heuristic Search Algorithms	Heuristics and Meta-heuristics; Problem Spaces: States, goals and operators; Heuristics search: Hill Climbing and Simulated Annealing, Tabu search	3
3.	Evolutionary Algorithms (EA)	Genetic Algorithms: Introduction, General framework, Encoding Techniques, Selection Operators, Crossover Techniques, Mutation Operators, Replacement Strategies. Differential Evolution: Introduction, Algorithm, Crossover Techniques, Mutation Techniques, Genetic vs DE, Examples	6
4.	Hybrid Evolutionary Algorithms & Multi-objective Optimization Evolutionary Algorithms	 Hybrid EA: Need of Hybridization, Memetic Algorithm, Intelligent Initialization, Local Search, Lamarkian vs. Baldwinian Adaptation. Multi-objective Optimization EA: Dominance, Non- dominated Solution, Pareto Optimal Solution, Elitist Non- dominated Sorting Algorithm. 	3
5.	Swarm Intelligence	Introduction to Swarm Intelligence, Particle Swarm Optimization (PSO): Algorithm, PSO vs EAs; Ant Colony Optimization (ACO): ACO Procedure, Travelling Salesman Problem using ACo, Ant Systems and its direct Variants (Elitist Ant Systems, Rank-based Ant Systems, Max- Min AS, Ant Colony Systems)	7
6.	Bio-Inspired Algorithms	Artificial Bee Colony: Introduction, Algorithm and worked example; Grey Wolf Optimization: Introduction, Algorithm and worked example; Cuckoo Search: Introduction, Algorithm and worked example; Fire-fly algorithm: Introduction, Algorithm and worked example; Bat Algorithm: Introduction, Algorithm and worked example	10
7.	Algorithms based on Physical Laws	Gravitational Search Algorithm: Introduction, Algorithm and worked example; Intelligent water drops (IWD) algorithm:	6

	and miscellaneous algorithms	Introduction, Algorithm and worked example; Biogeography Based Optimization: Introduction, Algorithm and worked example	
8.	Artificial Immune System	Immune System and Immunity; Artificial Immune System(AIS); Biological Immune System(BIS) vs Artificial Immune System(AIS); Typical Applications of AIS; General framework for AIS: Problem Representation, Affinity measure, Selection, Mutation; Basic Arificial Immune Models and Algorithms: Negative Selection Algorithms, Clonal Selection Algorithm, Immune Network Models; Movie Recommender System using AIS.	3
		Total number of Lectures	42
Evaluation	Criteria		
Componer	nts	Maximum Marks	
T1		20	
T2		20	
End Semester Examination		35	
ТА		25 (Assignments, Attendance and Tutorial submission)	
Total		100	

\mathbf{O}	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc.
(Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	(Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Xin-She Yang. Nature-inspired optimization algorithms. Elsevier, 2014.
2.	Raymond Chiong ed. Nature-inspired algorithms for optimisation. Vol. 193. Springer, 2009.
3.	Dario Floreano and Mattiussi Claudio. <i>Bio-inspired artificial intelligence: theories, methods, and technologies</i> . MIT press, 2008.
4.	De Castro, Leandro Nunes. Fundamentals of natural computing: basic concepts, algorithms, and applications. Chapman and Hall/CRC, 2006.
5.	Swarm and Evolutionary Computation: Elsevier
6.	Natural Computing : Springer

Course Code	16B1NCI836	Semester : Odd		Semester: 7 th Session: 2019-2020	
				Month	from July'19 to Dec'19
Course Name Interconnection Net		works in Compu	iter Archite	cture	
Credits 4			Contact H	ours	3-1-0 (L-T-P)

Faculty (Names)	Coordinator(s)	Bansidhar Joshi
	Teacher(s) (Alphabetically)	

COURSE O	UTCOMES	COGNITIVE LEVELS
C430- 10.1	Outline the architecture, design methodology, and characteristics of interconnection networks	Understand (Level 2)
C430- 10.2	Identify various topologies and routing schemes for On-Chip Networks	Applying (Level 3)
C430- 10.3	Analyze various flow control mechanisms in On-Chip Networks for deadlock/livelocks avoidance	Analyzing (Level 4)
C430- 10.4	Explain the functioning of Arbitration and Allocation schemes in router's micro-architecture	Evaluate (Level 5)
C430- 10.5	Propose and present solutions for effective communication in various interconnection network architectures	Create (Level 6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Interconnection Networks	Introduction, Types of Networks, Evaluation Metrics	6

2.	Тороlоду	Metrics for comparing topologies, Direct Topologies,	5
		Indirect Topologies, Hierarchical Topologies	
3.	Routing	Deterministic Routing, Oblivious Routing, Adaptive Routing	5
		Manager based Flaw Cautural Desket based Flaw Cautural	
4.	Flow-Control	Message-based Flow Control, Packet-based Flow Control,	6
		Filt-based Flow Control, Virtual Channels	
		Channel Dependency Granh Turn Model Un*/Down*	
5.	Deadlocks	Routing Escape Virtual Channels Deadlock Recovery	5
6.	Microarchitecture	Router Organization, Pipeline, Optimizations, Buffer	8
		Management, Crossbar Design, Allocators and Arbiters	_
7.	End Term	Topology, routing, flow-control and microarchitecture	5
	Presentations		
	1	Total number of Lectures	40
Evaluation	Criteria		
Componer	nts	Maximum Marks	
T1		20	
T2		20	
End Semes	ster Examination	35	
TA		25	
Total		100	

Reco Refe	mmended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, rence Books, Journals, Reports, Websites etc. in the IEEE format)
1.	W. Dally and B. Towles, "Principles and Practices of Interconnection Networks," Morgan Kauffman Publishers, 2004
2.	N. E. Jerger, T. Krishna, and LS Peh, "On-Chip Networks, 2nd Edition" Morgan Claypool Publishers, 2017.

3.	Papers from recent conferences: ISCA, MICRO, HPCA, ASPLOS, SIGCOMM, NSDI, NOCS, DATE, DAC, ISSCC
5.	

Machine Learning and Natural Language Processing (17B1NCI731)

Course Code	16B1NHS831	Semester: Odd (specify Odd/Even)		Semester: VII Session 2019 -2020 Month: July-Dec	
Course Name	Gender Studies				
Credits	3		Contact H	lours	(3-0-0)

Faculty (Names)	Coordinator(s)	Dr Parineeta Singh
	Teacher(s) (Alphabetically)	Dr Parineeta Singh

COURSE O	UTCOMES	COGNITIVE LEVELS
C401- 19.1	Demonstrate knowledge of the construct of gender and the way it intersects with other social and cultural identities of race, class, ethnicity and sexuality	Understand(C2)
C401 - 19.2	Apply feminist and gender theory in an analysis of gender including an examination of the social construct of femininity and masculinity	Apply (C3)
C401- 19.3	Analyze the ways in which societal institutions and power structures such as the family, workplace impact the material and social reality of women's lives	Analyze (C4)
C401- 19.4	Assess the need for Gender Sensitization and Gender Inclusivity and its practice in contemporary settings	Evaluate (C5)
C401- 19.5	Evaluate and interpret information from a variety of sources including print and electronic media, film, video and other information technologies	Evaluate (C5)

Module	Title of the Module	Topics in the Module	No. of
No.			Lectures for
			the module

1.	Introducing	Sex and Gender	8
	Gender Issues	• Types of Gender	
		• Gender Roles and Gender Division of Labor	
		• Gender Stereotyping and Gender Discrimination	
		The Other and Objectification	
2.	Gondor	Biological, Phenomenological and Socio-Cultural	8
		 Perspectives of Body Body as a Site and Articulation of Power Palations 	
	Perspectives of	 Body as a Site and Afficultation of Fower Relations Cultural Meaning of Female Body and Women's 	
	Body & Language	Lived Experiences	
		The Other and Objectification	
2		Bio-Social Perspective of Gender	9
3.		Gender as Attributional Fact	5
	Social Construction	Feminine & Feminist	
		• Major Theorists of Feminism Challenging Cultural	
	of Femininity &	Notions of Femininity	
	Feminism	• Feminism Today: Radical, Liberal, Socialist,	
		Cultural, Eco feminism & Cyber feminism	
		• Images of Women in Sports, Arts, Entertainment,	
		Media and Fashion Industry ;Cultural Feminism &	
		Celebrating Womanhood	
		Analysis of role women have played across cultures	
4.		• Definition and Understanding of Masculinities	9
	Social Construction	 Sociology of Masculinity and Drivilaged Social Organization of Masculinity and Drivilaged 	
	of Masculinity	 Social Organization of Masculinity Position of Masculinity 	
		 Politics of Masculinity and Power 	
		 Major Theorists of Masculinity 	
		• Masculine Identities in Literature, Cinema &	
		Media.	
5.	Gender		8
	Sensitization		
		• Women, Law & Women Rights In India	
	Empowerment	• From Women's Studies to Gender Studies: A	
	&Gender	Paradigm Shift	
	Inclusivity	 Gender Studies & Media: Creating New Paradigms in Gender & Culture 	
		Total number of Lectures	42
Evaluatio	n Criteria		
Components		Maximum Marks	
T1 .		20	
T2		20	
End Semester Examination		35	
TA		25 (Assignment, Viva)	
Total		100	

