MATS UNIVERSITY

ARANG, RAIPUR(C.G.)

VIII - Semester

S.N.	code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BT870	Advance Design of Structure – II	4	0	-	70	30	4
2.	BT871X	Professional Elective – III	4	0	-	70	30	4
3.	BT872X	Open Elective – III	3	0	-	70	30	3
4.	BT873	Computational Structural Analysis and Design Laboratory	-	-	2	30	20	1
5.	BT874	Major Project Work &Dissertation	-	-	18	120	80	12
		Total	**11**	**0**	**20**	**470**	**230**	**24**

L – Lecture, T – Tutorial, ESE – End Semester Examination,
P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

Professional Elective:

Subject Code	Subject Name
BT8411	Bridge Engineering
BT8412	Geographic Data Analysis & Applications
BT8413	Oil and Natural Gas Exploration
BT8414	Highway and Traffic Engineering
BT8415	Earthquake Engineering

Open Elective:

Subject Code	Subject Name
BT8421	Engineering System Analysis and Design
BT8422	Engineering System Design Optimization
BT8423	Engineering System Modeling and Simulation
BT8424	Game Theory with Engineering Applications
BT8425	Supply Chain Management-Planning

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Advance Design of Structure – II **Code:-BT870**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Objectives of the Subject:
1. Understand the behavior of combined footings.
2. Understand the behavior of retaining walls.
3. Understand the behavior of different types of water tanks.
4. Understand the behavior of different types of bridges.
5. Understand the behavior of prestressed concrete.

Unit-1:
Combined Footings Limit State Design of Combined Rectangular and Combined Trapezoidal Footings, Introduction to design of strap footing and Raft Foundation.

Unit-2:
Retaining walls Limit State Design of Cantilever retaining wall with horizontal and sloping backfill, Counterfort Retaining Wall with horizontal backfill.

Unit-3:
Water Tanks Circular tank (resting on ground) with flexible / rigid joint between floor and wall (by approximate method), Design of Circular overhead tank with domed bottom and top (membrane analysis), Intze Tank (Membrane Analysis): Dimensions, Design of top dome, Top ring beam, cylindrical wall, middle ring beam, conical dome, bottom dome. Introduction to design of water tanks using IS Codes, Introduction to continuity analysis.

Unit-4:
Bridges Various types of Bridges, Loading for road bridges, Design of super structure for solid slab bridge, Design of canlilever slab for T-Beam bridge. Introduction to design of interior panels and girders of a T-Beam Bridge.

Unit-5:
Prestressed Concrete Basic concepts, classification and types of prestressing, Prestressing systems, Losses in Prestress, Properties of materials, merits and demerits of prestressed concrete, Analysis of beam for flexure, Kern distances and efficiency of Sections.

Text Books: 1. Reinforced Concrete Structures – B.C. Punmia (Laxmi Publications)

2. Prestressed Concrete – N. Krishna Raju (New Age Publications)

3. RCC Design – Sinha & Roy (S. Chand & Co.)

Reference Books:

1. RCC Structures – N. Krishna Raju (New Age Publications)

2. Bridge Engineering – R.K. Raina 3. IS codes

Outcomes of the Subject:
1. Capable of designing combined footings.
2. Capable of designing retaining walls.
3. Capable of designing simple water tanks.
4. Capable of designing of solid slab bridges
5. Capable of analyzing prestressed concrete beams.

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Bridge Engineering **Code:-BT8411**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit 1: Bridge Engineering

Introduction to bridge engineering. Historical background of bridges and types. Bridge aesthetics and proportioning. Design process. Review of applicable design codes. Loads on bridges and force distribution. Bridge geometry. Conceptual design. Analysis tools for highway and pedestrian bridges. Concrete and steel deck design. Design of substructures such as foundations with or without piles; abutments, retaining walls and wing walls; columns and cap beams; bearings. Introduction to reinforced concrete and prestress concrete principles.

