Course Description

Course Code	15B19CI891	**Semester EVEN**	**Semester VIII** **Session** 2021 -2022 **Month from** Jan to June 2022
Course Name	**Project Part – II (CSE)**		
Credits	12	**Contact Hours**	…

Faculty (Names)	**Coordinator(s)**	Mukesh Saraswat (JIIT128), Prashant Kaushik (JIIT62)
	Teacher(s) (Alphabetically)	Entire Department

COURSE OUTCOMES		**COGNITIVE LEVELS**
C451.1	Summarize the contemporary scholarly literature, activities, and explored tools for hands-on in the respective project area	Understand Level (Level 2)
C451 .2	List out the specific requirements to develop the workable solution for the identified computing problem.	Analyze Level (Level 4)
C451 .3	Develop a workable computing solution for the identified problem	Apply Level (Level 3)
C451 .4	Evaluate the performance of the developed solution	Evaluate Level (Level 5)
C451 .5	Compile the results and findings of the project in written and verbal formats	Create Level (Level 6)

Evaluation Criteria

Components	**Maximum Marks**
Mid Semester Viva	20
Final Viva	30
Project Report	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)

Detailed Syllabus

Course Code	15B1NHS832	**Semester** Even **(specify Odd/Even)**	**Semester** VIII **Session** 2021-2022 **Month from** Feb-June 2022
Course Name	International Studies		
Credits	3	**Contact Hours**	**3(3-0-0)**

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

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C402-8.1	Demonstrate an understanding of the basic concepts in the area of international studies	Understanding (C2)
C402-8.2	Compare the changes in India's foreign policy in the Cold War era and the post Cold War era	Applying (C3)
C402-8.3	Analyze the major political developments and events since the 20th century	Analyzing (C4)
C402-8.4	Demonstrate an understanding of the rise of new power centres in the changing world order	Understanding (C2)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Basic Concepts	Balance of power and Collective security National Interest and its instruments	4
2.	An Overview of Twentieth Century International Relations History	World War I: Causes and Consequences Significance of the Bolshevik Revolution Rise of Fascism / Nazism World War II: Causes and Consequences	8
3.	Cold War Politics	Origin of the Cold War Evolution of the Cold War Collapse of the Soviet Union Causes of the End of the Cold War	8
4.	India's foreign policy during the Cold War era	Basic Determinants (Historical, Geo-Political, Economic, Domestic and Strategic) India's Policy of Non-alignment	6
5.	India's foreign policy in the Post-Cold War era	India and SAARC India and the Look East policy Impediments to regional co-operation: river water disputes; illegal cross-border migration; ethnic conflicts and insurgencies; border disputes	8
6.	Emergence of Other Power Centres	European Union Rise of Asia Powers- Russia, China and Japan	8
		Total number of Lectures	**42**

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project/ Quiz/Attendance)
Total	**100**

Project Based Learning: Each student would form a group of 3-4 and submit projects on India's foreign policy and rise of new power centres. This project would help the students' research about the India's relations- economic, political and diplomatic and also consider a variety of perspectives and interpretations of current world events.

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.	A. Chatterjee, *International Relations Today*. Noida, India: Pearson, 2019
2.	Appadorai, &M.S.Rajan, *India's Foreign Policy and Relations*. New Delhi, India: South Asian Publisher, 1985
3.	E.H. Carr,*International Relations between the Two World Wars: 1919-1939*. New York, USA: Palgrave, 2009
4.	J. Baylis &S. Smith, Ed. *The Globalization of World Politics: An Introduction to International Relations*. Oxford, UK: Oxford University Press, 2011
5.	P. Calvocoressi, *World Politics: 1945—2000*. Essex, UK: Pearson,2009
6.	P.Zelikow, *The Road less travelled: The secret battle to end the great war,1916-17*. New York, USA: Public Affairs, 2021
7.	R,Cooper, *The Ambassadors: thinking about diplomacy from Machiavelli to modern times*. London,UK: Weidenfeld & Nicolson, 2021

Optimization Techniques (16B1NMA831)

Simplex method and variants, game theory, queuing models, inventory models, network scheduling, CPM and PERT, sequencing problems, discrete and continuous dynamic programming, nonlinear programming problems-numerical methods.

