

**Lab-wise Breakup**

<b>Course Code</b>	15B19CI891	<b>Semester</b> Even (specify Odd/Even)	<b>Semester VIII Session</b> 2018 -2019 <b>Month from</b> Jan to June 2019
<b>Course Name</b>	Project Part – 2 (CSE)		
<b>Credits</b>	12	<b>Contact Hours</b>	...

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Manish Kumar Thakur
	<b>Teacher(s) (Alphabetically)</b>	Entire Department

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

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
Mid Semester Viva	20
Final Viva	30
Project Report	20
Day to Day Work	30
<b>Total</b>	<b>100</b>

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

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	14M1NCI231	<b>Semester</b> 2 <sup>nd</sup> Sem <b>(Even)</b>	<b>Semester</b> MTech & Intg. CSE <b>Session</b> 2018 -2019 <b>Month from</b> Jan to May
<b>Course Name</b>	Cryptography and Computer Security		
<b>Credits</b>	3	<b>Contact Hours</b>	3

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Gagandeep Kaur
	<b>Teacher(s) (Alphabetically)</b>	Dr. Gagandeep Kaur

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Understand principles & theories of cryptography and computer security; Classify symmetric encryption techniques	Understand Level (Level 1)
<b>CO2</b>	Apply the knowledge of number theory in public key cryptographic techniques	Apply Level (Level 2)
<b>CO3</b>	Analyze security mechanisms using rigorous approaches, including theoretical for intrusion detection systems	Analyze Level (Level 3)
<b>CO4</b>	Evaluate Authentication Techniques and Hash Algorithms	Evaluate Level (Level 4)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Introduction to principles and theories of cryptography and computer security, Network security protocols at different layers with respect to TCP/IP security protocol stack, namely, FTPS, HTTPS, DNSSEC, SSL, SSH, SMIME,	4
2.	IPSec	IPSEC (IP Security – IP Authentication Header, Payload Encapsulation) and PPTP	4
3.	Vulnerabilities & Solutions	Techniques and approaches to discover network and system vulnerabilities. Unwanted traffic, Firewalls, VPNs, Intrusion Detection, filters, Protocol weakness exploits, malware vulnerabilities, Spams, Defensive solutions: Packet filtering, Attack Classification and Vulnerability Analysis, Detection, Containment and Response/Recovery	6
4.	Security Tools	Tools for improving system security, Security, Secure Socket Layer and Secure Electronic Transaction.	2
5.	Network Attacks & Classification	Implementation of supervised & unsupervised defensive solutions based on packet filtering, attack classification & vulnerability analysis, detection and mitigation.	3
6.	Cryptography Basics	Mathematics of Cryptography: Modular Arithmetic, Congruence and Matrices, Plain Text, Cipher Text, Encryption Algorithm, Decryption Algorithm Requirements	4

		for Cryptography, Cryptanalysis and attacks	
7.	Symmetric Ciphers	Mathematics of Symmetric-Key Cryptography: Algebraic Structures, Conventional Symmetric Encryption Algorithms Symmetric vs Asymmetric Block and Stream ciphers, DES: DES Structure & DES Security, Double and Triple DES	8
8.	Asymmetric Ciphers	Cryptographic Modes Public Key Cryptography Principles & Applications Algorithms RSA, Diffe-Hellman Key Exchange, DSS Elliptic-curve, Stream Cipher: RC4 and RC5.	8
9.	Data Integrity	One way Hash Functions Message Digest MD5,SHA1 Digital Signatures Public Key Infrastructure (PKI) Digital Certificates Certificate Authorities	4
<b>Total number of Lectures</b>			<b>42</b>

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments + Attendance)
<b>Total</b>	<b>100</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Cryptography & Network Security, Forouzan, Tata McGraw Hill
2.	Botnets: The Killer Web App, Craig A. Schiller, Jim Binkley, David Harley, Gadi Evron Tony Bradley, Carsten Willems, Michael Cross, Syngress
3.	Cryptography and Network Security <i>Principles and Practice</i> , Sixth Edition, William Stallings, Pearson
4.	Understanding Cryptography, Christof Paar, Jen Pelzl, Springer
5.	USENIX Security Symposium
6.	ACM Transactions on Information and system security
7.	IEEE Press Computer Security and Privacy
8.	Cryptography & Network Security, Forouzan, Tata McGraw Hill

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	17M11CS121	<b>Semester ODD</b> <b>(specify Odd/Even)</b>	<b>Semester</b> IInd DD VIII <b>Session</b> 2018 - 2019 <b>Month from</b> January 2019 – June 2019
<b>Course Name</b>	<b>Cloud and Web Services Software Engineering</b>		
<b>Credits</b>	3-0-0	<b>Contact Hours</b>	...

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Sandeep Kumar Singh
	<b>Teacher(s)</b> <b>(Alphabetically)</b>	...

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Demonstrate role of Software engineering in combining cloud and web services computing paradigms for application development.	Understand Level (Level 2)
<b>CO2</b>	Analyze the requirements for developing web services and migrating applications to Cloud Services.	Analyzing Level (Level 4)
<b>CO3</b>	Categorize various cloud services into compute, storage, database, application, analytics, network, and deployment.	Analyzing Level (Level 4)
<b>CO4</b>	Make use of cloud and service engineering process to design, implement, and test, deploy and execute reusable restful and soap based web services.	Apply Level (Level 3)
<b>CO5</b>	Utilize some of the real world web services GOOGLE,AMAZON,EBAY,PAYPAL,FEDEX ETC.	Apply Level (Level 3)
<b>CO6</b>	Appraise different design patterns, Reference Architectures, performance metrics, testing tools and design patterns for Cloud.	Evaluate Level (Level 5)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Distributed Software Engineering	Distributed Systems, Client and Server Computing, Architectural Patterns for distributed systems, Software as Service, Software Development Life Cycle for Cloud Platform, Software Design Strategies for Cloud Adoption	4
2.	Service-oriented software engineering	Service-Oriented Computing, Service-Oriented Architecture (SOA), Restful Services, Service Engineering and Service Composition.	6
3.	Introduction to XML and Web Services	XML Technology Family, Structuring with XML- DTD, Schema, XML Processing, DOM,SAX, XML in Practice.	4
4.	Designing and Implementing Web	Web Services and Web Service Technologies-SOAP, WSDL,	6

