SEMESTER -III

S. No.	Course Code	Subject	L	T	P	Total	Evaluation		Cr.	Duration of Exam (Hrs.)
							Mid Sem	End Sem		
1	*	Program Elective-V	3	-	-	3	40	60	3	3
2	**	Open Elective	3	-	-	3	40	60	3	3
3	MTSE-209A	Dissertation Phase-I	-	-	20	20	100	-	10	3
		TOTAL	**6**		**20**	**26**	**180**	**120**	**16**	
							300			

***Program Elective –V**	
MTSE-201A	Design of Pre-stressed Concrete Structures
MTSE-203A	Analysis of Laminated Composite Plates
MTSE-205A	Fracture Mechanics of Concrete Structures
MTSE-207A	Design of Plates and Shells

****Open Elective**		
1.	MTOE-201A	Business Analytics
2.	MTOE-203A	Industrial Safety
3.	MTOE-205A	Operations Research
4.	MTOE-207A	Cost Management of Engineering Projects
5.	MTOE-209A	Composite Materials
6.	MTOE-211A	Waste to Energy

Program Elective -V

MTSE-201 A	Design of Pre-stresssed Concrete Structures						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	*Find out losses in the prestressed concrete. Understand the basic aspects of prestressed concrete fundamentals, including pre and post-tensioning processes*						
CO2	*Analyze prestressed concrete deck slab and beam/ girders*						
CO3	*Design prestressed concrete deck slab and beam/ girders*						
CO4	*Design of end blocks for prestressed members*						

Unit I

Introduction to prestressed concrete: types of prestressing, systems and devices, materials, losses in prestress. Analysis of PSC flexural members: basic concepts, stresses at transfer and service loads, ultimate strength in flexure, code provisions

Unit II

Statically determinate PSC beams: design for ultimate and serviceability limit states for flexure, analysis and design for shear and torsion, code provisions

Unit III

Transmission of prestress in pretensioned members; Anchorage zone stresses for posttensioned members

Unit IV

Statically indeterminate structures - Analysis and design - continuous beams and frames, choice of cable profile, linear transformation and concordancy

Unit V

Composite construction with precast PSC beams and cast in-situ RC slab - Analysis and design, creep and shrinkage effects. Partial prestressing - principles, analysis and design concepts, crack-width calculations

Unit VI

Analysis and design of prestressed concrete pipes, columns with moments

References Books:

1) Design of Prestressed Concrete Structures, Lin T.Y., Asia Publishing House, 1955
2) Prestressed Concrete, Krishnaraju N., Tata McGraw Hill, New Delhi, 1981
3) Limited State Design of Prestressed CONcrete, GuyanY., Applied Science Publishers, 1972
4) IS: 1343- Code of Practice for Prestressed Concrete

Program Elective -V

MTSE-203 A	Analysis of Laminated Composite Plates						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	*Analyze the rectangular composite plates using the analytical methods*						
CO2	*Analyze the composite plates using advanced finite element method*						
CO3	*Develop the computer programs for the analysis of composite plates*						

Unit I

Introduction: Displacement Field Approximations for Classical Laminated Plate Theory (CLPT) and First Order Shear Deformation Theory (FSDT), Analytical Solutions for Bending of Rectangular Laminated Plates using CLPT

Unit II

Governing Equations. Navier Solutions of Cross-Ply and Angle-Ply Laminated Simply-Supported Plates, Determination of Stresses. Levy Solutions for Plates with Other Boundary Conditions, Analytical Solutions for Bending of Rectangular Laminated Plates Using FSDT

Unit III

Finite Element Solutions for Bending of Rectangular Laminated Plates using CLPT

Unit IV

Introduction to Finite Element Method, Rectangular Elements, Formation of Stiffness Matrix, Formation of Load Vector, Numerical Integration, Post Computation of Stresses

Unit V

Finite Element Solutions for Bending of Rectangular Laminated Plates using FSDT

Unit VI

Finite Element Model, C^0Element Formulation, Post Computation of Stresses. Analysis of Rectangular Composite Plates using Analytical Methods

Reference:

1) Mechanics of Laminated Composites Plates and Shells, Reddy J. N., CRC Press

Program Elective -V

MTSE-205 A	Fracture Mechanics of Concrete Structures						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	*Identify and classify cracking of concrete structures based on fracture mechanics*						
CO2	*Implement stress intensity factor for notched members*						
CO3	*Apply fracture mechanics models to high strength concrete and FRC structures*						
CO4	*Compute J-integral for various sections understanding the concepts of EFM*						

Unit I

Introduction: Basic Fracture Mechanics, Crack in a Structure, Mechanisms of Fracture and Crack Growth, Cleavage Fracture, Ductile Fracture, Fatigue Cracking, Environment assisted Cracking, Service Failure Analysis

Unit II

Stress at Crack Tip: Stress at Crack Tip, Linear Elastic Fracture Mechanics, Griffith's Criteria, Stress Intensity Factors, Crack Tip Plastic Zone, Erwin's Plastic Zone Correction, R curves, Compliance, J Integral, Concept of CTOD and CMD

Unit III

Material Models: General Concepts, Crack Models, Band Models, Models based on Continuum Damage Mechanics, Applications to High Strength Concrete, Fibre Reinforced Concrete, Crack Concepts and Numerical Modeling.