Reco	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books,			
Refe	Reference Books, Journals, Reports, Websites etc. in the IEEE format)			
1	Davis K., et al, "Handbook of Gender and Women's Studies. London: Sage. (2006)			
2	Helgeson, Vicki S., "The Psychology of Gender", Pearson(2012)			
3	Friedan B., "The Feminine Mystique", Penguin. (1971/1992)			
4	Debeauvoir S. , "The Second Sex", Vintage (1953/1997)			
5	Wharton Amy S., "The Sociology of Gender: An Introduction to Theory & Research", Wiley-Blackwell (2005)			
6	Pachauri G.," Gender, School & Society", R.Lall Publishers(2013)			
7	Connell R.W, "Masculinities", Cambridge: Polity. (1985)			
8	MacInnes J., "The End of Masculinity". Buckingham: Open University Press. (1998)			
9	Kaul A.& Singh M., "New Paradigms for Gender Inclusivity", PHI Pvt Ltd (2012)			

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Lecture-wise Breakup					
Course Code	16B1NPH732	Semester: ODD	Semeste	er: 7 th Session: 2019 -2020	
			Month f	rom July 19 to December 19	
Course Name	Green Energy and Clir	Climate Modeling			
Credits	3		Contact Hours	3	

Faculty (Names) Coordinator(s)		Prashant Chauhan
	Teacher(s)	Prashant Chauhan

COURSE O	UTCOMES	COGNITIVE LEVELS
C401-6.1	Recall the basic information about different energy resources, reserves and define the problem with fossil fuel	Remembering (C1)
C401-6.2	Explain green house effect, modelling of temperature measurement and physics behind the global warming	Understanding (C2)
C401-6.3	Demonstrate the basic principles and designs of different solar collectors and concentrators, and identify the best design/material/location to absorb maximum solar energy	Applying (C3)
C401-6.4	Analyze the potential of different renewable energy sources like wind, ocean and bio mass energy	Analyzing (C4)
C401-6.5	Compare the output of renewable energy source using different design under different conditions/location	Evaluating (C5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Man and energy, world and Indian production /reserve of conventional energy sources, alternative energy sources.	02
2.	The greenhouse effect	Physics behind greenhouse effect, Blackbody radiation, layer model depending on energy flux and temperature at earth surface, radiation effect on Greenhouse gases, temperature structure of the atmosphere, Heat, pressure, wind, feedback mechanism. Carbon Cycle and Climate, Fossil Fuels, Effect of Conventional energy sources.	10

3.	Solar energy	Nature and availability of radiation, estimation of solar energy radiation. Effect of receiving surface, location and orientation, heat transfer consideration relevant to solar energy, Characteristics of materials and surface used in solar energy absorption. Device for thermal collection and storage	06
4.	4. Ocean Energy Tidal energy, and its characteristics, tidal energy estimation, important component of tidal energy plant, single basin plant, double basin plant, turbine, tidal power plant development in India, wave energy, design parameters of wave energy plant, introduction and working of ocean thermal energy conversion,		06
5.	Wind Energy and Bio Mass energy	Introduction to wind energy, Nature, power, forces, conversion and estimation. Components of wind energy system types, safety and environment, Introduction to bio mass energy, conversion and utilization of biogas plants and gas fiers	10
6.	Fusion Energy	Basics of DT fusion, Magnetic confinement fusion, laser inertial fusion, present status of fusion reactors and future scope at international and national level	6
Total number of Lectures		40	
Evaluation Criteria			
Components T1 T2 End Semester Examination TA Total		Maximum Marks 20 20 35 25 [2 Quiz (10 M), Attendance (10 M) and Cass performance 100	(5 M)]

Reco Refe	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)			
1.	Global Warming : Understanding the forecast by David Archer, Wiley			
2.	Kothari D.P. renewable energy resources and emerging technologies, Prentice of India			
3.	G D, Non-conventional energy sources, Khanna Publishers			

4.	Duffie J A & Beckmann W A, Solar engineering of thermal process, Wiley-International Publication

Subject Code	17B1NCI731	Semester Odd	Semester VII Session 2019 - 20
		(specify Odd/Even)	Month from July,19 to December,19
Subject Name	ct Name Machine Learning and Natural Language Processing		
Credits	4 Contact Hours 4		

Faculty (Names)	Coordinator(s)	Bharat Gupta
	Teacher(s)	Bharat Gupta

	COURSE OUTCOMES	COGNITIVE LEVELS
C430-2.1	Explain different syntax and semantics approaches in NLP	Understand Level [Level 2]
C430-2.2	Understand the fundamental mathematics applied in the field of NLP	Understand Level [Level 2]
C430-2.3	Apply different models like Hidden Markov Model, SVM, CRF, RNN, LSTM in parts of speech tagging	Apply Level [Level 3]
C430-2.4	Apply different probabilistic parsing techniques in NLP	Apply Level [Level 3]
C430-2.5	Apply different supervised and unsupervised techniques for document classification	Apply Level [Level 3]
C430-2.6	Analyze and apply appropriate Machine Learning techniques to solve the real world problem in NLP	Apply Level [Level 3]

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1	Introduction to Machine Learning & NLP	Introduction to Machine Learning & NLP, Challenges & Requirements	3
2	Mathematical Foundation	Probability Theory, Vector Spaces, Matrix algebra, Probability, Data representation, Tokenization, Lemmatization	5
3	Parts of Speech Tagging	Various Models: Hidden Markov Model, SVM, CRF, RNN, LSTM	11
4.	Parsing	Linguistic Essentials, Markov Models, Applications of tagging, Probabilistic parsing -	8

		CFG, CNF, CYK					
5.	Document classification	Supervised: Naive Bayes, Ngram's model, Sentiment analysis, Text classification,	8				
		Unsupervised: K-means, MaxEnt classifier					
6.	Topic Modelling	variants	2				
7.	Applications	Machine Translation, Question Answering	4				
		Total number of Lectures	42				
Evaluation C	riteria						
Components	Maximum Marl	xs					
T1	20						
T2	20						
End Semester	Examination 35						
ТА	ΓA 25 (Attendance and Tut Performance (5), Quiz/ Mini-Project/Assignment (20))						
Total	100						
Recommende Reference Boo	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc.)						
1.	Speech and Language Pro Computational Linguistics	cessing: An Introduction to Natural Language Process, and Speech Recognition (third edition) Daniel Jura	ssing, afsky and J. Martin				
2.	Handbook of Natural Language Processing & Machine Translation by Olive, Joseph, Christianson, Caitlin, McCary, John (Eds.), Springer						
3.	3. Statistical Machine Translation by Philipp Koehn, Cambridge University Press						
4.	Readings in Machine Translation edited by Sergei Nirenburg, H. L. Somers, Yorick Wilks, MIT Press						
5.	Natural Language Underst	Natural Language Understanding by James Allen, Benjamin Cummins Publisher					
6.	Foundations of Statistical NLP by Hinrich Schtze, Christopher D. Manning						
7.	Natural Language Processing with Python by Steven Bird, Ewan Klein, and Edward Loper						

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Course Code NBA Code	18B12CS434 CS434	Semester (Odd)		Semeste Month f	Semester Session 2019-2020 Month from July - December		
Course Name	Ethical Hacking						
Credits	04		Contact H	lours	(L+T) (3+1)		

Faculty (Names) Coordinator(s)		Dr. P. Raghu Vamsi	
	Teacher(s) (Alphabetically)	Dr. P. Raghu Vamsi	