Course Description

Course Code	16B1NMA831	**Semester** Even	**Semester** VIII **Session** 2021-2022 **Month from** Jan 2022 to June 2022		
Course Name	Optimization Techniques				
Credits	3		**Contact Hours**	3-0-0	
Faculty (Names)	**Coordinator(s)**	Dr. Shruti			
	Teacher(s) (Alphabetically)	Dr. Shruti			

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C402-2.1	apply generalized, revised and dual simplex method for linear programming problems (LPP).	Applying Level (C3)
C402-2.2	apply graphical, algebraic and linear programming techniques for pure and mixed strategy problems in game theory.	Applying Level (C3)
C402-2.3	classify and solve the problems on queuing and inventory models.	Analyzing Level (C4)
C402-2.4	solve and analyze the network scheduling and sequencing problems.	Analyzing Level (C4)
C402-2.5	make use of dynamic programming technique to solve complex linear programming problems.	Applying Level (C3)
C402-2.6	determine numerical solution of nonlinear multidimensional problems.	Evaluating Level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Review of Linear Programming	Convex sets, Linear Programming Problems (LPP), graphical method, simplex method and its variants, revised simplex method, Duality theory, dual simplex method, sensitivity analysis.	08
2.	Game Theory	Rectangular Games, Minmax Theorem, Graphical Solution of 2×n, 3×n, m×2, m×3 and m×n Games, Solution of games using LPP technique.	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 waiting space. Inventory Models: Deterministic and Probabilistic models.	08
4.	Sequencing & Scheduling	Processing of Jobs through Machines: Processing of n jobs through two machines, two jobs through m machines and n jobs through m	07

		machines. Project Scheduling: Network diagram, Critical Path Method (CPM), Project Evaluation and Review Technique (PERT).	
5.	Dynamic Programming	Discrete and Continuous Dynamic Programming: Bellman's principle of optimality, linear and nonlinear dynamic programming problems, Simple Illustrations.	06
6.	Nonlinear Programming	Unimodal function, One Dimensional minimization problem: Newton's method, Golden section method, Fibonacci search method, Bisection method. Multidimensional minimization problem: Steepest descent method, Multidimensional Newton's method.	07
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments)
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.	Taha, H. A., Operations Research - An Introduction, Tenth Edition, Pearson Education, 2017.
2.	Rao, S. S. - Engineering Optimization, Theory and Practice, Third Edition, New Age International Publishers, 2010.
3.	Hillier F., Lieberman G. J., Nag,B. and Basu, P., Introduction to Operations Research, 10th edition, McGraw-Hill, 2017.
4.	Wagner, H. M., Principles of Operations Research with Applications to Managerial Decisions, 2nd edition, Prentice Hall of India Pvt. Ltd., 1980.

CO-PO-PSO Mapping:

CO-PO and CO-PSO Mapping:

COs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
C402-2.1	**3**	**3**	**1**	**1**								**2**		
C402-2.2	**3**	**3**	**2**	**2**								**2**		
C402-2.3	**3**	**3**	**2**	**2**								**2**		
C402-2.4	**3**	**3**	**3**	**3**								**2**		
C402-2.5	**3**	**3**	**3**	**2**								**1**		
C402-2.6	**3**	**2**	**3**	**2**								**1**		
Avg.	**3**	**3**	**2**	**2**								**2**		

Detailed Syllabus
Lecture-wise Breakup

Subject Code	**17B1NHS732**	**Semester: Even**	**Semester : 8th** **Session : 2021 -2022** **Month: January to June**
Subject Name	**INDIAN FINANCIAL SYSTEM**		
Credits	**3**	**Contact Hours**	**3 (3-0-0)**

Faculty (Names)	**Coordinator(s)**	1. Dr. Mukta Mani (Sec 62) 2. Dr.Sakshi Varshney (Sec 128)
	Teacher(s) (Alphabetically)	2. Dr. Mukta Mani 2. Dr.Sakshi Varshney

NBA Code	Course Outcomes	Cognitive Level
C402-31.1	Understand the inter-linkage of components of financial system and financial instruments of Money market and Capital market.	C2
C402-31.2	Analyze ways of fund raising in domestic and international markets	C4
C402-31.3	Understand functioning of Stock market and evaluate securities for investment.	C5
C402-31.4	Apply the knowledge of Mutual Funds and Insurance in personal investment decisions	C3
C402-31.5	Apply knowledge of Income tax for calculation of tax liability of individual.	C3

Module No.	Subtitle of the Module	Topics in the module	No. of Hours
1.	Introduction	Meaning, Importance, and functions of Financial system. Informal and Formal financial system, Financial markets, Financial Institutions, Financial services and Financial instrument	3
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	3
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 IPO-Intermediaries in IPO, Book building process and allotment of shares	3