Unit -2

Introduction to Bridge Engineering, Definition of a bridge, historical development, bridge types
Design process and bridge aesthetics. General design considerations, Process of design coupled with aesthetics. Allowable stress design and limit state design approaches. Safety index and load combinations

Unit -3

Materials. Review of design codes. Loads on bridges Materials used in bridges. Various design codes such as AASHTO LRDF, AREMA, CHBDC and EUROCODE. Loads on bridges. Design criteriaAnalysis tools Force distribution. Strut-and-tie method incorporating force distribution. Other methods such as influence lines, cross method, matrix methods and finite element methods

Unit – 4

Concrete bridge deck design Reinforced concrete and prestressed concrete deck design principles. Applications to various cross-sections such as beams, continuous slabs, rigid frames and culverts, Bridge geometry Setting up the bridge coordinates and geometry. Screed elevations. Highway curves.Design of foundations Reinforced concrete spread and pile foundation designs

Unit- 5

Design of abutments Reinforced concrete abutment, wing wall and retaining wall designs

Design of columns, Reinforced concrete and steel column designs, and cap beam designs,

Design of deck supports, Selection and design of bearings

Reference Books:

Design of Highway Bridges, Richard M. Barker, Jay A. Puckett / John Wiley & Sons, Inc. 1997

Design of Modern Concrete Highway Bridges / Conrad P. Heins, Richard Lawrie / Wiley, 1984 ASSHTO and CANBAS bridge design codes

Course Outcomes:

1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Geographic Data Analysis & Applications **Code:-BT8412**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit- 1

GIS Overview The Nature of Geographic Information Data Representation: Measuring Systems: Location – Coordinate Systems Data Representation: Measuring Systems: Location – Coordinate Transformation Data Representation: Measuring Systems: Topology Measuring Systems: Attributes Data Representation.

Unit- 2

Spatial Data Models: Introduction to spatial data models Spatial Data Models: Raster data models Data Representation: Spatial Data Models: Relational Data Models Spatial Data Models: Vector Data Models Data Representation.

Unit 3

Spatial Data Models: Vector Data Models (II) Data Representation: Spatial Data Models: TIN Summary of Spatial Data Models: Raster, Vector, TIN Data Representation: Linking attribute data with spatial data Recent Development of Data models,

Unit-4

GIS Database Creation and Maintenance (I) Data Input & Editing, GIS Database Creation and Maintenance (II) DBMS and its use in GIS, GIS Database Creation and Maintenance (III) Metadata Database creation Guidelines NSDI, GIS Software and WebGIS,

Unit-5

Data Analysis: Measurement & Connectivity, Data Analysis: Interpolation, Data Analysis: Digital Terrain Analysis, Data Analysis: Statistical Operations & Point Pattern Analysis, Data Analysis: Classification, Data Analysis: GIS-based Modeling and Spatial Overlay (II) Data Analysis: Summary Uncertainty, Geo-representation & Geo-presentation GeoVisualization ,Spatial Modeling with GIS: Application in Physical Geography, Spatial Modeling with GIS: Application in Human Geography, Establishing a GIS site.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burragh and

Rachael A. Mc Donnell, Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

Course Outcomes:

1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Oil And Natural Gas Exploration **Code:-BT8413**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit 1:

Introduction: Structure of oil industry, financial aspects of the oil industry, world oil supply and demand. 2. Principles, Methods and Techniques for Oil and Gas Property Evaluation, Project Parameters: Time value of money in capital investment, Depreciation, depletion and amortization of oil projects, Financial measures and profitability analysis, Break-even and sensitivity analysis, Optimization Techniques

Unit 2 :

WELL COMPLETION: Design of Perforations Perforating process; Perforation Guns and firing head. Perforating/ well activation mechanism: Underbalanced and overbalanced perforations. Pressure control equipment (Well Head Lubricator Assembly); Type, size and orientation of perforation holes; Optimum Perforation Practices; Down-hole Equipment-Packers – their types, Tubing, Flow couplings, expansion joints, Sliding Sleeves / Side Pocket Mandrels & Blast Joints etc. Smart / Intelligent Wells, Well Completion Design

Unit 3 :

Deep water Production System : Fixed Platforms, Compliant Towers, Subsea systems, Extended Reach Wells, Floating Production Systems like FPSOs, FPSSs, TLPs, Spar Platform and FSOs. 5. Deep water applications of Subsea Technology : Subsea completion, X-mas tree, control systems, Manifolds, Templates, ROVs, deep-water installation vessels with DP system and associated problems. 6. Deep water Pipelines & umbilical : Issues in deep water Pipeline Design, Rigid and Flexible flow lines, Pipe-in-pipe, deep-water Risers and their configurations, Pipeline installation methods, Umbilical – functions, configurations and installation, Flow assurance strategies