COURSE O	UTCOMES	COGNITIVE LEVELS
CS434.1	Define what is ethical hacking and penetration testing, and when and why penetration testing is required along with testing phases.	Remember Level (Level 1)
CS434.2	Classify and outline the penetration testing phases and relate the phases to the specified context.	Understand Level (Level 2)
CS434.3	Identify and analyse the stages a penetration tester requires to take in order to compromise a target system.	Apply Level (Level 3)
CS434.4	Examine and implement tools and techniques to carry out a penetration testing.	Analyze Level (Level 4)
CS434.5	Critically evaluate security techniques used to protect system and user data to suggest countermeasures.	Evaluate Level (Level 5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1	Introduction	Key issues plaguing the information security world, incident management process, and penetration testing	3
2	Footprinting	Various types of footprinting, footprinting tools, and countermeasures.	3
3	Scanning and Enumeration	Network scanning techniques and scanning countermeasures. Enumeration techniques and enumeration countermeasures	3
4	System Hacking	System hacking methodology, steganography, steganalysis attacks, and covering tracks	3
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5	Malware and Virus	Different types of Trojans, Trojan analysis, and Trojan countermeasures. Working of viruses, virus analysis, computer worms, malware analysis procedure, and countermeasures	3
6	Sniffing	Packet sniffing techniques and how to defend against sniffing	3
7	Social Engineering	Social Engineering techniques, identify theft, and social engineering countermeasures	3
8	DoS Attacks	DoS/DDoS attack techniques, botnets, DDoS attack tools, and DoS/DDoS countermeasures	3
9	Session Hijacking	Session hijacking techniques and countermeasures	3
10	Web Servers and Apps	Dierent types of webserver attacks, attack methodology, and countermeasures. Dierent types of web application attacks, web application hacking methodology, and countermeasures	3
11	SQL Injection	SQL injection attacks and injection detection tools	3
12	Hacking WiFi and Bluetooth	Wireless Encryption, wireless hacking methodology, wireless hacking tools, and wi-fi security tools	3
13	Mobile Hacking and Security	Mobile platform attack vector, android vulnerabilities, jailbreaking iOS, windows phone 8 vulnerabilities, mobile security guidelines, and tools	3
14	IT Act 2008	Indian Information Technology Act 2000 and IT Amendment Act 2008	3
15	Pentesting Report	Various types of penetration testing, security audit, vulnerability assessment, and penetration testing roadmap	3
		Total number of Lectures	45
Evaluation	Criteria		
Components T1 T2 End Semester Examination TA Total		Maximum Marks 20 20 35 25 (Quiz/project and Attendance) 100	

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Sean-Philip Oriyano, "Certified Ethical Hacker Version 9 - Study Guide", EXAM 312-50, Sybex Wiely, 2016.
2.	Georgia Weidman, "Penetration testing A Hands-On Introduction to Hacking", No Scratch Press, 2014.
3.	Raphaël Hertzog, Jim O'Gorman, and Mati AharoniKali, "Linux Revealed Mastering the Penetration Testing Distribution", OFFSEC Press, 2017
4.	Corey P. Schultz, Bob Percianccante, "Kali Linux Cook Book", Second edition, Packet Publishing, 2017.
5.	Lee Allen, Tedi Heriyanto, Shakeel Ali, "Kali Linux – Assuring Security by Penetration Testing, Packet Publishing, 2014.
6.	Dejey, Murugan, "Cyber Forensics", Oxoford University Press, 2018.

Subject Code	19B12CS422	Semester Odd	Semester VII Session 2019-20
			Month from July '19 to Dec '19
Subject Name	Mathematical Foundations for Intelligent systems		
Credits	3	Contact Hours	3

Faculty (Names)	Coordinator(s)	Dr.Dhanalekshmi G		
	Teacher(s)	Dr. Archana Purwar, Dr.Dhanalekshmi G		
Sections	1			

COURSE	OUTCOMES	COGNITIVE LEVELS
C431- 5.1	Explain the concepts of computing eigenvectors, vector spaces, manipulate linear transformation and various decomposition techniques, probability, entropy.	Understanding Level (C2)
C431- 5.2	Explain concepts of unconstrained , constrained optimization , convexity, blackbox & global Optimization , langrange's function .and its application such as Support Vector Machine etc.:	Understanding Level (C2)
C431- 5.3	Explain concepts of time series analysis, linear vector calculus, Multivariable Calculus, Multivariate Chain Rule Gradient Descent Methods	Understanding Level (C2)
C431- 5.4	Apply the concepts of linear algebra, probability, Fourier transformation, optimization techniques, concepts of calculus in study of intelligent systems	Apply Level (C3)
C431- 5.5	Analyze different approaches for constructing intelligent systems using concepts of linear algebra, probability, Fourier transformation, optimization techniques, concepts of calculus in study intelligent systems	Analyze Level (C4)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for
1.	Application of Linear Algebra in intelligent systems	Introduction to linear algebra ; Data preparation using Linear Algebra in tabular and image datasets such as ^ one hot encoding and dimensionality reduction , ^ use of linear algebra notation and methods in sub-fields such as recommender systems.	the module 7
2.	Application of Probability and Information in intelligent systems	Introduction to Probability and entropy and its applications such as static and dynamic Bayesian network, Markov chain network	6
3.	Optimization in intelligent systems	Unconstrained , constrained optimization ,convexity, Blackbox & Global Optimization Langrange's function and its application such as Support Vector Machine etc.:	12
4.	Application of Fourier Transformation in data analytics	Introduction, time series analysis, application of Fourier transform in data processing and analysis	7
5.	Application of multivariate calculus	Introduction to multivariate Calculus, use of calculus in intelligent applications such as multivariate hyperbolic tangent neural network approximation, multivariate sigmoidal neural network approximation , deep learning NN	10
		Total number of Lectures	42
Evaluation Crit Components T1 T2 End Semester F TA	eria Maxim 20 20 Examination 35 25	num Marks	

Total

100

Recommended Reading material: (APA format)			
1.	Learning with Kernels by Scholkopf and Smola (2000)		
2.	Lecture Notes on The Fourier Transform and its Applications by Prof. Brad Osgood Electrical Engineering Department Stanford University		
3.	Optimization for Machine Learning Suvrit Sra, Sebastian Nowozin and Stephen J. Wright		
4.	Multivariable Calculus with Applications Maria Shea Terrell and Peter Lax		
5.	Duda, Hart, Stork: Pattern Classification.		
6.	Strang, Gilbert. Introduction to Linear Algebra. 4th ed. Wellesley-Cambridge Press, 2009. ISBN		
7.	Bishop, C. M.: Pattern Recognition and Machine Learning.		
8.	Lecture Notes on Maths for Intelligent Systems Marc Toussaint		
9.	<i>Principle and Theory for Data Mining and Machine Learning</i> by Clark, Forkoue, Zhang (2009)		

Course Code	17B1NCI732	Semester Odd (specify Odd/Even)		Semeste Month f	er 7 th Session 2018 -2019 From July 2019- Dec 2019
Course Name	Computer and Web Security				
Credits	3	Contact Hours		ours	3-1-0

Faculty (Names)	Coordinator(s)	Dr. Sangeeta Mittal
	Teacher(s) (Alphabetically)	Dr. Sangeeta Mittal

COURSE OUTCOMES		COGNITIVE LEVELS
C430-5.1	Assessing computing system's threats and access control in Operating Systems	Understand (Level-2)
C430-5.2	Explain Software Security Issues, their solutions along with cryptography	Understand (Level-2)
C430-5.3	Evaluate various malware detection systems	Analyze (Level-4)
C430-5.4	Identify client-side web access threats like cross site scripting and SQL injection	Apply (Level-3)
C430-5.5	Apply mechanisms of correct Identification and Authentication of users of computing resources	Understand (Level-2)
C430-5.6	Examine non-cryptographic network protocol vulnerabilities and their solutions	Analyze(Level-4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Vulnerability- Threat-Control Paradigm	Threats: Confidentiality, Integrity, Availability, Types of Threats, Types of Attackers, Software Security: Buffer Overflow, Coding threats	3

2.	Software Security Issues	Unintentional insecure Coding Practices, Buffer Overflow, Format String vulnerabilities, Stack Smashing	6
3.	Malware	Virus, Worms – Definition , Modelling and Solutions	5
4.	Malware Detection systems	Worm Detection, Worm Signature Extraction, Virus Detection, Intrusion Detection Systems – Anomaly Vs Signature Based and Host vs Network Based	4
5.	Web Access Threats	Web Browser Attacks: Browser Attack Types, Web Attacks Targeting Users, Obtaining User or Website Data, Code within Data, Foiling Data Attacks, Email Attacks: Phishing	6
6.	Access Control -1	Access Control and Authorization in OS	4
7.	Access Control -2	ntrol -2 Authentication Protocols	
8.	Non-Cryptographic network protocol vulnerabilities	Threats to Network Communications, Denial of Service: Flooding Attacks, Network Flooding Caused by Malicious Code, Network Flooding by Resource Exhaustion, Denial of Service by Addressing Failures, Traffic Redirection, DNS Attacks, Exploiting Known Vulnerabilities Distributed Denial-of-Service: Scripted Denial-of-Service Attacks, Bots, Botnets	7
9.	Cryptographic Solution	Types of Cryptography , Key Management, Digital Signature	3
		Total number of Lectures	42
Evaluation	Criteria		
Components T1 T2 End Semester Examination TA Total		Maximum Marks 20 20 35 25 (Tut(5) + Attendance(5) +Quiz(5)+Mini Project(5)) 100	