4.	Foreign investments in India	Fund raising from foreign market through: Foreign direct investment and foreign institutional investment, ADR, GDR, ECB, and Private equity.	3
5.	Stock Market	Trading in secondary market- Stock exchanges, regulations, demutualization, broker, listing of securities, dematerialization, trading, short selling, circuit breaker, stock market indices- methods of calculation of indices.	3
6.	Stock Valuation and Analysis	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	7
7.	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	6
8.	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- basic, DA, HRA, leave salary, Gratuity, Pension, Allowances and Perquisites; Income from Capital Gain, Deductions under section 80C to 80U.	14
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Class participation and Attendance)
Total	**100**

Project Based learning: The students will form groups of 4-5 students. They will carry-out stock analysis of a selected company on the basis of fundamental and technical analysis techniques studied in lecture classes. Finally, they will give their recommendation about the performance of stock.

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	Pathak Bharti V, *Indian Financial System*, 5th Edition, Pearson Education, 2018
2	Madura Jeff, *Personal Finance*, 6th Ed, Pearson Education, 2017.
3	Machiraju H R, *Indian Financial System*, 4th Ed, Vikas Publication, 2010

4	Bhole L M, *Financial Institutions and Markets*, 4th ed. Tata McGraw Hill Publication, 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,Sharma,' De-jargoned: Book building process, Live Mint,2015.
9	Madhavan, N. "Pushing the accelerator instead of brakes: Can Subhiksha make a comeback?", Business Today, 28th June 2009.
10	Kaul, Vivek, "Master Move: How Dhirubhai Ambani turned the tables on the Kolkata bear cartel", The Economic Times, July 1, 2011.

Detailed Syllabus

Lecture-wise Breakup

NOTE: All the entries (…) must be in Times New Roman 11.

Course Code	17M11CS121	**Semester** EVEN **(specify Odd/Even)**	**Semester M.Tech CSE (**IInd) DD (VIII) **Session** 2021-2022 **Month from** January 2022 – June 2022
Course Name	**Cloud and Web Services Software Engineering**		
Credits	3-0-0	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	Prof. Sandeep Kumar Singh
	Teacher(s) (Alphabetically)	Prof. Sandeep Kumar Singh, Dr.Naveen Kumar (JIIT -128)

COURSE OUTCOMES		**COGNITIVE LEVELS**
C113.1	Demonstrate role of Software engineering in combining cloud and web services computing paradigms for service development.	Understand Level (Level 2)
C113.2	Make use of web & cloud services and **service engineering process** to design, implement, and test, deploy and execute services.	Create Level (Level 6)
C113.3	Categorize various cloud services into compute, storage, database, application, analytics, network, and deployment.	Understand Level (Level 2)
C113.4	Analyze the requirements for developing and migrating applications to Web and Cloud Services.	Analyzing Level (Level 4)
C113.5	Appraise different **design patterns, reference architectures, performance metrics, testing for Cloud and Web Services.**	Evaluate Level (Level 5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Distributed Software Engineering	Software Engineering Meets Services and Cloud Computing, Distributed Systems, Models of Interaction, Client and Server Computing, Architectural Patterns for distributed systems, Software as Service.	3
2.	Service-oriented software engineering	Service-Oriented Computing, Service-Oriented Architecture (SOA), Service Engineering and Service Composition	4
3.	Modelling Service Composition	Business Process Modeling Notation (BPMN), block-structured process execution languages, including BPML and BPEL, Modelling tools like Bizagi,BPMN.io etc	5
4.	Introduction Web to Services	Brief of Web Services, Service Oriented Architectures, Core Functionality- SOAP, WSDL,UDDI, Microservices Architecture	4
5.	Designing and Implementing Services	Web Service Development Life Cycle, SOAP, Restful Services, Microservices – Domian Driven Design, Implementation, Deployment and Testing of Services	4
6.	Address SE in Web services	Web Services Design Pattern, Metrics to Measure Web Service Performance.	3
7.	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	3
8.	Cloud Services from Amazon	IAM services-users, groups, policy and roles, Elastic Compute Cloud, Databases on Amazon, Storage on Amazon services,	6
9.	Migrate, Secure and	Migration of Application to Web or Cloud Service, Enabling SSL	4

	Consume Services	authentication and authorization, consuming services using another service or application.	
10.	Address SE in Cloud services	Cloud Services Design Pattern, Metrics to Measure Cloud Service Availability, elasticity, Scalability, Load balancing, Auto scaling. Performance, Cloud Service Automation	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25