Unit-4:

Emerging deep water Technologies : Autonomous Underwater Vehicles (AUVs) Seismicwhile-drilling, Dual-activity-drilling, Innovative Floating Production Concepts, Subsea processing, subsea separation (VASPS, SUBSIS, Twister) and any new innovations. 8. Problems and

Mitigation in Deepwater Drilling: Specialized consideration, specific planning requirement, specialized equipment and deep water complication

Unit-5:

Advanced Numerical Methods: Solution of tridiagonal system, Evaluation of double and triple integrals by numerical method and its application, solution of non-linear simultaneous equations numerical solution of integral equations, Advanced method of interpolation, Numerical solution of simultaneous first order ordinary differential equations and higher order O.D.E. Initial and Boundary value problems, Numerical solution of partial differential equations: Laplace and Poisson equation, Heat conduction and waved equations, Applied Statistics Review of binomial, Poisson, normal and log normal probability distributions. Interval estimates. Tests of significance for mean, variance (One an two population case-Z,t,X2 and F tests), tests for correlation and regression coefficients, Non-parametric tests: sign test, Mann-Whiteney Wilcoxon U-test. Run test and test of randomness. One way & two way analysis of variance, Time series analysis, reliability an dlife testing experiments in engineering problems.

Course Outcomes:

1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Highway and Traffic Engineering **Code:-BT8414**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit-1:
Introduction Traffic Engineering, Growth of Traffic, Function of Traffic Engineer, 3E's of traffic Engineering, Special problems due to mixed traffic and other conditions in developing countries, Measures to meet the Problem, Concept of PCU.

Unit-2:
Traffic Characteristics Road user characteristics, Vehicular characteristics, Traffic flow characteristics, Capacity, Traffic studies, Volume, Spot speed, Speed and delay, Origin and destination, Parking and accident, Design of Parking Facilities.

Unit-3:
Traffic Operations Traffic regulations, Controls on vehicles, Drivers and flow, One way street tidal flow operation, priority for high occupancy vehicles, Traffic control devices, Signs, Signals, Islands and markings, Design of isolated traffic signals by IRC method.

Unit-4:
Traffic Safety Accidents, Analysis of traffic accidents, Preventive Measures, Highway lighting, Effect of road conditions and road geometrics on traffic safety, Traffic safety awareness.

Unit-5:
Traffic and Environment Pollution problems of cities, Noise pollution, Air pollution, Vibration, Environmental Impact Assessment, Mitigative Measures, and Road site development and Arboriculture.

Text Books:
1. Traffic Engineering – McShane, W.R. and Roes, R.P. (Prentice Hall, New Jersey, 1990).
2. Traffic Engineering and Transport Planning – Kadiyali, L.R. (Khanna Publishers, Delhi, 1996).

Reference Books:
1. Transport Planning and Traffic Engineering – Flaherty, CAO'(Ed.) (John Wiley & Sons, Inc., New York, 1997)
2. Traffic Flow Fundamentals – May, A.D. (Prentice Hall, Englewood Cliffs, New Jersey, 1990)

Course Outcomes:
1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:-Earthquake Engineering **Code:-BT8415**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

UNIT 1
Definitions of basic problems in dynamics, static versus dynamic loads, different types of dynamic loads, undamped vibration of SDoF system, natural frequency and period of vibration, damping in structure.

UNIT 2
Seismological background, seismicity of a region, earthquake faults and waves, structure of earth, plate tectonics, elastic – rebound theory of earthquake, Richter scale, measurement of ground motion, Seismogram.

UNIT 3
Direct determination of frequencies and mode shape, orthogonality principle, approximate methods for determination of frequencies and mode shape model error of forced vibration of MDoF.

UNIT 4
Characterization of ground motion, earthquake response spectra, factors influencing response spectra, design response spectra for elastic system, peak ground acceleration, response spectrum shapes.

UNIT 5
Review of damage during past earthquakes and remedial measures, seismic design consideration, ductility demand, reinforcement detailing for member and joints.