	Services		
5.	Introduction to Cloud Services	Cloud Services, Cloud Deployment Models, Cloud Technologies and Open Source Software, Challenges - Scaling Computation, Scaling Storage, Multi-Tenancy, Availability, Limitations and Challenges in Cloud-Based Applications Development	6
6.	Requirements Engineering for Amazon Web service	Compute, Storage, Database, Application, Content Delivery, Analytics, Deployment and Management, Identity and Access Management, Salesforce.com, Microsoft Office 365, Box, Google Apps, Amazon Web Services, Concur, Zendesk, Dropbox, Slack etc	2
7.	Cloud Services from Amazon	IAM services-users, groups, policy and roles, Elastic Compute Cloud, Databases on Amazon, Storage on Amazon services,	6
8.	Address SE in Web services	Web Services Design Pattern, Metrics to Measure Web Service Performance.	3
9.	Address SE in Cloud services	Cloud Services Design Pattern, Metrics to Measure Cloud Service Availability, elasticity , Scalability, Load balancing, Auto scaling. Performance.	6
<b>Total number of Lectures</b>			<b>43</b>

#### Evaluation Criteria

##### Components

##### Maximum Marks

T1	20
T2	20
End Semester Examination	35
TA	25 (To be mapped from Assignment 1,2 and 3)
<b>Total</b>	<b>100</b>

**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.	Software Engineering Frameworks for the Cloud Computing Paradigm Zaigham Mahmood and Saqib Saeed
2.	Cloud Computing and Software Services Theory and Techniques Syed A hson and Dr. Mohammad Ilyas
3.	Engineering Long-Lasting Software: An Agile Approach Using SaaS and Cloud Computing Beta Edition 0.9.0 Armando Fox and David Patterson
4.	Cloud Computing: A Hands-On Approach Book by Arshdeep Bahga and Vijay K. Madiseti
5.	Cloud Computing Design Patterns Book by Amin Naserpour, Robert Cope, and Thomas Erl
6.	XML, Web Services, and the Data Revolution Book by Frank P. Coyle
7.	Software Engineering Book by Ian Sommerville
8.	Engineering Software As a Service: An Agile Approach Using Cloud Computing Textbook by Armando Fox and David Patterson
9.	Design Patterns: Elements of Reusable Object-Oriented Software with Applying UML and Patterns:

	An Introduction to Object-Oriented Analysis and Design and the Unified Process by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, 2003
10.	Cloud-Based Software Engineering PROCEEDINGS OF THE SEMINAR NO. 58312107

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Subject Code</b>	17M11CS122	<b>Semester:</b> Even (specify Odd/Even)	<b>Semester Even Session</b> 2018-2019 <b>Month from</b> Jan'19 to June'19
<b>Subject Name</b>	Performance Evaluation of Computing Systems		
<b>Credits</b>	3-0-0	<b>Contact Hours</b>	3
<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Kavita Pandey	
	<b>Teacher(s) (Alphabetically)</b>	Dr. Kavita Pandey	

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Demonstrate the ability to describe the correct tools and techniques for computer system performance evaluation	Understand (level 2)
<b>CO2</b>	Identify the probability distribution in a given stream of data that corresponds to a source of randomness in a system.	Apply (level 3)
<b>CO3</b>	Design the appropriate model of a discrete, dynamic, stochastic system using the theory of random processes.	Apply (level 3)
<b>CO4</b>	Inspect the mathematical modeling techniques, Markov chains, queuing theory for analyzing the system.	Analyze (level 4)
<b>CO5</b>	Select the appropriate experiments and perform a simulation study of the given system.	Evaluate (level 5)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the module</b>	<b>No. of Lectures for the module</b>
1.	Overview of Performance Evaluation	Need for Performance Evaluation, Systematic approach to Performance Evaluation, Selection of evaluation techniques and performance metrics	5
2.	Random Variables and Probability distributions	Discrete and continuous random variable, Expectation and variance, Bernoulli random variable, Binomial distribution, Poisson distribution, Geometric distribution, Normal and Exponential distribution, Normal approximation and Poisson approximation to binomial distribution, hazard rate function, , Comparing systems using sample data, Confidence	10

		interval	
3.	Markov Process	Introduction and classification of stochastic processes, Discrete time and Continuous time markov chains, Birth and death processes , Transition probabilities, Steady state solution, Performance measure in terms of time spent and expected reward	6
4.	Queuing models	Basics of Queuing theory, Kendall notation, Little’s Law, Analysis of a single queue with one server and multiple servers, Analysis of finite buffers queuing systems	8
5.	Simulation modeling	Intoduction to simulation, Types of simulation, Random number generation, a survey of random number generators, seed selection, testing random number generators , random variate generation	6
6.	Measurement techniques and tools	The art of data presentation, Ratio Games	2
7.	Experimental design and analysis	Types of Experimental designs, $2^2$ factorial designs, General $2^k$ factorial designs, $2^{k-p}$ fractional factorial designs	5
<b>Total number of Lectures</b>			<b>42</b>
<b>Evaluation Criteria</b>			
<b>Components</b>		<b>Maximum Marks</b>	
T1		20	
T2		20	
End Semester Examination		35	
TA		25 (...)	
<b>Total</b>		<b>100</b>	
<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)			
1.	Raj Jain, "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling", Wiley, 1991.		
2.	K.S. Trivedi, "Probability and Statistics with Reliability, Queueing and Computer Science Applications", John Wiley and Sons, 2001.		
3.	Ross, Sheldon M. “A First Course in Probability”. Upper Saddle River, N.J.: Pearson Prentice Hall, 2006		
4.	Obaidat, Boudriga, " <i>Fundamentals of Performance Evaluation of Computer and Telecommunication Systems</i> ", 2010, Wiley, ISBN 978-0-471-26983		
5.	Ross, Sheldon M. “Introduction to Probability Models”. Amsterdam: Academic Press, 2010.		
6.	Fortier, Michel, "Computer Systems Performance Evaluation and Prediction", 2003, Elsevier, ISBN 1-55558-260-5		