Reco Refe	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)		
1.	Security in Computing 5 th Edition , Charles P Fleeger et. al. , Prentice Hall		
2.	2. Information Security, Principles and Practice, Mark Stamp, Wiley		

3.	Kali Linux, Abhinav Singh, Packt Publishing
4.	Computer Viruses and Malware, John Aycock, Springer
5.	Computer Security: Art and Science, Matt Bishop, Addison Wesley

Subject Code	17B1NCI747	Semester (ODD)	Semester Odd Session 2019 - 20 Month from July to Dec		
Subject Name	Cloud Computing	ng			
Credits	4	Contact Hours	3 Lectures+ 1 Tutorial		

Faculty	Coordinator(s)	Prakash Kumar
(Names)	Teacher(s) (Alphabetically)	Prakash Kumar

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Overview of Distributed Trends of computing, Distributed Compu Computing Grid Computing, Ubiquitous compu Introduction to distributed computing.		1
		System models for Distributed, Client Server Models, Peer to Peer Models	1
		Next big thing: cloud computing, Cloud Computing, Pay-as-per-use Model, Enabling Technologies.	1
2.	Introduction to Cloud Computing , Issues and Challenges	What's cloud computing, History of cloud computing, Correlation between distributed and Cloud Computing.	1
		Characteristics, Transparency, Scalability, Multi- Tenant architecture, Benefits of cloud computing, Optimal System Resource utilization	1
		Service models, Private, Public, Community,	1

	Hybrid, Deployment models. SaaS, PaaS, IaaS.			
		Current issues and challenges of cloud computing, Management of Data Centers, Energy aware Issue etc.	1	
3.	Cloud Architecture	Traditional computing architecture, Layers of traditional architecture, their pros and cons.	1	
		Cloud Computing Architecture, Role of Virtualization, Various Models	2	
		Role of network in cloud computing, Providing High speed communication bandwidth	1	
4.	Virtualization Techniques	Role of Virtualization in Cloud Computing, Virtualization of resources and related issues.		
			1.5	
		Virtualization Technologies, Virtual Machine Monitors, Virtual Machines	1.5	
		Virtualization Techniques, ISA Level virtualization, Hardware Abstraction level, OS level, Library Level, Application Level virtualization techniques.	2	
		Introduction to Intel Virtualization Technology (IVT)	1	
		Intel IA-32 and Itanium Architectures, Challenges in the design of these architectures.	2	
		Addressing the challenges by VTx and VTi architectures.	1	
		Root Mode and Non-root mode operations of VTx and VTi	1	
5.	Energy Aware Computing in	Energy Aware concepts and techniques.	2	
	Cloud, Resource Allocations and Load Balancing techniques	Energy Aware computations with DVFS, Various	2	
		Resource allocation Load balancing techniques.	2	

6.	Cloud Simulation platforms and Open Source Frameworks CloudSim, GridSim, iFogSim etc.		2	
		Creation of Cloudlets VMs, Data Centers in Cloudsim and iFogSim environments	2	
7.	Cloud Security	Network level security, Data level security,	1	
		Access management and control, Authentication in cloud computing	2	
8.	Cloud computing and IoT	Introduction to Cloud and IoT platforms.	1	
		Open Source Cloud and IoT integration	2	
		Applications of Cloud and IoT for Sustainable developments	2	
	Total numb	er of lectures	42	
Recommende Reference Boo	d Reading material: Author(s), Title oks, Journals, Reports, Websites et	e, Edition, Publisher, Year of Publication etc. (Text k c. in the IEEE format)	oooks,	
1.	K. Hwang, Geoffrey C. Fox, Jack J. Dongarra, "Distributed and Cloud Computing- From Parallel Processing to the Internet of Things", Morgan Kauffman Publishers, Elsevier.			
2.	Tanenbaum, A.S, Marten, V. Steen, Distributed Systems : Principles and Paradigms, 2 nd Edition, Prentice Hall .			
3.	M. Singhal, N. G. Shivaratri, Advanced Concepts in Operating Systems, 1 st Ed., Tata McGraw- Hill, 1994.			
4.	"Introduction to Cloud Computing Architecture" Sun's White Paper, 1 st Edition, June, 2009.			
5.	Tanenbaum, A. S Distributed Operating Systems, 1 st Ed., Prentice-Hall, Englewood Cliffs, NJ, 1995.			
6.	Sanderson, Dan, Programming Google's Application Engine, O'Reilly, Google Press.			
7.	IEEE, ACM Transactions, Journals and Conference papers on "Distributed and Cloud Computing."			
8.	George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'REILLY publication.			
9.	"Virtualization Overview", White paper, VM Ware.			

10.	"Implementing Virtualization" White paper, Intel virtualization Technology, 2008	
11.	Tulloch, Mitch, Understanding Microsoft virtualization solutions: From the Desktop to Data Center, Microsoft Press.	

Course Code	17B1NCI748	Semester Odd (specify Odd/Even)		Semester VII Session 2019-2020 Month from July 19 to Dec 19	
Course Name	Graph Algorithms and	d Applications			
Credits 3			Contact H	ours	3-1-0

Faculty (Names)	Coordinator(s)	Anurag Goel
	Teacher(s) (Alphabetically)	Anurag Goel

COURSE O	UTCOMES	COGNITIVE LEVELS
C431-1.1	Find the shortest path, minimum spanning tree, maximum flow, articulation points, bridges, etc. in the given weighted or unweighted graph	Remembering (Level-1)
C431-1.2	Model the real world computational problems using graph	Understanding (Level-2)
C431-1.3	Apply conventional, approximation and evolutionary algorithmic approaches for graph based computational problems like, covering problems, bipartite set matching, planarity testing, graph reliability, etc.	Applying (Level-3)
C431-1.4	Develop computing solutions for the real world computational problems modelled using graph	Creating (Level-6)
C431-1.5	Analyze the time and space complexities of the designed algorithms and developed solutions for the computational problems	Evaluating (Level-5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Scope, Basic concepts and terminology, Adjacency Matrix, Incidence Matrix, Cycle Matrix, Cut-set Matrix, Path Matrix,	1

		Determining lower bounds, Adversary arguments, Problem reductions, NP-completeness, etc.	
2.	Applications of Connectivity and Reliability	Reliable communication network design, Cycle detection, Searches, Multiway cut, Minimum K-cut, etc.	5
3.	Applications of Traversability	Shortest paths, Optimal tours, Euler's Cycle, Hamiltonian Cycle, TSP, etc.	4
4.	Applications of Trees	Spanning trees, Steiner Tree, Minimum cost constructions, Coding theory, Phylogeny construction, etc.	4
5.	Applications of Matching/Partitioni ng	Personnel assignment, Optimal assignment, Hungarian Algorithm, Territory demarcation, Stable Marriage, Project Allocation, etc.	5
6.	Applications of Coverings	Vertex Cover, Set Cover, Shortest superstring, Geometric problems, etc.	4
7.	Applications of Colourability	Storage management, Timetable schedules, etc.	3
8.	Applications of Planarity	Planarity detection, PCB design, Facilities layout and floor plan design, Software testing, Defense strategies, etc.	4
9.	Applications of Digraphs	Circuit theory and electrical network analysis, Transport networks, Job sequencing, Disk scheduling, Participant rankings in tournaments, Choice consistency, Project planning, etc.	5
10.	Applications of Flows	Max-flow min-cut, Feasible flows, Transportation problems, etc.	4
11.	Graph Databases	Embrace Relationships with Graph Databases, Querying Graphs: Cypher Query Language, Graph Database Application	3
	1	Total number of Lectures	42
Evaluation	Criteria		
Componen T1 T2 End Semes TA Total	nts ater Examination	Maximum Marks 20 20 35 25 (Assignments, Paper Reading) 100	

Reco Refe	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science, Prentice-Hall, 1974				
2.	Frank Harary, Graph Theory, Addison-Wesley, 1969				
3.	Reinhard Diestel, Graph Theory, 3e, Springer-Verlag, 2005				
4.	Kenneth H. Rosen, Discrete Mathematics and its Applications, 6e, McGraw-Hill, 2007				
5.	Thomas H Cormen, Charles E Leiserson, Ronald L. Rivest, and Cliff Stein, Introduction to Algorithms, 2e, MIT Press, 2001				
6.	A Gibbons, Algorithmic Graph Theory, Cambridge University Press, 1985				
7.	V. A. Vazirani, Approximation Algorithms, Springer International Edition				
8.	Douglas B. West, Introduction to Graph Theory, Pearson, Second Edition				