Attendance = 05
Internal assessment & Assignments in PBL mode = 20
(A Macro Assignment is given which will make the student conversant in design, creation and implementation of an application using Web Services and Cloud Services. This will make them industry ready in applying web and cloud services)

Total **100**

Recommended Reading material:

Text Books

1.	Mahmood Z, Saeed S (eds) (2013) Software Engineering Frameworks for the Cloud Computing Paradigm. Springer-Verlag, London
2.	Cloud Computing: A Hands-On Approach Book by Arshdeep Bahga and Vijay K. Madisetti, December 2013 CreateSpace Independent Publishing Platform7290 Investment Drive # B North Charleston SC United States
3.	Cloud Computing Design Patterns Book by Amin Naserpour, Robert Cope, and Thomas Erl, June 2015, Prentice Hall Press One Lake Street Upper Saddle River, NJ United States
4.	**Software Engineering Book by Ian Sommerville Apil 2015, Pearson**
5.	Amazon Web Services for Mobile Developers: Building Apps with AWS October 2017, Abhishek Mishra, SYBEX Inc. 2021 Challenger Drive Alameda, CA United States
6.	Web Services, Service-Oriented Architectures, and Cloud Computing, Second Edition: The Savvy Manager's GuideJanuary 2013, Douglas K. Barry, Morgan Kaufmann Publishers Inc. 340 Pine Street, Sixth Floor San Francisco CA United States

Reference Books

7.	XML, Web Services, and the Data Revolution Book by Frank P. Coyle , March 2002, Addison-Wesley Longman Publishing Co., Inc.75 Arlington Street, Suite 300 Boston, MA,United State
8.	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
9.	Cloud Computing and Software Services Theory and Techniques Syed A hson and Dr. Mohammad Ilyas July 2010, CRC Press, Inc. Subs. of Times Mirror 2000 Corporate Blvd. NW Boca Raton, FL, United State

Detailed Syllabus
Lecture-wise Breakup

Subject Code	17M11CS122	**Semester:** Even **(specify Odd/Even)**	**Semester** II **Session** 2021-2022 **Month from** Jan'22 **to** June'22
Subject Name	Performance Evaluation of Computing Systems		
Credits	3	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr. Kavita Pandey
	Teacher(s) (Alphabetically)	Dr. Kavita Pandey

COURSE OUTCOMES		**COGNITIVE LEVELS**
C114.1	Demonstrate the ability to describe the correct tools and techniques for computer system performance evaluation	Understand (level 2)
C114.2	Identify the probability distribution in a given stream of data that corresponds to a source of randomness in a system.	Apply (level 3)
C114.3	Design the appropriate model of a discrete, dynamic, stochastic system using the theory of random processes.	Apply (level 3)
C114.4	Inspect the mathematical modeling techniques, Markov chains, queuing theory for analyzing the system.	Analyze (level 4)
C114.5	Select the appropriate experiments and perform a simulation study of the given system.	Evaluate (level 5)

Module No.	**Title of the Module**	**Topics in the module**	**No. of Lectures for the module**
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 interval	10
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	8

		with one server and multiple servers, Analysis of finite buffers queuing systems	
5.	Simulation modeling	Introduction 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
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Attendance (10 Marks), Assignments / Quiz / Mini project (15 Marks)
Total	**100**

Project based Learning: Each student in a group of 2-3, study the research papers related to experimental designs and present their summary in the form of report. To make it application based, students select the recent articles which is applied on various contemporary domains. Understanding the research papers gives them the knowledge about applicability of experimental designs in identifying the important factors, their variations, etc.

Recommended Text books:

1.	Raj Jain, "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling", Wiley, Reprint Edition, © 2014.
2.	K.S. Trivedi, "Probability and Statistics with Reliability, Queueing and Computer Science Applications", John Wiley and Sons, 2nd Edition, Reprint Edition, © 2018.