## Project Based Learning I (Open Data Centric Services Development)

### Detailed Syllabus Lab-wise Breakup

<b>Course Code</b>	17M27CS111	<b>Semester Even</b> (specify Odd/Even)	<b>Semester II Session</b> 2018 -2019 <b>Month from Jan to July</b>
<b>Course Name</b>	Project Based Learning I (Open Data Centric Services Development)		
<b>Credits</b>	2	<b>Contact Hours</b>	4

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Tribhuvan Kumar Tewari
	<b>Teacher(s)</b> (Alphabetically)	Monali Mavani, Shilpa Bubhkar

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
CO.1	Conduct literature review to compare and contrast their project with existing work in the area and prepare a project proposal to be delivered to their peers and faculty members	Understanding Level (Level II)
CO.2	Develop an ability to function in task oriented team, divide role responsibilities to build a project on open data	Understanding Level (Level III)
CO.3	Understand professional and ethical responsibility & acquire ability to communicate effectively amongst team members, peers & evaluators	Analyzing Level (Level II)
CO.4	Analyze and identify Open Source framework for writing data-centric applications over the latest technologies: .Net Core, C# 7.3, ASP.NET Web API, implementation; plan & submit project development timeline	Applying Level (Level IV)
CO.5	Appraise by giving milestone presentations to their peers and faculty about their current progress.	Evaluating Level (Level V)
CO.6	Prepare technical report detailing the problem statement, proposed methodology, software specification, design, test plan, and implementation details.	Creating Level (Level VI)

<b>Module No.</b>	<b>Title of the Module</b>	<b>List of Experiments</b>	<b>CO</b>
1.	Conduct literature review	Conduct literature review to compare and contrast their project with existing work in the area and prepare a project proposal to be delivered to their peers and faculty members	CO.1
2.	Divide role responsibilities to build a project on open data	Develop an ability to function in task oriented team, divide role responsibilities to build a project on open data	CO.2
3.	Communicate effectively amongst team members, peers &	Understand professional and ethical responsibility & acquire ability to communicate effectively amongst team members, peers & evaluators	CO.3

	evaluators		
4.	Plan & submit project development timeline	Analyze and identify various open data frameworks, RESTful APIs, Python libraries for project implementation; plan & submit project development timeline	CO.4
5.	Presentations	Appraise by giving milestone presentations to their peers and faculty about their current progress.	CO.5
6	Prepare technical report	Prepare technical report detailing the problem statement, proposed methodology, software specification, design, test plan, and implementation details.	CO.6

### Evaluation Criteria

Components	Maximum Marks
Fortnightly assessment	48
Peer group evaluation	8
Self assessment by the student	8
Viva-voce at the end of the semester	16
Semester end presentation by the students	10
Report at the end of the semester	10
<b>Total</b>	<b>100</b>

## Nature Inspired Computation and Applications

### Detailed Syllabus

<b>Subject Code</b>	19M12CS211	<b>Semester Even</b>	<b>Semester Session 2018- 2019</b> <b>Month from Jan to June</b>
<b>Subject Name</b>	Nature Inspired Computation and Applications		
<b>Credits</b>	<b>3</b>	<b>Contact Hours</b>	<b>3</b>

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Anuja Arora
	<b>Teacher(s) (Alphabetically)</b>	Dr. Anuja Arora

SNO	Description	Cognitive Level (Bloom Taxonomy)
CS211.1	Identify the need of computational complexity, evolutionary, and approximate algorithms.	Apply Level (Level 3)
CS211.2	Understand nature inspired algorithms, its strength, weakness, and suitability	Understand Level (Level 2)
CS211.3	Make use of nature-inspired algorithms to design, learn and optimize problem	Apply Level (Level 3)
CS211.4	Evaluate performance of Nature inspired algorithm in context of problem solving in optimized manner	Evaluate Level (Level 5)
CS211.5	Create a real environment effective artificial system with the use of properties exhibited from nature.	Create Level (Level 6)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Nature Inspired Computation Fundamental	Computational Complexity, NP-Hardness, Reductions, Approximation Algorithms vs. Heuristics, Newton Raphson Method, Characteristics of Natural Systems/Algorithms	5
2.	Empirical and Evolutionary Algorithms	Empirical Algorithms, Empirical hardness. Evolutionary Algorithms, optimization Fitness landscape Analysis, EA Theory	5

3	Evolutionary Algorithms	Genetic Algorithm, GA Encoding Techniques, Selection techniques, Variation(Crossover and Mutation) Techniques, Genetic Programming Differential Evolution Algorithm, sample problems, DE-Crossover and Mutation techniques	8
4	Swarm Intelligence	Particle Swarm Optimization, PSO Sample Problems, Ant Colony Optimization and real life case study solutions, Artificial Bee Colony Algorithm, Gravitational Search Algorithm, Diffusion Search	12
5	Modeling and problem solving	Artificial Neural network, , Artificial Immune System,Self-organizing Maps, Pattern Recognition and Binding, Forest's Algorithm, Harmony Search, Hebbian Learning, Boltzmann Machines	7
11	Case Studies and Applications	World Wide Web, Social Network, Image Processing, Earthquake, routing & scheduling	5
<b>Total number of Lectures</b>			<b>42</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Evolutionary Optimization Algorithms, D. Simon (2013), Wiley.
2.	Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies, D.Floreano and C. Mattiussi (2008), MIT Press.
3.	Fundamentals of Natural Computing: Basic Concepts, Algorithms, and Applications, L. N. de Castro (2006), CRC Press.
4.	Leandro Nunes de Castro, " Fundamentals of Natural Computing, Basic Concepts, Algorithms and Applications", Chapman & Hall/ CRC, Taylor and Francis Group, 2007
5.	Marco Dorigo, Thomas Stutzle," Ant Colony Optimization", PHI,2005
6.	Albert Y.Zomaya, "Handbook of Nature-Inspired and Innovative Computing", Springer, 2006

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Subject Code</b>	<b>19M12CS214</b>	<b>Semester Even</b> <b>(specify Odd/Even)</b>	<b>Semester – Eighth Session 2018 - 2019</b> <b>Month from Jan to Jun 2019</b>
<b>Subject Name</b>	Multimedia Design and Analysis		
<b>Credits</b>	<b>3</b>	<b>Contact Hours</b>	<b>3</b>