Subject Co	de	17B1NCI749		Semester ODD	Semester VII Session 2019-2020 Month from JUL 2019 to DEC 2019		
Subject Name		MOBILE COMPUTI	NG	и			
Credits		4		Contact Hours	3-1-0 (L-T-P)		
Faculty		Coordinator(s)	Dr	. Charu			
(Names)		Teacher(s) (Alphabetically)	Dr	. Charu			
COURSE O	UTCO	DMES	<u> </u>			COGNITIVE LEVELS	
C431-4.1	Assess the suitability of different techniques in multiplexing, modulation, spread spectrum, frequency reuse factor for specific wireless network requirements				ultiplexing, actor for specific	Evaluate Level [Lev	el 5]
C431-4.2	Identify important issues and concerns on security and privacy of a mobile computing environment and assess technical solution for security and privacy of user data. Apply Level			Apply Level [Level	3]		
C431-4.3	Analyze performance aspects of medium accessing, transport layer methodologies and routing techniques in wireless networks (WLAN, WPAN) and mobile networks (GSM, UMTS, UTRAN). Analyze Level [Level			el 4]			
C431-4.4	Apply functional aspects of Android mobile operating system in developing mobile applications. Apply Level [L				Apply Level [Level	3]	
C431-4.5	Build contemporary mobile applications based on different widgets, different views and view groups, SMS, mail, and location aware services through Internet for mobile environments. Create Level [Level			el 6]			
C431-4.6	Explain the working of different protocols for mobile network layer and mobile transport layer. Unders			Understand Level [l 2]	_evel		

Module No.	Title of the Module	Topics in the module	No. of Lectures for the module
1.	Introduction	Introduction to mobile computing: Applications, mobile and wireless devices, history of wireless communication, open research topics, simplified reference model	3
2.	Wireless Transmission	Frequency for radio transmission, regulation, signals, antennas, signal propagation, multiplexing, modulation, spread spectrum, cellular systems	6
3.	Medium Access Control	Specialized MAC, Hidden and exposed terminals, near and far terminals, SDMA, FDMA, TDMA, CDMA., comparison of S/T/F/CDMA	4
4.	Telecommunication Systems	GSM: Mobile Services, System Architecture, Radio Interface, Protocols, Localization and calling, Handover, Security, Data Services, UMTS and UTRAN, Core Network, Handover	6
5.	Wireless LAN	Infrastructure and ad-hoc network, IEEE802.11: System architecture, protocol architecture, Physical Layer, Medium access control layer, MAC management, 802.11b, 802.11a,HIPERLAN, Bluetooth	5
6.	Mobile network Layer	Mobile IP, Dynamic host configuration protocol, mobile ad-hoc networks, routing	4
7.	Mobile transport layer	Traditional TCP: congestion control, slow start, fast retransmit/fast recovery, implications of mobility, TCP improvements, TCP over 2.5, 3.5 wireless networks, performance enhancing proxies, Mobility.	4

8.	Mobile Operating Systems	Android OS- Installing, Setup, Getting started, Making and testing Android projects, Basic program structure, Java- based layout, XML-based layout, Hybrid layout, Project structure summary, Android Programming: running Simple 'Hello World' Applications.	8
9.	Research Issues in Wireless and Mobile Computing	Mobile networking, Quality of Service in Mobile Networks, Mobile access to World-Wide-Web, Mobile Data Management, Mobile Transactions, Mobile Computing Models	2
		Total number of Lectures	42
Evaluation Crit	eria		
Components T1 T2 End Semester H TA Total	Maximum M 20 20 Examination 35 25 (Assign 100	Marks ment, Quiz, Project)	

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	Jochen Schiller, "Mobile Communications", second edition, Addison-Wesley, 2004.			
2.	Stojmenovic, and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002.			
3.	Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University Press, 2004.			
4.	Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", McGraw-Hill Professional, 2005			
5.	Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.			
6.	Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.			
7.	Raj Kamal, "Mobile Computing", first edition, Oxford University Press, 2007.			

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8.	Asoke K Talukder, and Roopa R. Yavagal, "Mobile Computing: Technology, Application and Service Creation", Tata McGraw-Hill Professional, 2005
9.	Abdelsalam Helal, "Any Time, Anywhere Computing: Mobile Computing Concepts and Technology", Kluwer Academic Publishers, 1999.
10.	IEEE Transaction on Broadcasting
11.	IEEE Transaction on Communication
12.	IEEE Transaction on Computers
13.	IEEE Transaction on VT
14.	IEEE Communication Letters

Lecture-wise Breakup						
Course Code	17B1NHS731	Semester: Odd		Semeste	er VII Session 2019-2020	
				Month from July 2019 to Dec 2019		
Course Name Customer Relationshi		ip Management				
Credits 3			Contact H	ours	3-0-0	

Faculty (Names)	Coordinator(s)	Dr. Shirin Alavi
	Teacher(s) (Alphabetically)	Dr. Shirin Alavi

COURSE O	UTCOMES	COGNITIVE LEVELS
C401- 17.1	Apply the financial, social and electronic aspects of the Customer Relationship in business situations.	Apply Level (C3)
C401- 17.2	Appraise the role of customer share and customer centricity in organizations.	Apply Level (C3)
C401- 17.3	Develop the skills to understand customization, innovation and co- creation in organizations and apply them in business contexts.	Analyze Level (C4)
C401- 17.4	Analyze the role of interactive technology for customer engagement, customer retention and customer experience management in organizations.	Analyze Level (C4)
C401- 17.5	Evaluate the technological solutions and their applications for effective Customer Relationship Management across different functions in organizations.	Evaluate Level (C5)
C401- 17.6	Develop specific models for response modelling and consumer profiling in organizations.	Create Level (C6)

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Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	CRM-The Strategic Imperatives	Introduction, CRM in Marketing and IT, CRM for Business Leadership, Criticality of customer relationships, Why businesses should adopt CRM, Implementing CRM.	3
2.	Conceptual Foundations of CRM, Building Customer Relationships	Evolution of CRM, Benefits, Schools of thought on CRM, Defining CRM. Customer Retention and Customer Acquisition, Customer Profitability is Skewed, Service Benefits of CRM, Transaction Marketing vs. Relationship Marketing, Relationship Building as a process, Bonding for Customer Relationships-Financial, Social, customization and Structural bonds, Ladder of Loyalty Zero Customer Defection, CRM Framework.	7
3.	Relationship Marketing and Economics of CRM	Internal and external relationships, Electronic Relationships, Operational, Analytical and Collaborative CRM, Market Share vs. Share of Customer, Customer Lifetime Value, and Activity based costing for CRM	6
4.	CRM in B2C ,B2B Markets , Customer Experience Management	CRM in Product and Service Markets, Case Studies, Characteristics of Business Markets, Participants in the business buying process, Key Account Management, Using KAM for Customer Segmentation, Customer Retention Strategy, KAM as a growth and Development Strategy, Customer Value Management in Business Markets, Importance of CRM in B2B Markets, Customer Emotion, Customer Knowledge, Reciprocity, Voice of the Customer, Participation.	7
6.	Components of e CRM solutions (Overview) and Role of Digital Technologies	Data warehousing, Datamining and CRM, Market Basket Analysis and Retail sector, Campaign Management, Sales Force Automation, Customer Service and Support, Corporate Blogs, Online communities, Twitter, Wikis. The Experience ecosystem. CEM, Consumer engagement, segmentation and differentiation.	7

7.	Product offerings in the CRM Marketplace(Overv iew) and CRM Roadmap	Evaluating Technological solutions for CRM, Comparison of Siebel, Oracle, MySAP.com and People Soft Enterprise solutions, Comparison of Talisma, Sales logix, Microsoft and Sales notes for small and medium enterprises, Defining a CRM strategy, CRM Implementation Roadmap, Developing a relationship orientation, Customer centric marketing and processes, Building organizational capabilities through internal marketing, Issues in implementing a technology solution for CRM.	7
8.	Operational issues in implementing CRM,Social CRM	Process view of CRM, Budgeting for attraction vs. retention, Learning from customer defections, Customer Retention Plans, Evaluating Retention programs, Social Customer Relationship Management, Social Customer Insights, Social CRM Strategy, and Social Customer Analytics.	5
Total numl	per of Lectures		42
Class Prese	entations		6
Evaluation	Criteria		
Componer T1 T2 End Semes TA Total	nts ter Examination	Maximum Marks 20 20 35 25 (Presentation , Class Test 1,Class Test 2, Attendance) 100	

Reco Refe	mmended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, rence Books, Journals, Reports, Websites etc. in the IEEE format)
1.	Customer Relationship Management, Ed. Peelan Rob Beltman, 2 nd Edition, Pearson, 2014.
2.	Ou, Y. C., Verhoef, P. C., & Wiesel, T. The effects of customer equity drivers on loyalty across services industries and firms. Journal of the Academy of Marketing Science, <i>45</i> (3), 336-356, 2017.
3.	Lin, Y. C., Lee, Y. C., & Lin, S. Y. The influence of the personality traits of webcasters on online games. International Journal of Electronic Customer Relationship Management, <i>11</i> (1), 94-103, 2017
4.	Menzel, C. M., & Reiners, T.Customer relationship management system a case study on small-medium-

	sized companies in north Germany. In <i>Information Systems for Small and Medium-sized Enterprises</i> pp. 169-197. Springer, Berlin, Heidelberg, 2014.
5.	Customer Relationship Management-A strategic perspective, G. Shainesh, Jagdish Sheth, Reprinted Macmillan Publishers India Limited, 2009.
6.	Mukerjee, K., Customer Relationship Management-A Strategic approach to Marketing, 3rd Edition Prentice Hall of India, 2007.
7.	Customer Relationship Management Concepts and Technologies-Francis Buttle, 3 rd Edition Taylor and Francis, 2015.
8.	Berry, Michael, J. A, Linoff, Gordon S., Datamining Techniques for Sales, Marketing and CRM, 2 nd Edition, Wiley Publications, 2007.