Recommended Reference books:

1.	Ross, Sheldon M. "A First Course in Probability". Upper Saddle River, N.J.: Pearson Prentice Hall, 10th Edition, ©2019
2.	Obaidat, Boudriga, "*Fundamentals of Performance Evaluation of Computer and Telecommunication Systems* ", 2010, Wiley, ISBN 978-0-471-26983
3.	Ross, Sheldon M. "Introduction to Probability Models". Amsterdam: Academic Press, 12th Edition, ©2019
4.	Fortier, Michel, "Computer Systems Performance Evaluation and Prediction", 2003, Elsevier, ISBN 1-55558-260-5

Detailed Syllabus

Subject Code	17M22CS115	**Semester Even**	**Semester M.Tech II** **Session 2021- 2022** **Month from Jan to June**
Subject Name	Large Scale Graph Algorithms and Analytics		
Credits	**3**	**Contact Hours**	**3**
Faculty (Names)	**Coordinator(s)**	Dr. Adwitiya Sinha	
	Teacher(s) (Alphabetically)	Dr. Adwitiya Sinha	

S.No.	Description	Cognitive Level (Blooms Taxonomy)
C161.1	Understand the characteristics & significance of large-scale graphs over complex structures	Understanding Level (Level III)
C161.2	Analyze several techniques to yield and process information from large-scale real-world data sources	Analyzing Level (Level II)
C161.3	Apply the concept of random network theory to large graphs	Applying Level (Level IV)
C161.4	Evaluate the heterogeneous behavior in large-scale graphs with hyper-graphs and multi-graphs for recommendation	Evaluating Level (Level V)
C161.5	Design algorithmic frameworks for large-scale complex interconnected structures	Creating Level (Level VI)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1	Introduction to Large-scale Graphs	Basics of Graph, Multi-Graph, Hypergraph & its Duality, Introduction & Application of Large-scale Graph, Characteristics, Challenges	6
2	Data Sources & Categorization	Complex Data Sources (Social Networks, Simulations, Bioinformatics), Categories – Social graphs (Facebook, Twitter, Google+), Endorsement graphs (Web Link Graph, Paper Citation Graph), Location graphs (Map, Power Grid, Telephone Network), Co-occurrence Graphs (Term-Document Bipartite, Click-through Bipartite)	7
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)	7

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	Computation for Massive Data Sets	Large scale Graph Clustering: Spectral Clustering, Modularity-based Clustering, Random Walks, Social Balance Theory	5
6	Large Graph Representation, Analysis & Implementation	Adjacency Matrix Representation, Adjacency List Representation, Graph Implementation Strategies & Softwares (PowerBI, Python, NetworkX, Pajek, MapReduce, GraphLab, Orange)	5
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	5
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	Attendance (15 Marks), Assignment/Quiz/Mini-project (10 Marks)
Total	**100**

Project based learning: Each student in a group of 3-4 will extract data from real-world domains using data streaming, web crawling, application programming interfaces (APIs), or from standard repositories that are globally recognized. For conducting application-based research, the students are encouraged to analyze social/political/financial/disease related data and generate underlying networked structure based on activity and topology. Analysing the real-world data for providing link prediction, community detection, security enhancements, commercial decision making, cost-benefit analysis, etc. using network science algorithms, tools, and analytics.

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.	Deo, Narsingh. *Graph theory with applications to engineering and computer science*. Courier Dover Publications, 2017.
2.	Gross, Jonathan L., and Jay Yellen, eds. *Handbook of graph theory*. CRC press, 2003.
3.	Fundamentals of Natural Computing: Basic Concepts, Algorithms, and Applications, L. N. de Castro (2006), CRC Press.
4.	Bondy, John Adrian, and Uppaluri Siva Ramachandra Murty. *Graph theory with applications*. Vol. 290. London: Macmillan, 1976.
5.	West, Douglas Brent. *Introduction to graph theory*. Vol. 2. Upper Saddle River: Prentice hall, 2001.
6.	Bollobás, Béla. *Modern graph theory*. Vol. 184. Springer Science & Business Media, 2013.

Detailed Syllabus
Lecture-wise Breakup

Course Code	**18B12HS811**	Semester: EVEN	Semester: VIII Session: 2021-22 Month from: Feb-June
Course Name	**Industrial Sociology**		
Credits	3	Contact Hours	(3-0-0)

Faculty (Names)	Coordinator(s)	Shikha Kumari
	Teacher(s) (Alphabetically)	Shikha Kumari

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-38.1	Understand the scope of industrial sociology and major theories on labour and work	Understand (C2)
C402-38.2	Analyzing the contemporary issues related to industry in the post-LPG era	Analyze (C4)
C402-38.3	Evaluating work in its social aspects such as gender, caste, class and unpaid work, as different from its better known economic dimension.	Evaluating (C5)
C402-38.4	Evaluate and interpret information about emerging issues in the industry through various sources like print and electronic media, film, documentary and other information technologies	Evaluate(C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introductio n	• Scope and importance of the study of Industrial Sociology	3