<b>Faculty</b>	<b>Coordinator</b>	Dr. Suma Dawn
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<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Illustrate the basic concepts of Multimedia System.	Understanding Level (C2)
<b>CO2</b>	Make use of multimedia standards, tools and systems with a comprehensive understanding.	Apply Level (C3)
<b>CO3</b>	Identify relevant methods, parameters and visualization aspects of media applications.	Analyze Level (C4)
<b>CO4</b>	Examine the general issues in conventional and contemporary platforms for multimedia analysis.	Analyze Level (C4)
<b>CO5</b>	Perceive particular multimedia applications using computing resources based on best practices and design principles.	Evaluate Level(C5)

<b>Module No.</b>	<b>Subtitle of the Module</b>	<b>Topics in the module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Sensory Perception, Technologies, Taxonomies, and Applications.	2
2.	Multimedia Types & Authoring Tools	MM Types - Text; Graphical – static, dynamic, medical, remote sensed imaging; Audio, Video, web pages, UI designs, Games including VR System, etc; MM Standards, datatypes and Compression; MM Authoring tools;	10
3.	Multimedia Design	Principles of multimedia design and production for creation, corrections, enhancement of new or existing content;	8
4.	Multimedia Analysis	Understanding and using multimedia features, video analysis and management, retrieval techniques, spatial indexing methods, long-term learning and Relevance Feedback, audio analysis and retrieval, semantic based retrieval techniques; MM databases and data mining – storage, searching, indexing, retrieval, etc; Visual Data Mapping;	12
5.	Case Studies	Large-scale image retrieval; Learning from 3D sensors; Learning Methods for Images and Audio data sets.	10
<b>Total number of Lectures</b>			<b>42</b>

<b>Evaluation Schème</b>	Test 1	<b>20</b>
	Test 2	<b>20</b>
	Test 3	<b>35</b>
	Project, Assignment and Class Assessment, Attendance	<b>25</b>
	Total	<b>100</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
<b>JOURNALS &amp; Conferences</b>	<p>Elsevier</p> <p>Computer Vision and Image Understanding  Digital Signal Processing: A Review Journal  Graphical Models and Image Processing  Journal of Visual Communication and Image Representation  Real-Time Imaging  Computers &amp; Graphics  Data &amp; Knowledge Engineering  Image and Vision Computing  Pattern Recognition  Pattern Recognition Letters  Signal Processing  Signal Processing: Image Communication</p> <p>IEEE</p> <p>IEEE Transactions on Circuits and Systems for Video Technology  IEEE Transactions on Multimedia  IEEE Transactions on Image Processing  IEEE Transactions on Medical Imaging  IEEE Transactions on PAMI</p> <p>Kluwer</p> <p>International Journal of Computer Vision  Journal of Intelligent Information System  Multidimensional Systems and Signal Processing</p> <p>SPIE</p> <p>Journal of Electronic Imaging</p>

**Large Scale Graph Algorithms & Analytics**  
**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	17M22CS115	<b>Semester Even</b> (specify Odd/Even)	<b>Semester M.Tech (II) Session 2018-19</b> <b>Month from Jan-Jun</b>
<b>Course Name</b>	Large Scale Graph Algorithms & Analytics		
<b>Credits</b>	3	<b>Contact Hours</b>	3-0-0 (3 hrs per week)

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Adwitiya Sinha
	<b>Teacher(s)</b> (Alphabetically)	Dr. Adwitiya Sinha

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>CO1</b>	Extract real-world large-scale data sets through streaming, scrapping, crawling, etc.	Understand Level (Level 2)
<b>CO2</b>	Apply large scale graphs spanning over complex structures	Apply Level (Level 3)
<b>CO3</b>	Design methods to yield required information from large data sources	Creation Level (Level 6)
<b>CO4</b>	Model game theoretic approach to large network creation	Apply Level (Level 3)
<b>CO5</b>	Analyze the evolution process of social web from random graph	Analyze Level (Level 4)
<b>CO6</b>	Analytically discover pattern and perform ranking algorithms	Analyze Level (Level 4)
<b>CO7</b>	Compare performance study of indexing, clustering and classification algorithm	Evaluation Level (Level: 5)
<b>CO8</b>	Propose framework for massive graphs	Creation Level (Level 6)
<b>CO9</b>	Assess behavior of social network using power law distribution	Evaluation Level (Level: 5)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction to Large-scale Graphs	Introduction & Application of Large-scale Graph, Characteristics, Challenges, Hyper Graphs, Multi Graphs, Graph Duals	4
2.	Data Sources & Categorization	Complex Data Sources , Categories – Social graphs (Facebook, Twitter, Google+), Endorsement graphs (Web Link Graph, Paper Citation Graph), Technological graphs (Map, Power Grid, Telephone Network), Recommendation Graphs (feedback analysis, product recommendation), Interest graphs, Biological graphs (neural network, food	6

		web)	
3.	Basic Large-scale Graph Analysis	Basic Large-scale Graph Analysis (Efficient Search – Graph Traversal and Search Algorithms; Pattern Discovery -Matching Algorithms, Centrality Computing Algorithms, List Ranking Algorithms; Partitioning – Connected Component Algorithms, Graph-Cut Algorithms)	6
4.	Advanced Large-scale Graph Analysis	Advanced Large-scale Graph Analysis (Graph indexing and ranking – Link Analysis Algorithms, Web Crawling, Page Ranking Personalized Page Rank, Page Rank Axioms, HITS; Data Based Approaches Clustering and Classification Algorithms	7
5.	Distributed Computation for Massive Data Sets	Map Reduce Framework – Large scale Graph Clustering: Spectral Clustering, Modularity-based Clustering, Random Walks, and Pregel Framework.	5
6.	Large Graph Representation & Implementation	Adjacency Matrix Representation, Adjacency List Representation, V-Graph Representation (segmented vectors, storing graph topology), Graph Implementation Strategies & Software (RStudio, Python, Gephi, Pajek, SNAP, NetLogo, etc.)	7
7.	Advanced Research Topics	Power Law Distribution in Social Networks, Models of Power Law Random Graphs, Game-Theoretic Approach to Modeling Network Creation, Rank Aggregation and Voting Theory, Recommendation Systems	7
<b>Total number of Lectures</b>			<b>42</b>