<u>Detailed Syllabus</u> Lecture-wise Breakup

Пессиге-wise Бтеакир				
Course Code	17B1NHS732	Semester : Odd	Semester VII	Session 2019 -2020
			Month from	July 2019 to Dec 2019
Course Name	Indian Financial Syst	tem		
Credits	3	0	ontact Hours	3-0-0
Faculty (Names)	Coordinator(s)	Dr. Mukta Mani(Sec62), Dr. Sakshi	Varshney(Sec128)
	Teacher(s) (Alphabetically)	Dr. Mukta Mani(Sec62), Dr. Sakshi	Varshney(Sec128)

COURSE OU	COGNITIVE LEVELS	
After pursuing	the above mentioned course, the students will be able to:	
C401-1.1	Understand the inter-linkage of components of financial system and financial instruments of Money market and Capital market.	Understanding Level (C2)
C401-1.2	Analyze ways of fund raising in domestic and international markets	Analyzing Level (C4)
C401-1.3	Understand functioning of Stock market and evaluate securities for investment.	Evaluating Level (C5)
C401-1.4	Apply the knowledge of Mutual Funds and Insurance in personal investment decisions	Applying Level (C3)
C401-1.5	Apply knowledge of Income tax for calculation of tax liability of individual.	Applying Level (C3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Meaning, Importance, and functions of Financial system. Informal and Formal financial system, Financial markets, Financial Institutions, Financial services and Financial instrument	4
2.	Money Market	Features of money market Instruments: Treasury bills, commercial bills, commercial papers, certificates of deposit, call and notice money, Functions of money market, Linking of money market with Monetary policy in India	5
3.	Capital Market	Features of Capital market instrument: Equity shares, Bonds. Fund raising through Initial Public Offering, Rights issue, Preferential allotment and Private Placement. Process of Initial Public Offering- Intermediaries in IPO, Book building process and allotment of shares	6
4.	Foreign investments in India	Fund raising from foreign market through: Foreign direct investment and foreign institutional investment, American Depository Receipts, Global Depository Receipts, External Commercial Borrowings, and Private equity.	5

5.	Stock Market	Trading in secondary market- Stock exchanges, regulations, demutualization, broker, listing of securities, dematerialization, trading, short selling, circuit breaker,	5			
7.	Stock Valuation and Analysis	stock market indices- methods of calculation of indices. Investing basics: Consideration of Risk and Return, Stock Valuation and Analysis- Fundamental analysis: Economy, industry and company analysis; Technical Analysis of stocks using technical charts	6			
8.	Investing in Mutual Funds and Insurance	Mutual Funds: Basics, Types of funds, risk and return considerations in selection of funds; Insurance: Basics, Life insurance and health insurance, types of policies	4			
9.	Overview of Income Tax	Basics of Income tax- Concept of previous year, assessment year, person, income. Calculation of Income tax liability for individuals: Income from salaries- Salary, Allowances, Perquisites, Income from Capital Gain, Deductions under section 80C to 80U.	7			
Tota	l number of Lectures		42			
Clas	s presentations		6			
Eval	uation Criteria					
Com	ponents	Maximum Marks				
TI		20				
12 End	Somester Exemination	20 25				
	Semester Examination	33 25 (Procontation class tasts Attendance)				
Tota	1	100				
	n mmandad Raading ma	tarial: Author(s) Title Edition Publisher Vear of Publica	tion atc. (Taxt			
book	s. Reference Books. Jou	urnals, Reports, Websites etc. in the IEEE format)				
1.	Pathak Bharti V. <i>India</i>	<i>n Financial System</i> , 5 th Edition, Pearson Education, 2018				
2.	Madura Jeff. Personal	<i>Finance</i> , 6 th Ed. Pearson Education, 2017.				
3.	Machiraju H R Indian Financial System 4 th Ed Vikas Publication 2010					
4.	Bhole L M, Financial	Institutions and Markets, 4 th ed. Tata McGraw Hill Publicat	ion, 2006.			
5.	Singhania & Singhania. Students Guide to Income Tax. Taxmann Publication, 2019.					
6.	How to Stimulate the Economy Essay [Online]Available: https://www.bartleby.com/essay/How- to-Stimulate-the-Economy-FKJP5QGATC					
7.	Reserve Bank of India	, 'Money Kumar & the Monetary Policy', 2007				
8.	Ashiwini Kumar,Sharr	na,' De-jargoned: Book building process, Live Mint,2015.				
9.	Madhavan, N. "Pushin Business Today, 28 th J	g the accelerator instead of brakes: Can Subhiksha make a c une 2009.	comeback?",			
10.	Kaul, Vivek, "Master I The Economic Times	Move: How Dhirubhai Ambani turned the tables on the Koll s, July 1, 2011.	kata bear cartel",			

Subject Code	17B1NHS733	Semester : ODD	Semester: VII Session 2019-20 Month from July- Dec	
Subject Name	Human Rights and Social Justice			
Credits	3	Contact Hours	(3-0-0)	

Faculty (Names)	Coordinator(s)	Dr. Chandrima Chaudhuri
	Teacher	Dr. Chandrima Chaudhuri

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C401-18.1	Demonstrate an understanding of the concept and idea of human rights and social justice	Understand (C2)
C401-18.2	Evaluate and interpret information about human rights issues from various sources like print and electronic media, film, documentary and other information technologies	Evaluate(C5)
C401-18.3	Demonstrate an understanding of the International norms and standards of human rights	Understand (C2)
C401-18.4	Analyze the emerging dimensions of human rights and the challenges posed by them	Analyze (C4)

Module	Subtitle of the Module	Topics in the module	No.	of
No.			Hour	s
			for t	he:
			modu	ule

1.	Conceptual Background of Human Rights and Social Justice	 Meaning and Concept of Human Rights & Social Justice Notion and Classification of Rights: Natural, Moral and Legal Rights, Concept of Civil Rights Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights; Collective/Solidarity Rights), Distinction between CPR & ESCR 	6
2.	Rights	 Magna Carta Modern Movement for Human Rights: The United States Declaration of Independence The French Declaration of the Rights of Man and the Citizen United States Bill of Rights Geneva Convention of 1864 	9
3.	International Human Rights Standards	 Universal Declaration of Human Rights, 1948. International Covenant on Civil and Political Rights, 1966 International Covenant on Economic, Social and Cultural Rights, 1966 	8
3.	Human Rights of the specially disadvantaged sections of the society	 Scheduled Castes/Scheduled Tribes and Other Backward Classes: Caste Prejudice and Discrimination Minorities: Human Rights Issues of Ethnic minorities Women and Children: Gender Discrimination, Domestic Violence and Offences against Women; Gender Sensitive Laws, Children: Child Abuse, Child Labour, Street Children Aged and Disabled Persons: Vulnerability and social taboos 	8
5.	Human Rights of the Working Class	 Migrant Workers Bonded Labourers Agricultural Labourers Casual Workers 	5
6.	Emerging Dimensions Of Human Rights	 National Sovereignty versus 'international enforcement' of human rights International politics of human rights and selective application of international sanctions Unilateral use of coercion and implementation of human rights Human rights, and science and technology 	6
Total nur	mber of Hours		42
Evaluation Componn T1 T2 End Semn TA	on Criteria Ients M 2 2 ester Examination 3 2	aximum Marks 0 0 5 5 (Assignment)	<u></u>