		• Nature and type of industrial society • Study of industrial relations	
2.	Theoretical Orientation	• Functional theory of labour (Durkheim) • Conflict/Marxian theory of labour • Weberian Theory of labour	5
3.	Social dimensions of work (I)	• Types of work: Unpaid Domestic and Volunteer work/ Service sector work/ managerial and white collar work/ blue collar work- Sectors of employment	5
4.	Social dimensions of work (II)	• Gendered Organization: Feminization of Labour and Poverty • Discrimination and Harassment (gender, racial, ethnic) • Caste system as a tool to stratify the labour force	8
5.	Industrialization in India	• Trade Union: Concept, Functions and Types, History of Trade Union Movement in India Trade • Socialism- LPG era India • Unions and Challenges of Privatization, risks and hazards, Law and work, Decline of Trade Unions, Disputes & Conciliation.	8
6.	Contemporary Issues	• Globalization and Technology: Criteria for measuring Globalization • Automation of work and its Impact (Reference: AI technologies) • Employment trends	8
7.	New initiatives in India	• Indian Endeavors- Make in India/ Start up India, Skills India programme	5
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**

Evaluation Criteria

Components	**Maximum Marks**
T1	20 (Project based)
T2	20
End Semester Examination	35

TA	25 (project/movie review/quiz)
Total	**100**

PBL- Student in a group of 4-5 will submit a project on New initiative in India- (a)make in India/(b)start up India.

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.	Bhattacharjee. S. (2016). *Industrial Sociology*. Aavishkar Publications. Jaipur
2.	Edgell, S. (2006). "Unpaid Work-Domestic and Voluntary work". *The Sociology of Work: Continuity and Change in Unpaid Work.*NewDelhi:Sage
3.	Freeman. C. (2009). 'Feminity and Flexible labour: Fashioning Class through gender on the global assembly line'. Massimiliano Mollona, Geert De Neev and Jonathan parry (eds.) *Industrial Work And life:An Anthropological Reader*.Berg: Oxford
4.	Grint, K.(2005)."Classical Approaches to Work: Marx, Durkheim and Weber". *The Sociology of Work: An Introduction*. Polity Press. Cambridge.
5.	Mishra. R (2016). *Industrial Sociology*. Laxmi Publications. New Delhi
6.	Prasad. J (2013). *Industrial Sociology*.Vayu Education of India: Delhi
7.	Singh. Y. & Sharma. R (2016). *Industrial Sociology*. AITBS Publishers: Delhi
8.	Sinha, P.N.R. (2006). *Industrial relations, Trade Unions and Labour legislations*. Pearson: New Delhi
9.	Watson, T.J. (2003). *Sociology, Work and Industry*. Routledge: London and New York

Course contents and plan

Subject Code	**18B12HS815**	**Semester Even**	**Semester** VIII **Session 2021-22** **Month from** Feb to June 2022
Subject Name	**QUALITY ISSUES IN ENGINEERING**		
Credits	3 (3-0-0)	**Contact Hours**	3-0-0

Faculty (Names)	**Coordinator(s)**	Dr. Akarsh Arora
	Teacher(s) (Alphabetically)	Dr. Akarsh Arora

Course Objectives:

1. To implement the principles and concepts inherent in a quality management approach to managing the engineering issues of a manufacturing or service organization.
2. To understand the philosophies of the gurus of quality in order to better evaluate TQM implementation proposals offered by quality management organizations and consultants.
3. To successfully implement process improvement teams trained to use the various quality tools for identifying appropriate process improvements.
4. To assess exactly where an organization stands on quality management with respect to the ISO 9000 quality management standard and various awards criteria.

COURSE OUTCOMES		**COGNITIVE LEVELS**
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)

Module No.	**Subtitle Of The Module**	**Topics In The Module**	**No. Of Lectures For The Module**
1.	Fundamentals And Evolution Of Quality	Introduction, Dimensions Of Quality, Fundamentals, History Of TQM, Contemporary Influences	6
2.	Quality Tools And The Improvement Cycle	Various Costs, Juran's Coq Accounting Statement, Voice Of Customers: Kano's Model, House Of Quality, QFD Process, Seven Tools For Quality Management	9
3.	Benchmarking	Meaning, Process, Methods	3