#### Evaluation Criteria

##### Components

##### Maximum Marks

Test-1	20
Test-1	20
End Semester Examination	35
TA	25 (Quiz + Evaluative Assignment + Class Test + Attendance)
<b>Total</b>	<b>100</b>

**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 India Learning Private Limited, 1979
2.	Douglas B. West, Introduction to Graph Theory, Pearson Education India, 2015
3.	Matthew O. Jackson, Social and Economic Networks, Princeton University Press, 2010
4.	Santanu Saha Ray, Graph Theory with Algorithms and its Applications, Springer India, 2013
5.	Dieter Jungnickel, Graphs, Networks and Algorithms, Springer-Verlag Berlin Heidelberg, 2013
6.	Reinhard Diestel, Graph Theory, Springer-Verlag Berlin Heidelberg, 2017



**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	18B12BT415	<b>Semester Even</b> <b>(specify Odd/Even)</b>	<b>Semester VIII Session 2018 -2019</b> <b>Month from January-June</b>
<b>Course Name</b>	<b>Intellectual Property Rights and Bioethics</b>		
<b>Credits</b>	3	<b>Contact Hours</b>	3

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	1. Prof. S Krishna Sundari
	<b>Teacher(s)</b> <b>(Alphabetically)</b>	1. Prof. S Krishna Sundari

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
C402-14.1	Recall National and International IP rules and Agreements	Remember Level(C1)
C402-14.2	Summarize various aspects of Intellectual Property Rights in context with technological advancements	Understand Level(C2)
C402-14.3	Utilize different patent search engines and search patent literature in speciality domains	Apply Level(C3)
C402-14.4	Identify appropriate guidelines related to engineering, professional, and biotechnology research ethics	Apply Level(C3)
C402-14.5	Survey and classify patents, make a report and present the IPR status in different fields.	Analyze Level(C4)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Intellectual Property Rights	Different forms of Intellectual Property Rights - their Relevance, Importance to Industry, Academia, Role of IPRs in biotechnology, Patent Terminology: Patents, Trademarks, Copyrights, Industrial Designs, Geographical Indications, Trade secrets, non-disclosure agreements, Patent Life and Geographical Boundaries	4
2.	International organizations & IPR	Overview of WTO, TRIPS, WIPO, GATT, International conventions, Trade agreements, Implication of TRIPS for developing countries	3
3.	Process involved in Patenting, Patent Search	Procedural steps in patenting, Process of filing, PCT application, pre-grant & post-grant opposition, PCT and Patent harmonization including Sui-generis system, Patent Search methods, Patent Databases & Libraries, online tools, Country-wise patent searches (USPTO, EPO, India etc.), patent mapping	4

4.	IPR in Agriculture Technology & Biotechnology	Basic features of Indian Plant Varieties Protection & Farmer's Rights Act, UPOV, Invention/ Discovery, Patentable subject matter, Generics, Compulsory Licensing, Exclusive Marketing Rights (EMR), Bolar provision, Bayh-Dole act, Second medical use	4
5.	Traditional Knowledge and Intellectual Property Rights	The importance of Traditional Knowledge (TK) for developing nations, protecting TK, The local, national and global dimensions of the issues in TK and IPRs, Traditional Medicine & IP Protection, Folklore, Patenting of Health Foods: Case studies	3
6.	Introduction to Bioethics	Need of bioethics, applications and issues related to Bioethics, Social and cultural issues	2
7.	Bioethics & Biodiversity	Conserving natural Biodiversity, convention on protecting Biodiversity, Protocols in exchanging Biological material across borders	2
8.	Bioethics & GMO's	Issues and concerns pertaining to Genetically modified foods & food crops, Organisms and their possible health implications and mixing up with the gene-pool	3
9.	Bioethics in Medicine	Protocols of ethical concerns related to prenatal diagnosis, gene therapy, Organ transplantation, Xenotransplantation, ethics in patient care, Informed consent	7
10.	Bioethics & Cloning	Permissions and Procedures in Animal Cloning, Human cloning, Risks and hopes	3
11.	Bioethics in Research	Stem cell research, Human Genome Project, Use of animals in research, human volunteers for Clinical research, Studies on Ethnic races	5
12.	Ethics in Profession	Ethics related to professional streams , engineering	2
<b>Total number of Lectures</b>			<b>42</b>

#### Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments, Attendance)
<b>Total</b>	<b>100</b>

**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.	"Bioethics & Biosafety" by Sateesh MK, IK International publications, 2008
2.	USPTO Web Patent Databases at: <a href="http://www.uspto.gov/patft">www.uspto.gov/patft</a>
3.	Government of India's Patents Website: <a href="http://patinfo.nic.in">patinfo.nic.in</a>
4.	Intellectual property India: <a href="http://www.ipindia.nic.in">www.ipindia.nic.in</a>

5.	“Indian Patent Law : Legal and Business Implications” by AjitParulekar, Sarita D'Souza Macmillan India publication, 2006
6.	“Agriculture and Intellectual Property Rights”, edited by: Santaniello,V., Evenson, R.E., Zilberman, D. and Carlson, G.A. University Press publication, 2003
7.	Research papers and Reports provided from time to time