Text Books:
1. Earthquake Resistant Design of Structures – P. Agrawal & M. Srikhande (Prentice Hall)
2. Earthquake Resistant Design of Structures – S. K. Duggal (Oxford University Press)

Reference Books:
1. Dynamics of Structures Theory & Applications to Earthquake Engineering – A. K. Chopra (Pearson Education)
2. Structural Dynamics – Theory & Computation – Mario Paz (CBS Publishers)
3. Basics of Structural Dynamics and Asesismic Design – S. R. Damodarasamy, S. Kavitha (PHI Learning)

Course Outcomes:

1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Engineering System Analysis and Design Code:-BT8421
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit- 1

System Analysis Fundamentals: Introducing SA&D ,SA&D concepts, Roles of system analyst. The system development life cycle, Using CASE tools. Depicting system graphically, determining feasibility, activity planning and control. Information requirements analysis: Sampling and investigating data,

Unit-2

Prototyping, The analysis process Using data flow diagram; Using data dictionaries, Describing process specifications and structured decisions; The system proposal. The essentials of design designing output; designing input, Designing the file or database Designing the user interface, Designing data.

Unit-3

Documenting the design phase, Software engineering and implementation Quality assurance through software engineering; Implementing the information system, Case Study.

Unit-4

Process Modeling Introduction to process modeling Logical models Physical models Data Flow Diagrams Functional Decomposition Diagrams Event diagrams Process Descriptions Structured English, Decision Tables, Decision Trees Data Modeling Entities Attributes Relationships Synchronization of System Models ,Object Modeling

Unit-5

Introduction to system design System Design Approaches Modern Structured Design - Structure Charts Information engineering Prototyping Joint Application Development (JAD) Rapid Application Development (RAD) Object Oriented Design Application Architecture and Modeling Physical Data Flow Diagrams Information Technology Architecture

Course Outcomes:
1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Engineering System Design Optimization Code:-BT8422
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit 1
Problem Formulation and Setup System characterization Identification of objectives, design variables, constraints, subsystems ,System-level coupling and interactions, Examples of MSDO in practice, Visualization techniques in design optimization Subsystem model development, Model partitioning and decomposition, interface control Collaborative Optimization, Bi-Level Formulations Subsystem model selection: fidelity versus expense
Model and simulation development and validation

Unit 2:
Optimization and Search Methods Optimization and exploration techniques: Review of linear and nonlinear programming Heuristic techniques: genetic algorithms simulated annealing, Tabu search Design Space Exploration: Design of Experiments (DOE): Full factorial search, parameter study, Taguchi/orthogonal arrays, latin hypercubes Mixed integer programming (application to hub spoke / network problems) Sensitivity and post-optimality analysis: Jacobian matrix, Hessian, finite differences Adjoint methods and Lagrange multipliers

Unit 3:
Multiobjective and Stochastic Challenges Multiobjective optimization:Weighted sum optimization Weak and strong dominance Pareto front computation Goal programming and isoperformance Physical Programming Multiattribute Utility Theory Introduction to robust design Monte-Carlo Sampling Design under uncertainty Reliability analysis, Taguchi methods

Unit 4 :
Implementation Issues and Real World Applications System assessment and extensions: What is optimality Design for value: including lifecycle costing Optimizing product families and platforms Implementation issues: Model reduction Approximation techniques: response surfaces, kriging, neural networks Concurrent design.

Unit 5:
Sequentially unconstrained minimization techniques (SUMT) Interior penalty function Exterior penalty function Augmented Lagrange

Multiplier (ALM) Constrained minimization techniques Constrained direct search Linearization methods (LP, SLP) Non-linear methods (Feasible directions, GRG, SQP) Heuristic optimization techniques Genetic algorithms Ant colony optimization Particle swarm optimization, obust design Orthogonal arrays RBDO.