Total

Recommended Reference Books	Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)					
1.	Banton, M. (1996). International Action against Racial Discrimination. Oxford: Clarendon Press					
2.	Cassese, J. (1990). Human Rights in Changing World. Philadelphia: Temple University Press					
3.	Cruft, R., Liao, S.M.& Renzo. M. (2015). <i>Philosophical Foundations of Human Rights</i> . Oxford: Oxford University Press					
4.	Dhiman, O.P. (2011). Understanding Human Rights An Overview. New Delhi: Kalpaz Publication					
5.	Donnelly, J. (2013). Universal Human Rights and Practices. Ithaca: Cornell University Press					
6.	Easterly, W. (2014). The tyranny of experts: Economists, dictators, and the forgotten rights of the poor. New York: Basic Books					
7.	Joshi. K.C. (2019). International Law and Human Rights. Lucknow: Eastern Book Company					
8.	Saksena, K.P. (ed.) (1984). Human Rights in Asia: Problems and Perspectives. New Delhi: HURITER					
9.	Sen, A. (1999). Development as Freedom. Oxford: Oxford University Press					
10.	Sinha, M.K, (2000). <i>Basic Documents on International Human Rights and Refugee Laws</i> . New Delhi: Manak Publications					
11.	Verma, R.S., (2000). <i>Human Rights: Burning Issues of the World</i> . Volumes I, II and III. Delhi: Radiant Publishers					
12.	U.N. Department of Public Information. (2018). <i>Universal Declaration of Human Rights</i> . U.SA.: United Nations					

Course Code	17B1NHS734	Semester Odd		Semeste	er VII Session 2019-2020
			Month from July to Dec 2019		from July to Dec 2019
Course Name	Managerial and Com	munication Skill	S		
Credits	3		Contact H	ours	(3-0-0)

Faculty (Names)	Coordinator(s)	Dr. Deepak Verma
	Teacher(s) (Alphabetically)	Dr. Deepak Verma

	COGNITIVE						
		LEVELS					
C401-3.1	Understand Level (C2)						
C401-3.2	3.2 Assess one's and other's communication skills and adapt oneself in order to meet challenges at the competitive workplace						
C401-3.3	Apply the appropriate conflict handling style for effective conflict management	Apply Level (C3)					
C401-3.4	Demonstrate understanding about the opportunities and challenges of intercultural communication and recognizing cultural variations	Understand Level (C2)					
C401-3.5	Apply the appropriate steps for better decision making by interpreting information	Apply Level (C3)					
C401-3.6	Develop an understanding of professional ethics	Apply Level (C3)					

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Communication	Build an overall understanding and expectations of the professional environment Introspection and SWOT	5
	(CSA) &	analysis of self, Gap Analysis, Guidelines for developing	

	Development Plan	necessary skills and required knowledge to help students in their professional life, Strategies in the Job- Search process, Work on their personality profile and communication skills to make them ready to face the professional world	
2.	Fundamentals and Functions of Business Communication	Definition and Importance of Business Communication, Communication requirements and characteristics of Managerial Communication, Interpersonal & Intrapersonal Business Communication	5
3.	Building Active Communication Skills	Writing for effect in business messages, Listening, Formal Speaking, Defensive and Non-Defensive Communication, Corporate Body language, Audio and Visual communication, Business Etiquettes and Mannerism	5
4.	Conflict Resolution and Negotiation skills	Origins of Conflict, Guidelines for Effective conflict management, Effective Negotiation in professional environment, Gaining leverage through Persuasion, Impasse and Alternative Dispute Resolution (ADR)	5
5.	Corporate communication	Meeting Management: Need and Importance of Meetings, Conduct of Meeting, Public Relations : Meaning, Functions of PR Department, Roles and responsibilities of an Internal and External PR team, Corporate Social Responsibility	5
6.	Group Discussion and Interview Preparation and, Psychometric Tests	Introduction to the Job recruitment process, Criteria and methods of selection, Interview and GD concepts. Types of Interviews – Selection, Appraisal, Grievance, Exit, Preparing for an Interview, mock group discussion sessions, Psychometric Tests: Importance, Pattern & Practice sessions	5

7.	Data Interpretation and Decision makingImportance of Data Interpretation, Decision Making Techniques, Case Study: Approaches to solve , Reasoning: Interpretation Techniques					
8.	Communicating Interculturally	Understanding the opportunities and challenges of Intercultural communication, Enhancing Intercultural sensitivity, Improving intercultural communication skills	5			
9.	Ethics of Business Communication	Ethics, Fairness & Trust in Business Communication	2			
		Total number of Lectures	42			
Evaluation	Criteria					
Components		Maximum Marks				
T1		20				
T2		20				
End Semes	ter Examination	35				
		25 (Assignment, Discussion Questions)				
Total		100				

Reco Refe	ecommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, reference Books, Journals, Reports, Websites etc. in the IEEE format)							
1.	R.V. Lesikar, & M.E. Flatley, <i>Basic Business Communication Skills for Empowering the Internet Generation</i> , Tenth Edition, Tata McGraw Hill Publishing Company, 2005							
2.	S. Sengupta, Business and Managerial Communication, Prentice Hall of India, 2011.							
3.	A.C. Krizan, P. Merrier, J. Logan, & K. Williams, <i>Business Communication</i> , Eight Edition, Thomson South-Western, 2011.							
4.	C.L.Bovee, J.V.Thill, Business Communication Essentials: Fundamental skills for the Mobile-Digital-Social Workplace, Eighth Edition, Pearson Education, 2018							
5.	J. Higgins., Ten skills for Effective Business Communication, Tyco Pr, 2018							
6.	M. Munter, L. Hamilton, Guide to Managerial Communication, Tenth Edition, Pearson, 2014							

Course Code		17B1NMA73	31	Semester OddSemester VII(specify Odd/Even)Month from J		I Session 2019 -2020 June 2019 toDec. 2019			
Course Name		Applied Linear Algebra							
Credits		3			Contact H	Iours	3-0-0	1	
Faculty (N	ames)	Coordinato	r(s)	Dr. Lokendra k	Kumar, Dr.	Dinesh C	. S. Bis	sht	
		Teacher(s) (Alphabetica	ully)	Dr. Dinesh C. S	S. Bisht, Dr	. Lokend	ra Kun	ar	
COURSE will be able	OUTC(e to:	DMES : After	pursuing	ng the above mentioned course, the students			COGNIT	COGNITIVE LEVELS	
C401-7.1	explain	n field, vectors	, vector	spaces and their	dimensions			Understan	ding level (C2)
C401-7.2	apply l	inear transform	nations i	n solving practic	cal engineer	ring probl	ems.	Applying	Level (C3)
C401-7.3	develo solutio	op the concept n of a system of	of rank, of linear	determinant, exi equations.	stence and	uniquene	ess of	Applying	Level (C3)
C401-7.4	explair	n the concept o	f length	, distance and in	ner-produc	t.		Understan	ding level (C2)
C401-7.5	apply the concept of orthogonality and orthogonal matrices to orthogonalize a set of linearly independent vectors.Appl					Applying Level (C3)			
C401-7.6	analyze eigenvalues, eigenvectors and their properties to solve a system of ordinary differential equations.					Analyzing	gLevel (C4)		
Module	Title o	f the	Topics	s in the Module					No. of
No.	Modu	le							Lectures for the module
1.	Vector Dimen	Space and sion	ector subsp n of a set, Complement	ace, linea Dimensio nt	r deper on of a	ndence vector	7		
2.	Linear Transf	ormation I	Linear represe subspa Linear	hear Transformation and its algebra, and its matrix resentation, homomorphism, isomorphism, rank and pspace, rank-nullity theorem, Solution of a system of hear Equations, Determinant			trix and null m of	7	
3.	LinearChange of basis, Inverse of a linear transformation, LinearTransformation IIfunctional, transpose					, Linear	5		
4.	Inner F Metric	Product and	Inner p Orthon orthog	ner product space, Metric and normed spaces. thonormal basis, Orthogonal Subspaces, Gram-Schmidt chogonalization.			Schmidt	8	
5.	Eigen Eigen	Values and Vectors	Eigen diagon of real	values and Eigenvectors, Modal matrix and nalization, Similarity Transformation, Eigen system symmetric, orthogonal, Hermitian and unitary			systems ary	9	

		matrices				
6.	Applications of	Bilinear and Quadratic forms, Positive definite matrices,	6			
	Linear Algebra	Norm of a matrix, Condition number, Application to find				
		solutions of ordinary differential equations				
Tota	l number of Lectures		42			
Eval	uation Criteria					
Com	ponents	Maximum Marks				
T1		20				
T2		20				
End Semester Examination 35						
TA		25 (Assignments, Quizzes)				
Tota	1	100				
Reco	mmended Reading mate	rial: Author(s), Title, Edition, Publisher, Year of Publication etc	. (Text books,			
Refe	rence Books, Journals, Rej	oorts, Websites etc. in the IEEE format)				
1.	Hoffman, K and Kunze	R., Linear Algebra, Fourth Edition, Prentice Hall of India, 200)5			
2.	Strang, G., Linear Algebra and its Applications, 3 rd Ed., 1998					
3.	Noble, B. and Daniel, J., Applied Linear Algebra, Prentice Hall of India, 2000					
4.	Lipshutz, S. and Lipson	h, M. , Linear Algebra, 3 rd Edition, Schaum Series, 2001				
5	Krishnamurthy, V., Ma	inra, V. P., and Arora, J. L., An Introduction to Linear Algebra	a, Affilated			
5. East-West, 1976						