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	16B1NMA831	<b>Semester</b> Even (specify Odd/Even)	<b>Semester VIII Session</b> 2018-2019 <b>Month from</b> January 2019 to June 2019
<b>Course Name</b>	Optimization Techniques		
<b>Credits</b>	3	<b>Contact Hours</b>	3-0-0
<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Prof. A. K. Aggarwal	
	<b>Teacher(s) (Alphabetically)</b>	Prof. A. K. Aggarwal	
<b>COURSE OUTCOMES</b>			<b>COGNITIVE LEVELS</b>
After pursuing the above mentioned course, the students will be able to:			
<b>C402-2.1</b>	apply generalized, revised and dual simplex method for linear programming problems (LPP).	Applying Level (C3)	
<b>C402-2.2</b>	apply graphical, algebraic and linear programming techniques for pure and mixed strategy problems in game theory.	Applying Level (C3)	
<b>C402-2.3</b>	classify and solve the problems on queuing and inventory models.	Analyzing Level (C4)	
<b>C402-2.4</b>	solve and analyze the network scheduling and sequencing problems.	Analyzing Level (C4)	
<b>C402-2.5</b>	make use of dynamic programming technique to solve complex linear programming problems.	Applying Level (C3)	
<b>C402-2.6</b>	determine numerical solution of nonlinear multidimensional problems.	Evaluating Level (C5)	
<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Review of Linear Programming	Convex sets, Linear Programming Problems (LPP), graphical and simplex method, Big-M method, Two phase method, generalized simplex method, revised simplex method, Duality theory, dual simplex method.	08
2.	Game Theory	Rectangular Games, Minmax Theorem, Graphical Solution of $2 \times n$ , $3 \times n$ , $m \times 2$ , $m \times 3$ and $m \times n$ Games, Reduction to Linear Programming Problems.	06
3.	Queuing Theory & Inventory Model:	Introduction, Steady-State Solutions of Markovian Queuing Models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited space, M/G/1, Inventory Models.	06
4.	Sequencing & Scheduling	Processing of Jobs through Machines, CPM and PERT.	06
5.	Dynamic Programming	Discrete and Continuous Dynamic Programming, Simple Illustrations.	06
6.	Nonlinear Programming	Unimodal function, One Dimensional minimization problem, Newton's Method Golden Section, Fibonacci Search, Bisection, Steepest Descent Method, Multidimensional Newton's method.	08

		<b>Total number of Lectures</b>	<b>40</b>
<b>Evaluation Criteria</b>			
<b>Components</b>		<b>Maximum Marks</b>	
T1		20	
T2		20	
End Semester Examination		35	
TA		25 (Quiz, Assignments)	
<b>Total</b>		<b>100</b>	
<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)			
<b>1.</b>	Taha H. A., Operations Research: An Introduction, 7th edition, PHI, 2002.		
<b>2.</b>	Rao, S. S. - Engineering Optimization, Theory and Practice, Third Edition, New Age International Publishers, 2010.		
<b>3.</b>	Wagner, H. M., Principles of Operations Research with Applications to Managerial Decisions, Prentice Hall of India Pvt. Ltd., 1975.		
<b>4.</b>	Hillier F. and Lieberman G. J., Introduction to Operations Research, 6th edition, McGraw-Hill, 1995.		

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	<b>18B12NHS812</b>	<b>Semester Even</b> <b>(specify Odd/Even)</b>	<b>Semester 8 Session 2018 -2019</b> <b>Month from Jan 2018 to July 2018</b>
<b>Course Name</b>	Social and Legal Issues		
<b>Credits</b>	3	<b>Contact Hours</b>	<b>3-0-0</b>

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr Swati Sharma
	<b>Teacher(s)</b> <b>(Alphabetically)</b>	Dr Swati Sharma

<b>CO Code</b>	<b>COURSE OUTCOMES</b>	<b>COGNITIVE LEVELS</b>
C402-10.1	Demonstrate an understanding of social science and business law to individuals and businesses.	Understanding Level (C2)
C402-10.2	Critically evaluate how information technology, contractual agreements, rights and obligations affects business and society	Evaluating Level (C5)
C402-10.3	Analyse legal implications of societal laws.	Analyzing Level (C4)
C402-10.4	Develop acceptable attitudes with respect to ethical cultural and social issues related to technology, system, information	Applying Level (C3)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Introduction to Social and Legal Issues	1
2.	Social Structure and Impact	Social Structure Social Impact on Information system and Technology Corporate Social Responsibility	6
3.	Ethics	Business Ethics & Values, Professional Conduct, Code of ethics for an Engineer, Ethics in Bio-Tech.	6
4.	Societal Laws	Introduction to Constitution, Right to information, Consumer Protection Act,	8
5.	Business Laws	Contract Act, Company Act, Negotiable Instruments Acts	8
6.	Intellectual Property & Cyberspace	Intellectual Property Issues:(What is Intellectual Property , Copyright Law, Trademark and Law of Patent	5
7.	Cyber Crime, Laws and IT Act	Computer Crimes(Fraud and Embezzlement, Sabotage & Information Theft, Intruders, Hacking&	8

		Cracking), Computer Crime Laws, Digital Forgery, Cyber Terrorism, Wiretapping, IT Act	
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<b>Total number of Lectures</b>			<b>42</b>
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<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment and Oral Viva)
<b>Total</b>	<b>100</b>

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

<b>1.</b>	Albuquerque D, Business Ethics Principles and Practices, 1 <sup>st</sup> edition, Oxford University Press,2010
<b>2.</b>	Baase,S, A Gift Of Fire Social, Legal, & Ethical Issues in Computing and Internet,2 <sup>nd</sup> edition Prentice Hall, US, 2006
<b>3.</b>	Diwan,P. & Kapoor,S, Cyber And E-Commerce Laws with information Technology Act, & Rules,2 <sup>nd</sup> edition, Prakesh Publication House,Jaipur , 2000
<b>4</b>	Gogna,P.P.S., A Text book of Business Law, 1 <sup>st</sup> ed, , S Chand & Company LTD.2000
<b>5</b>	Ghosh,B., Ethics in Management and Indian Ethos, 2 <sup>nd</sup> Edition, Vikas Publishing house,New Delhi, 2006

**Detailed Syllabus**

<b>Course Code</b>	15B1NHS832	<b>Semester</b> Even (specify Odd/Even)	<b>Semester VIII Session</b> 2018 -2019 <b>Month from</b> Jan - July
<b>Course Name</b>	International Studies		
<b>Credits</b>	3	<b>Contact Hours</b>	<b>3-0-0</b>

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Monica Chaudhary
	<b>Teacher(s) (Alphabetically)</b>	Dr. Monica Chaudhary