4.	Quality Gurus	Contribution of Quality Gurus	3
5.	Six Sigma	Six Sigma, Capability Of A Process/Product/Service, DMAIC Process	6
6.	Lean Concepts	Kaizen, Poka-Yoke, Andon, Kanban, JIT, 5-S, 7 Mudas	3
7.	Statistical Thinking And Applications	Statistical Process Control, Acceptance Sampling, Specification And Control Limits, Control Charts For Variables, Control Charts For Attributes	6
8.	Quality Awards And Certifications	MBNQA, RGNQA, Deming Prize, ISO Standards	3
9.	Quality Strategy For Indian Industry	India's Quality Journey, Quality Management In India	3
Total Number Of Lectures			42

Project-based Learning: Students are required to visit any business organization to observe the brief about the organization; its products; its suppliers; its operations; its processes, Quality control system and techniques followed by the company, Quality standards met by the company, application of quality tools or lean manufacturing system, Sigma capability of products or processes, DMAIC methodology, application and relevance of the quality concepts studied in the course. Collecting information on quality systems, quality standards, quality certifications or awards received, and sigma capability will upgrade students' knowledge and strengthen their skills to tackle multiple quality engineering issues along with employability.

Evaluation Criteria	
Components	**Maximum Marks**
T1	20 (Written)
T2	20 (Written)
End Term	35 (Written)
TA	25 (Project Assignment, Quiz)
Total	**100**

Recommended Reading material:	
1.	Besterfield D. H., Besterfield-Michna C., Besterfield G. H., Besterfield-Sacre M. *Total quality management*, Prentice Hall, 1999.
2.	Evans, J. R., Dean J. W. *Total quality management, organization and strategy*, Thomson, 2003. 399 p.
3.	Kanji G. K., Asher M. *100 Methods for Total Quality Management*. London: SAGE Publications, 1996.
4.	Oakland G. F. *Total Quality Management*, Oxford, 1995.
5.	Goetsch D. L., Davis S. B. *Quality management. Introduction to TQM for production, processing and services*. New Jersey: Prentice Hall, 2003.
6.	John S. Oakland. *Total Quality Management and Operational Excellence*: Text with cases, Fourth edition, 2014
7.	Dale H. Besterfield. *Total Quality Management*, (Revised Edition). India: Pearson, 2011.

Detailed Syllabus
Lecture-wise Breakup

Course Code	18B12PH814	**Semester: Even**	**Semester:** VIII **Session:** 2021 -2022 **Month: January to June**
Course Name	Plasma Physics		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. Anuraj Panwar
	Teacher(s)	Dr. Anuraj Panwar

COURSE OUTCOMES		**COGNITIVE LEVELS**
C402-34.1	Define terminology and concepts of plasma physics with various natural phenomena and engineering applications.	Remembering Level (C1)
C402-34.2	Summarize plasma and explain its electric, magnetic, dielectric and thermal properties.	Understand Level (C2)
C402-34.3	Develop magneto-hydrodynamic fluid and kinetic models to explain various phenomena taking place in homogeneous, isotropic and anisotropic plasma conditions.	Apply Level (C3)
C402-34.4	Analyze and formulate mathematical / analytical expressions for various nonlinear processes in plasmas.	Analyze Level (C4)
C402-34.5	Evaluate physical problems, estimate their numerical solutions and draw inferences from the results.	Evaluate Level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Introduction to the Plasma State**	Elementary concepts, definition of temperature Debye Shielding, plasma parameters, applications of Plasma Physics, Production of Plasmas in the laboratory, Drifts of charged particles under the effect of different combinations of electric and magnetic fields and Mirror Machine.	10
2.	**Fluid description of plasmas**	Relations of Plasma Physics to ordinary electromagnetics, dielectric constant of a plasma, collisions, equation of continuity, macroscopic parameters of plasma, two and one fluid equations for plasma.	04
3.	**Nonlinear Waves in Plasmas**	Plasma oscillations, space charge waves of warm plasma, ion-acoustic waves and electromagnetic waves in magnetized plasma.	08
4.	**Diffusion and Resistivity**	Decay of Plasma by diffusion, diffusion across a magnetic field, single fluid MHD equations, Diffusion in fully ionized Plasmas, Bohm diffusion and Neoclassical diffusion.	06
5.	**Stability of fluid plasma**	The equilibrium of plasma, classification of plasma instabilities, stability analysis: Two stream instability and Gravitational instability or Rayleigh Taylor instability (Plasma supported against gravity by magnetic field).	04
6.	**Nonlinear effects**	Ponderomotive force, Parametric instabilities, decay instability, two plasmon decay, stimulated Raman scattering and stimulated Brillouin scattering, non linear Landau damping.	06
7.	**Controlled thermo-nuclear fusion**	Magnetic and inertial confinement schemes, ITER, TOKAMAK.	02
		Total number of Lectures	**40**