Course Outcomes:

1. Students are expected to understand to learn the subject well and use it in practicality
2. Students are expected to understand the need of this subject and can manage to use it with other technology
3. Students are expected to understand the restrictions in use of this subject

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Engineering System Modeling And Simulation **Code:-BT8423**
Total Theory Periods: - **40** Total Tutorial Periods: **10**

Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit- 1

Simulation Basics,Handling Stepped and Event-based Time in Simulations,Discrete versus Continuous Modelling,Numerical Techniques,Sources and Propagation of Error,Dynamical, Finite State, and Complex Model Simulations,Graph or Network Transitions Based Simulations,Actor Based Simulations,Mesh Based Simulations,Hybrid Simulations

Unit-2

Converting to Parallel and Distributed Simulations,Partitioning the Data,Partitioning the Algorithms,Handling Inter-partition Dependencies,Probability and Statisics for Simulations and Analysis. Modeling and Simulation Principles; System Analogies (mechanical, electrical, fluid and heat elements); Block Diagram Models and Transfer Functions

Unit-3

Introduction to Queues and Random Noise,Random Variates Generation,Sensitivity Analysis,Simulations Results Analysis and Viewing Tools,Display Forms: Tables, Graphs, and Multidimensional Visualization,Terminals, X and MS Windows, and Web Interfaces,Validation of Model Results

Unit- 4

M&S in Test and Evaluation, M&S in Test and Evaluation, M&S in Production and Deployment, M&S in Support of the Fu State Space Models; Model Linearization, Linear Graphs, Modeling of Electrical, Mechanical Systems, and Mechatronics Systems; System Response and Simulation, Model verification and validation; System Identification Rate Production Decision, M&S in Support of Equipment Fielding, M&S System Support,

Unit- 5

Introduction Principles of Modeling and Simulation Modeling and Simulation of Mixed Systems Block Diagram Modeling MIMO: State-Space System Models Theoretical Foundations: Modeling of Dynamic Systems Electrical, Mechanical, Fluid, and DC Motor Constructing and Analyzing First Order Math Models Practical Applications of First Order Math Models Constructing and Analyzing Second Order Math Models Practical Applications of Second Order Math Models Modeling of Mechanical Systems for Mechatronic Applications: Bond Graphs Modeling Electro-Mechanical Systems System Identification Bases System Identification Methods Case Studies: UAV Quadrotor Case Studies: Hard Discs

Course Outcomes:
1. Students are expected to understand to learn the subject well and use it in practicality
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3. Students are expected to understand the restrictions in use of this subject

MATS UNIVERSITY
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Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Game Theory with Engineering Applications **Code:-BT8424**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:

1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit 1

Games and solutions. Game theory and mechanism design. Examples from networks. Matrix and continuous games. Iterated strict dominance. Rationalizability. Nash Equilibrium; existence and uniqueness. Mixed and correlated equilibrium. Supermodular games. Potential/congestion games.

Unit 2

Myopic learning; fictitious play. Bayesian learning. Evolutionarily stable strategies. Computation of Nash equilibrium in matrix games. Backward induction and subgame perfect equilibrium. Applications in bargaining games. Nash bargaining solution. Infinitely/finitely repeated games.

Unit 3

Trigger strategies. Folk theorems. Imperfect monitoring and perfect public equilibrium. Mixed and behavioral strategies. Bayesian Nash equilibrium. Applications in auctions. Different auction formats. Revenue and efficiency properties of different auctions. Optimal auctions; revenue-equivalence theorem. Social choice viewpoint. Impossibility results. Revelation principle. Incentive compatibility.

Unit – 4

VCG mechanisms. Mechanisms in networking, decentralized mechanisms. Positive and negative externalities. Utility-based resource allocation. Selfish routing. Wardrop and Nash equilibrium. Partially optimal routing. Network pricing. Competition and implications on network performance. Strategic network formation. Price of anarchy.

Unit – 5

Strategic Games and Nash Equilibrium Strategic games: examples Nash equilibrium: concept and examples Best response functions Dominated Actions Symmetric games and symmetric equilibriaHumanities and Social Sciences Pre-requisites: Mathematics Additional Reading: Microeconomic theory CoordinatorsBertrand's model of duopoly market Electoral Competition War ofAttrition Auctions Accident LawsMixed Strategy Nash Equilibrium Introduction Strategic games with randomisation Mixed strategy Nash equilibrium: concept and examples Dominated Actions Formation of Players' beliefs Backward induction,Extensive Games and Nash Equilibrium Stackelberg model of duopoly markets Ultimatum game