<b>CO Code</b>	<b>COURSE OUTCOMES</b>	<b>COGNITIVE LEVELS</b>
C402-8.1	Interpret the major security issues in the Eurasia Region.	Understanding (C2)
C402-8.2	Compare the developed and developing economies along with other major international economic concepts and institutions.	Applying (C3)
C402-8.3	Analyze the major historic, economic, political, socio-cultural and technological issues from a global perspective.	Analyzing (C4)
C402-8.4	Discuss India's relations with USA, Russia and China.	Understanding (C2)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Introduction	Introduction	1
2.	Historical Aspects	<ul style="list-style-type: none"> <li>• Feudalism, Socialism, communism, Capitalism,</li> <li>• World War I</li> <li>• World War II: Allies &amp; the world</li> <li>• Current Power Centers</li> </ul>	12
3.	Global Markets	<ul style="list-style-type: none"> <li>• The politics of trade</li> <li>• Liberal market economies—The United States</li> <li>• The rise of emerging markets—reaching where?</li> <li>• WTO, Trading blocks, International treaties</li> </ul>	6
4.	Social-cultural	<ul style="list-style-type: none"> <li>• Global Population, Migration</li> <li>• Human Rights – Amnesty, UNO, Geneva Convention</li> <li>• Environmental and Ethical Issues</li> <li>• Communication &amp; Culture</li> </ul>	4
5.	Political	<ul style="list-style-type: none"> <li>• International Relations: Terrorism, United Nations</li> <li>• Current Issues in International Politics: China &amp; Sea Water, Israel – Palestine, Ukraine, European Union</li> </ul>	8



		<ul style="list-style-type: none"> <li>• Warfare in the Modern World</li> </ul>	
6.	Emerging Technologies	<ul style="list-style-type: none"> <li>• Top 10 emerging technologies by World Economic Forum 2018</li> <li>• Emerging health technologies by WHO</li> <li>• Emerging technologies: options for the future</li> </ul>	5
7.	India	<ul style="list-style-type: none"> <li>• India's Relation with China, US, Russia</li> <li>• Great Indians Diaspora and their contributions</li> <li>• India: Futuristic View</li> </ul>	8
<b>Total number of Lectures</b>			<b>42</b>

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz and Attendance)
<b>Total</b>	<b>100</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	M. Friedman, Chapters 1–3, 6, 10, and 12–13 in <i>Capitalism and Freedom: 40th Anniversary Edition</i> . University of Chicago Press, 2002.
2.	T. Oatley, <i>International Political Economy</i> (4th Edition) (Paperback). New York: Longman, 2010.
3.	J. Keegan, <i>A History of Warfare</i> , Vintage Books, New York, 1994.
4.	A. Sen, <i>Development as Freedom</i> , Anchor Books, New York, 1999.
5.	J.B. Stewart, "A Reporter at Large: Eight Days." <i>The New Yorker</i> , September 21, 2009.
6.	Top 5 Futuristic Technologies That Exist Today! <a href="https://www.youtube.com/watch?v=VUncbfJaf8Q">https://www.youtube.com/watch?v=VUncbfJaf8Q</a>
7.	A. Rawi, L. Alfaro, et al. "Bombardier: Canada vs. Brazil at The WTO." Harvard Business School Case. Harvard Business School Publishing. Case: 9-703-022, February 20, 2003.
8.	<a href="http://www.forbes.com/sites/carolkinseygoman/2011/11/28/how-culture-controls-communication/">http://www.forbes.com/sites/carolkinseygoman/2011/11/28/how-culture-controls-communication/</a>

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	18B12HS815	<b>Semester Even</b>	<b>Semester 8<sup>th</sup> Session 2018 -2019</b> <b>Month from January 2019 to May 2019</b>
<b>Course Name</b>	QUALITY ISSUES IN ENGINEERING		
<b>Credits</b>	3	<b>Contact Hours</b>	3-0-0

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Santoshi Sengupta
	<b>Teacher(s) (Alphabetically)</b>	Dr. Santoshi Sengupta

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
C402-32.1	Apply the concepts of quality within quality management systems by understanding various perspectives, historical evolution; and contributions of key gurus in the field of quality	Apply Level (C3)
C402-32.2	Determine the effectiveness of acceptance sampling using single and double sampling plans and operating characteristic curves	Evaluate Level (C5)
C402-32.3	Determine quality by employing a wide range of basic quality tools, lean concepts and process improvement techniques such quality function deployment	Evaluate Level (C5)
C402-32.4	Examine the importance of six sigma, various quality standards, awards, certifications	Analyze Level (C4)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Fundamentals of Quality	Perspectives and Definitions of Quality, Dimensions Of Quality for Product and Service, History of Quality, Phases of Quality Assurance, Alignment, Linkage, Reengineering, Contribution of Gurus – Shewhart, Deming, Ishikawa, Juran	6
2.	Cost of Quality and Quality Function Deployment	Cost of Quality, Voice Of Customers: Kano's Model, House Of Quality, QFD Process	6
3.	Basic Tools of Quality	Checksheets, Cause and Effect Diagrams, Histograms, Flowcharts, Pareto Analysis, Scatter Diagrams, Run Charts	9
4.	Statistical Thinking And Applications	Acceptance Sampling, Single Sampling Plan, Double Sampling Plan, Statistical Process Control, Specification And Control Limits, Control Charts For Attributes, Control Charts For Variables	9
5.	Six Sigma, Benchmarking and	Six Sigma, Capability Of A Process/Product/Service, DMAIC Process, Benchmarking Meaning, Process,	9

	Lean Concepts	Methods; JIT, Andon, Kanban, Kaizen, Poka-Yoke, 5-S, 7 Mudas	
6.	Quality Standards and Awards	ISO Standards, MBNQA, RGNQA, Deming Prize	3

<b>Total number of Lectures</b>			<b>42</b>
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<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Assignment, Case Study, Quiz, Oral Questions)
<b>Total</b>	<b>100</b>

**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.	NVS Raju, Total Quality Management, 1 <sup>st</sup> Edition, Cengage Learning, 2014
2.	Kanishka Bedi, Quality Management, 1 <sup>st</sup> Edition, Oxford University Press, 2006
3.	D.H. Besterfield, Total Quality Management, Revised 3 <sup>rd</sup> Edition, Pearson Education, 2011

### Lecture-wise Breakup

<b>Course Code</b>	19B1NHS812	<b>Semester- Even</b>	<b>Semester 8th Session 2018 -2019</b> <b>Month from</b> January 2019 to June 2019
<b>Course Name</b>	International Finance		
<b>Credits</b>	<b>3</b>	<b>Contact Hours</b>	<b>3-0-0</b>

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Dr. Mukta Mani
	<b>Teacher(s) (Alphabetically)</b>	Dr. Mukta Mani