Syllabus Description

Course Co NBA Code	Course Code17B2NCI731SemesterOddSemester VIISession2019 - 20NBA Code:432.6432.6Month from July '19' to Dec '19'					on 2019 - 20 to Dec '19'		
Subject Name	(Co	mputer Graphics					
Credits	2	4		C	ontact Hou	irs	3-1-0	
Faculty	·		Coordinator		Dr. Suma	Dawn(J	62)/ Gaurav Kumar Nig	am(J128)
			Teacher(s)		Dr. Suma	Dawn(J	62)/ Gaurav Kumar Nig	am(J128)
COURSE OUTCOMES				1			COGNITIVE LEVELS	
C432-6.1	C432-6.1 Explain the basics and core different graphics systems, graphics, and others.			re c s, us	e concepts of computer graphics including , usage of GPUs, applications of computer		Understanding Level (Level 2)	
C432-6.2	Com such using	npo 1 as g (se scenes by apply , viewing transforr OpenGL.	ing nati	common 2 ions, clippin	D & 3D 1g, proje	graphics algorithms ections, rendering, etc.	Creating Level (Level 6)
C432-6.3	Anal refle	lyz ecti	e models for lighti on and models for	ng - sha	– distant an ding – flat,	d multip smooth	ble light sources; , Phong, etc.	Analyzing Level (Level 4)
C432-6.4 Demonstrate the use of pla surface detection methods			aner and surface curves, and use of visible s for scene presentation.			Understanding Level (Level 2)		
C432-6.5	5 Explain animation and key framing. Understanding I (Level 2) (Level 2)					Understanding Level (Level 2)		
C432-6.6	 6 Interpret and critique procedural modelling, fractals, and particle systems and critique existing systems. 				Evaluating Level (Level 5)			

Modu le No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
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1.	Introduction		Context, Requirements, and Application: History of computer graphics, graphics architectures and software, imaging: pinhole camera, human vision, synthetic camera, modeling vs rendering.	3	
2.	Graphics Pipeline and Hardware		Display Unit, Frame buffer, DPU, GPU	2	
3.	Raster Graphics & related Data structures		Line, circle, ellipse, polygon, Area filling; Rasterization: line drawing via Bresenham's algorithm, clipping, polygonal fill; Introduction to hidden surface removal (z buffer);	10	
4.	Colours		Color perception, color models (RGB, CMY, HLS), color transformations. Color in OpenGL. RGB and Indexed color;	3	
5.	2D and 3D Planer and Curved objects		Data structures for modeling; Algorithms for Mesh generation, Clipping, 2D and 3D; Geometric Transformations, and so on; Geometric transformations: affine transformations (translation, rotation, scaling, shear), homogeneous coordinates, concatenation, current transformation and matrix stacks; Three dimensional graphics: classical three dimensional viewing, specifying views, affine transformation in 3D, projective transformations;	10	
6.	Rendering		Data Structures, Algorithms and hardware support; Ray Tracing; Shading: illumination and surface modeling, Phong shading model, polygon shading; Discrete Techniques: buffers, reading and writing bitmaps and pixelmaps, texture mapping, compositing;	10	
7.	Animation		Introduction to animation and keyframing; vector-based animations	2	
8.	Procedural modeling		Fractals and particle systems	4	
Total number of Lectures					
Evaluation A. THE Criteria B. Inte		A. THI B. Inte	EORY Examination I. Test1 II. Test2 III. End Term rnal - including Assignments, Ouizzes, attendance, etc	Max. Marks 20 20 35 25	
		•	Total	100	

Recor	Recommended Reading material: (APA format)				
1.	Foley, J. D., Dam, A. V., Feiner, S. K., Hughes, J. F., & Carter, M. P. (1997). Computer graphics: Principles and practice, in c. <i>Color Research and Application</i> , 22(1), 65-65.				
2.	Marschner, S., & Shirley, P. (2015). Fundamentals of computer graphics. CRC Press.				
3.	Hearn, D., & Baker, M. P. (1997). Computer graphics, C version.				
4.	Angel, E. (1997). Interactive Computer Graphics: A top-down approach with OpenGL (Vol. 2). Addison-Wesley.				
5.	Hill Jr, F. S. (2008). Computer graphics using open gl. Pearson education.				
6.	Rogers, D. F. (1986). Procedural elements for computer graphics. McGraw-Hill, Inc				
7.	Newman, W. M., & Sproull, R. F. (1979). <i>Principles of interactive computer graphics</i> . McGraw-Hill, Inc				
8.	ACM Transactions on Graphics				
9.	IEEE Transactions on Visualization and Computer Graphics				
Detailed Syllabus

Lecture-wise Breakup

Subject Code	17B2NCI735	Semester Odd (specify Odd/Even)	Semester VII So Month from Jur	nester VII Session 2019_2020 onth from June 19 to Dec 19		
Subject Name	Advanced Databases					
Credits	4	Contact Hours	3-1-0	0		
Faculty	Coordinator(s)	Dr Devpriya Soni	Devpriya Soni			
(Names)	Teacher(s) (Alphabetically)	Dr Devpriya Soni	r Devpriya Soni			
COURSE OUTCOMES			COGNITIVE	COGNITIVE LEVEL		
C431-8.1	Analyze concurrency control, transaction and recovery in data management.		Analyze Lev	Analyze Level (Level 4)		
C431-8.2	Choose appropriate ways to optimize queries.		Create Leve	Create Level (Level 6)		
C431-8.3	Apply queries in different SQL, XQuery, CQL etc).	forms (relational algebra,	Apply Level	Apply Level (Level 3)		
C431-8.4	Show understanding of mo paradigms such as NoSQL	odern data processing and XML	Remember	Remembering Level (Level 1)		
C431-8.5	Explain methods suitable for particular types of data such as temporal, multimedia or spatial data.		a Understand	Understanding Level (Level 2)		
C431-8.6	Develop and connect a sample web application with a given NOSQL database.		Create Leve	Create Level (Level 6)		
Module No.	Subtitle of the Module	Topics in the modul	Topics in the module fo			
1.	Refresher on databases ar modelling	nd SQL: Data Definition Manipulation, Relat EER Modelling	SQL: Data Definition and Data Manipulation, Relational Algebra, ER& EER Modelling			

2.	Stored Procedures and Blocks of code stored and execut		2		
	Triggers	the server, creating Triggers.			
3.	Transaction Management	Transactions Processing, ACID rules	7		
		Concurrency Control, Recovery	ļ		
4.	Query Optimization	Data storage, Query processing and	4		
		Techniques of optimization	ļ		
5.	Different Types of Data	Unstructured, Semi-Structured and	2		
		Structured Data and their Storage	ļ		
		Concerns	ļ		
6.	Data Storage and Retrieval	Motivation, characteristics and	3		
	Concerns	complexities of Data Storage and Data	l		
		Retreival,	l		
7.	Query Languages	Basics and Need of various Query	2		
		Languages	l		
8.	Database security and	Database security and privacy, including	6		
	privacy	anonymisation and release	l		
9.	NoSQL Databases	NoSQL to relax ACID rules; consistency,	7		
		availability, partition tolerance	I		
10.	XML Databases	XML, XPath and XQuery, XSLT,	6		
		Integrating XML with Databases	l		
11.	Special purpose databases	Temporal, spatial, or multimedia	2		
		databases	l		
	N		43		
Evaluation	Criteria	<u></u>			
Componen	its Maximum Ma	ırks			
T1	20				
Т2	20				
End Semest	ter Examination 35				
ТА	25 (10 Attd, 10 Assignment, 5 Class Performance)				
Total	Total 100				
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books,					

Reference Books, Journals, Reports, Websites etc)				
1.	Henry F Korth, Abraham Silberschatz, S. Sudurshan, Database system concepts, 5th Edition, McGraw-Hill,2006			
2.	Ramez Elmasri , Shamkant B. Navathe , Fundamentals of Database Systems, 4th Edition, Pearson Education, 2006.			
3.	Thomas Connolly, Carolyn Begg, Database Systems-A Practical Approach to design, Implementation and Management, 3rd Edition, Addison-Wesley,2002.			
4.	NoSQL for Mere Mortals by Dan Sullivan			
5.	Administering Oracle by Ivan Bayross			
6.	Handbook of Database Security: Applications and Trends, Editors: Michael Gertz, Sushil Jajodia, 2016.			