Course Outcomes:

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3. Students are expected to understand the restrictions in use of this subject

MATS UNIVERSITY
GULLU, ARANG, RAIPUR

Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:-Supply Chain Management-Planning **Code:-BT8425**
Total Theory Periods: - **40** Total Tutorial Periods: **10**
Total marks in end semester Exam: **100**
Minimum Number of Class test to be conducted: **02**

Course Objectives:
1. Make student understand the subject and its uses in engineering
2. To make students understand the basics and utilize them according to modern needs
3. To make students learn the problems faced while using this subject and how to prevent those problems

Unit 1

Building blocks of a supply chain network. Business processes in supply chains. Types of supply chains and examples. Strategic, tactical, and

operational decisions in supply chains. Supply chain performance measures. Supply chian inventory management: Newsboy, Base-stock, and (Q,r) models, multi-echelon supply chains, bullwhip effect. Performance modeling of supply chains using

Unit 2

Markov chains and queueing networks. Mathematical programming models for supply chain planning, design, and optimization. Best practice supply chain solutions. Internet-enabled supply chains: e-marketplaces, e-procurement, e-logistics, e-fulfillment, customer relationship management, web services, Rosettanet, ERP and supply chains, supply chain automation, and supply chain integration.

Unit 3

Introduction to Supply Chain Management and Supply Chain Strategy, Supply Chain Performance Metrics and Drivers and Seven-Eleven Japan Case Analysis, Distribution Network in a Supply Chain and Network Design, Case Analysis and Global Supply Chain Networks, Demand Forecasting and Aggregate Planning, Logistics and Managing Transportation, Sourcing and Coordination in a Supply Chains, Bullwhip effect, Barilla Case Study,

Unit 4

Introduction, Achieving a Strategic Fit, SCM Metrics/Drivers and Obstacles, Distribution network in a SC. Network design. Network design in an uncertain environment, Briefly Transportation, Aggregate planning, Consumer Electronics (CE) Supply Chain, Planning Supply and Demand. Case study: Restructuring GM. Read GM's Restructuring Plan on the web page, Inventory planning with known demand.

Unit 5

Inventory planning with uncertain demand, Product availability with uncertain demand. Case study: Cathay Pacific Spare Parts. Prepare the case ,Sourcing and contracts in SC — for more takeNew product/model introduction, Case study: Sport Obermeyer Ltd. Prepare the case, Coordination in a SC. Value of and distortion of information: Bullwhip effect, Green Supply Chains. (b) Global Supply Chains

Course Outcomes:

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MATS UNIVERSITY
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Semester: **B.Tech 8th Sem** **Branch**:- **Civil Engineering**
Subject:- Computational Structural Analysis and Design LabCode:-BT873
Total Theory Periods: - **40** Total Tutorial Periods: **10**

Experiments to be performed (Min 10 experiments):

1.Details of reinforcement in a simply supported RCC beam (singly reinforced) with the given design data regarding the size and number of bars, stirrups their size and spacing.

2.Details of reinforcement in a simply supported RCC beam (doubly reinforced) with the given design data regarding the size and number of bars, stirrups their size and spacing.

3.Details of reinforcement in a simply supported RCC beam (T section) with the given design data regarding the size and number of bars, stirrups their size and spacing.

4.Details of reinforcement in a one way slab with the given design data regarding the size and number of bars, their size and spacing.

5.Details of reinforcement in a two way slab with the given design data regarding the size and number of bars, their size and spacing.

6. Details of reinforcement in a stair case with the given design data regarding the size and number of bars, their size and spacing.
7. Details of reinforcement for a RCC rectangular column with isolated footing.
8. Details of reinforcement for a RCC circular column with isolated square footing.
9. Detailing of Combined footings.
10. Detailing of Retaining walls.
11. Detailing for Water Tanks.
12. Detailing for R.C.C. slab Bridge.
13. Detailing for R.C.C. T-Beam Bridge.
14. Detailing for Prestressed Concrete Girder.
15. Bar bending schedules for few of the above items.

Field Visit (Minimum 3 times):
Study of complete standard drawing:
1. Multistoried building
2. Bridge
3. Water tank

List of Equipments / Machine Required:
1. List of Equipments – Not Required