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C402-12.1</b>	Explain the global market scenario, its imperfections and risks which affect the multinational businesses trade.	Understanding level (C2)
<b>C402-12.2</b>	Analyze the international transactions of balance of payments and understand their relationship with key macroeconomic indicators	Analyzing level (C4)
<b>C402-12.3</b>	Apply the concepts of foreign exchange market and currency derivatives for making transactions in foreign exchange market	Applying level (C3)
<b>C402-12.4</b>	Analyze the role of parity conditions and other factors in exchange rate determination.	Analyzing level (C4)
<b>C402-12.5</b>	Analyze the central bank's intervention in foreign exchange market and evaluate the causes of exchange rate disequilibrium	Evaluating level (C5)

<b>Module No.</b>	<b>Subtitle of the Module</b>	<b>Topics in the module</b>	<b>No. of Lectures for the module</b>
<b>1.</b>	Introduction	Financial Globalization and Risk, Global financial Marketplace, Eurocurrency market and LIBOR, Theory of comparative advantage, Globalization process	<b>4</b>
<b>2.</b>	Balance of Payments	BOP transactions, accounting, Accounts of BOP, Capital and Financial Accounts, BOP and key macroeconomic variables	<b>4</b>
<b>3.</b>	Exchange Rates	Foreign Exchange market, functions, participants, types of transactions: spot, forward and swap transactions Methods of stating exchange rates, quotations and changes in exchange rates	<b>6</b>

4.	Foreign Exchange rate determination and forecasting	Exchange rate determination theories, Currency market intervention, disequilibrium, forecasting	6
5.	Forward Exchange	Forward foreign exchange, premiums and discounts, forward rates vs future spot rates, payoff profile, swaps, forward quotations	6
6.	Currency Futures and options market	Foreign currency futures, Currency options, Forwards, futures and options compared	6
7.	International Parity Conditions	Purchasing Power Parity and Interest Parity Prices and Exchange rates, Exchange rate pass-through, Forward rate, Prices, Interest rates and exchange rates in equilibrium	5
8.	Transaction and Translation Exposure	Types of foreign exchange exposure, Hedging, Overview of translation, Translation methods, US translation procedures	5
<b>Total</b>			<b>42</b>

<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 (Class test, Assignment, Class participation)
<b>Total</b>	<b>100</b>

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ( Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Eiteman, D K., Stonehill, A.I. and Moffett, M.H., <i>Multinational Business Finance</i> , 14 <sup>th</sup> Ed., Pearson India Education, 2018.
2.	Levi, M.D., <i>International Finance</i> , 4 <sup>th</sup> Ed., Routledge Publication, 2009.
3.	Jain, P K., Peyrard, J. and Yadav, S.S., <i>International Financial Management</i> , Macmillan India, 1999.
4.	Desai, M.A., <i>International Finance- A Casebook</i> , Wiley India, 2007.
5.	Shapiro, Alan C., <i>Multinational Financial Management</i> , 7 <sup>th</sup> Ed., John Wiley and Sons Inc., 2003.

**Detailed Syllabus**  
**Lecture-wise Breakup**

<b>Course Code</b>	18B12PH811	<b>Semester Even</b>	<b>Semester VIII Session 2018 -2019</b> <b>Month from January to June</b>
<b>Course Name</b>	Photonics and Applications		
<b>Credits</b>	3	<b>Contact Hours</b>	3

<b>Faculty (Names)</b>	<b>Coordinator(s)</b>	Navneet Kumar Sharma and Anshu Varshney
	<b>Teacher(s) (Alphabetically)</b>	Navneet Kumar Sharma and Anshu Varshney

<b>COURSE OUTCOMES</b>		<b>COGNITIVE LEVELS</b>
<b>C402-3.1</b>	Recall the fundamental properties of light and the processes involved in the generation of light	Remembering (C1)
<b>C402-3.2</b>	Interpret the theory of fiber optics	Understanding (C2)
<b>C402-3.3</b>	Apply the fundamentals of various nonlinear optical effects in technology; make use of holography and its applications	Applying (C3)
<b>C402-3.4</b>	Compare the operational principles, characteristics and trade-offs of optical detectors and modulators of light	Analyzing (C4)

<b>Module No.</b>	<b>Title of the Module</b>	<b>Topics in the Module</b>	<b>No. of Lectures for the module</b>
1.	Lasers	Review of different types of laser systems. LEDs, Semiconductor lasers, Quantum well lasers, Q-switching and Mode locking in lasers.	8
2.	Fiber Optics	Numerical aperture, Step and graded index multimode fibers, attenuation and dispersion, modes in optical fibers. Single mode fiber, mode cutoff and mode field diameter. Connector and splice losses, Erbium doped fiber amplifier and Characterization techniques including OTDR.	10
3.	Photo detectors	Semiconductor photo detectors.	5
4.	Optical Electronics	Wave propagation in anisotropic media, Electro-optic effect: phase and amplitude modulation. Acousto-optic effect: modulators, deflectors and tunable filters, Magneto-optic effect: modulators.	4
5.	Optical devices	Electro-optical device, Acousto-optical device, Magneto-optical device, Optical Communication.	2
6.	Nonlinear Optics	SHG, Sum and Difference frequency generation, parametric amplification, wavelength converters, Self focusing with lasers.	6
7.	Holography	Recording and Reproduction of Hologram, Applications of holography.	4

8.	Applications of Photons in Memory devices	CD, VCD, DVD.	1
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<b>Total number of Lectures</b>			<b>40</b>
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<b>Evaluation Criteria</b>	
<b>Components</b>	<b>Maximum Marks</b>
T1	20
T2	20
End Semester Examination	35
TA	25 [2 Quiz (10 M), Attendance (10 M) and Cass performance (5 M)]
<b>Total</b>	<b>100</b>

**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.	R. P. Khare, <i>Fiber Optics and Optoelectronics</i> , Oxford University Press.
2.	A. K. Ghatak and K. Thyagarajan, <i>Optical Electronics</i> , Cambridge university Press.
3.	A. K. Ghatak and K. Thyagarajan, <i>An Introduction to Fiber Optics</i> , Cambridge university Press.
4.	B. B. Laud, <i>Lasers and Nonlinear Optics</i> , New Age International.