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz+PBL+Attendance+class performance)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Textbooks, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	F. F. Chen., *Introduction to Plasma Physics*, Springer (2016).
2.	Krall and Trievelpiece, *Principles of Plasma Physics*, McGraw-Hill (1973).
3.	W. L. Kruer, *The Physics of laser plasma interactions*, Addison Wesley (1988).
4.	Liu and Tripathi, *Interaction of electromagnetic waves with electron beams and plasmas*, World Scientific (1994).

Project based Learning (PBL): Students groups may be formed to submit project reports on natural and engineering applications of plasma physics. Students may be asked to make presentations on topics like mirror machine, plasma diffusion, Raman scattering and plasma fusion devices. Students may be asked to present recent published articles on plasma applications. Students may be asked to solve plasma physics problems by using their expertise computer language

Department of Humanities and Social Sciences

AY: 2021-22 (Even Semester)

Course Opening Report

Programme Name: M.Tech Integrated CSE

Semester: 11

Course Name & Code: English for Research Paper Writing &19M13HS111

Name of Course Coordinator Ms. Rashmi Jacob

1. Course Outcomes:

At the completion of the course, students will be able to,

COURSE OUTCOMES		COGNITIVE LEVELS
C204.1	Demonstrate an understanding of all the aspects of grammar and language needed to write a paper.	Understand Level (C2)
C204.2	Apply grammatical knowledge & concepts in writing and presentation.	Apply level (C3)
C204.3	Examine each section of a paper after careful analysis of Literature Review.	Analyze Level (C4)
C204.4	Determine the skills needed to write a title, abstract and introduction, methods, discussion, results and conclusion.	Evaluate Level (C5)
C204.5	Compile all the information into a refined research paper after editing and proofreading	Create Level (C6)

2. CO-PO-PSO Mapping:

				BT	CSE		CSE (DA)		ECE (CS)		ECE (MET)	
COs	**PO1**	**PO2**	**PO3**	**PSO1**	**PSO1**	**PSO2**	**PSO 1**	**PSO 2**	**PSO 1**	**PSO 2**	**PSO 1**	**PSO 2**
C204.1	**1**	**2**										
C204.2	**2**	**2**										
C204.3	**2**	**3**										
C204.4	**3**	**3**										
C204.5	**2**	**3**										
Avg.	**2**	**3**										

3. Identified gaps in Syllabus/ Course Description (If Any): None

4. Modifications in Syllabus/ Course Description (If Any):

Details of Modification (Addition/ Removal)	Justification	Strengthens POs/PSOs
PSO Mapping revised	The course content stresses on Communication in terms of language and not as part of technical term of Computer Science Engineering. So PSO is getting very weakly mapped.	

5. Actions for Improving CO Attainments:

COs	Attainments in 2020-21	Action to be taken in 2021-22 to improve CO attainment	Strengthens POs/PSOs
C204.1	2.8		
C204.2	3.0		
C204.3	3.0		
C204.4	2.8		
C204.5	1.0	This course will focus more on writing different sections of the paper using IMRAD model.	PO2

6. Innovative Teaching and Learning Method to be used:

Simulation games will be introduced for vocabulary enhancement and for language learning purpose.

7. Strategies for

- **Weak Learners:** To give more exercise handouts for practice on the topics discussed in the classroom.

- **Bright Students:** To introduce the students to the concept of peer reviewing through various simulation games to be undertaken as part of problem solving classes.

8. Innovative Evaluation Strategy to be used:

Some of the components of TA would use denotative writing activities using creative picture composition.

Signature: Amba **Signature: Rashmi**

Module Coordinator: Dr.Amba Agarwal Course Coordinator: Ms.Rashmi Jacob

Detailed Syllabus

Lecture-wise Breakup

Course Code	18M12CS113	**Semester** 2nd Sem **(Even)**	**Semester** MTech & Intg. CSE **Session** 2021-22 **Month from** Feb to June
Course Name	Cryptography and Computer Security		
Credits	3	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Dr. Jaspal Kaur Saini
	Teacher(s) (Alphabetically)	Dr. Jaspal Kaur Saini

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

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
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	5
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
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignments + 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.	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 *Principles and Practice*, 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