References:

1) Fracture Mechanics, Suri C. T. and Jin Z.H., 1st Edition, Elsevier Academic Press, 2012
2) Elementary Engineering Fracture Mechanics, BroekDavid, 3rd Rev. Ed. Springer, 1982.
3) Fracture Mechanics of Concrete Structures – Theory and Applications, Elfgreen L., RILEM Report, Chapman and Hall, 1989
4) Fracture Mechanics – Applications to Concrete, Victor, Li C., Bazant Z. P., ACI SP 118, ACI Detroit, 1989

Program Elective -V

MTSE-207 A	Design of Plates and Shells						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	*Analyze and design prismatic folded plate systems*						
CO2	*Analyze and design shells using approximate solutions*						
CO3	*Analyze and Design Cylindrical Shells*						
CO4	*Design Doubly Curved Shells using Approximate Solutions*						

Unit I

Prismatic folded Plate Systems

Unit II

Shell Equations

Unit III

Approximate Solutions

Unit IV

Analysis and Design of Cylindrical Shells

Unit V

Approximate Design methods for Doubly Curved Shells

References:

1) Theory of Plates and Shells, Timoshenko and Woinowsky-Krieger S., Tata Mc Graw Hill Edition, 2010
2) Design and Construction of Concrete Shell Roofs, Ramaswamy G. S., 1st Edition, 2005
3) Design of Reinforced Concrete Shells & Folded Plate, Varghese P. C., 1st Edition, PHI
4) Design of Plate and Shell Structures, Jawad Maan H., Springer Science

Open Elective

MTOE-201 A	Business Analytics						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)							
PO1	*Understand the role of business analytics within an organization*						
PO2	*Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization*						
PO3	*To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making*						
PO4	*To become familiar with processes needed to develop, report, and analyze business data*						
PO5	*Use decision-making tools/Operations research techniques*						
PO6	*Mange business process using analytical and management tools*						
PO7	*Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc*						
Course outcomes (CO)							
CO1	*Students will demonstrate knowledge of data analytics*						
CO2	*Students will demonstrate the ability of think critically in making decisions based on data and deep analytics*						
CO3	*Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making*						
CO4	*Students will demonstrate the ability to translate data into clear, actionable insights*						

Unit I

Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organization, competitive advantages of Business Analytics.

Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modeling, sampling and estimation methods overview.

Unit II

Trendiness and Regression Analysis: Modeling Relationships and Trends in Data, simple Linear Regression. Important Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology.

Unit III

Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes.

Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization

Unit IV

Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression orecasting with Casual Variables, Selecting Appropriate Forecasting Models.

Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model

Unit V

Decision Analysis: Formulating Decision Problems, Decision Strategies with the without 8 Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

Unit VI

Recent Trends in Embedded and collaborative business intelligence, Visual data 4 recovery, Data Storytelling and Data journalism.

References

1) Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press
2) Business Analytics by James Evans, persons Education

Open Elective

MTOE-203 A	Industrial Safety						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**

Unit I

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and fire fighting, equipment and methods.

Unit II

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment

Unit III

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

Unit IV

Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

Unit V

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.

References

1) Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
2) Maintenance Engineering, H. P. Garg, S. Chand and Company.
3) Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication
4) Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London

Open Elective

MTOE-205 A	Operations Research						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	*Students should able to apply the dynamic programming to solve problems of discreet and continuous variables*						
CO2	*Students should able to apply the concept of non-linear programming*						
CO3	*Students should able to carry out sensitivity analysis*						
CO4	*Student should able to model the real world problem and simulate it*						

Unit I

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

Unit II

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

Unit III

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

Unit IV

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

Unit V

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

References

1) H.A. Taha, Operations Research, An Introduction, PHI, 2008
2) H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982
3) J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008
4) Hitler Libermann Operations Research: McGraw Hill Pub. 2009
5) Pannerselvam, Operations Research: Prentice Hall of India 2010
6) Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

Open Elective

MTOE-207 A	Cost Management of Engineering Projects						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Course Outcomes (CO)							
CO1	*Students should able to learn the cost concepts in decision making*						
CO2	*Student should be able to do cost planning and Marginal Costing*						
CO3	*Students should be able to create a database for operational control and decision making.*						

Unit I

Introduction and Overview of the Strategic Cost Management Process

Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

Unit II

Project: meaning, Different types, why to manage, cost overruns centers, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non-technical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process.

Unit III

Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis.

Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.

Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.

Unit IV

Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

References

1) Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2) Charles T. Horngren and George Foster, Advanced Management Accounting
3) Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting

Open Elective

MTOE-209 A	Composite Materials						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	*To enable students to aware about the composite materials and their properties.*						
Course Outcomes (CO)							
CO1	*Students should able to learn the Classification and characteristics of Composite materials.*						
CO2	*Students should able reinforcements Composite materials.*						
CO3	*Students should able to carry out the preparation of compounds.*						
CO4	*Student should able to do the analysis of the composite materials.*						

UNIT I

INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Iso-strain and Iso-stress conditions.

UNIT II

Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT III

Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT IV

Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R.
3. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:

1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

Open Elective

MTOE-211 A	Waste to Energy						
Lecture	**Tutorial**	**Practical**	**Credit**	**End Sem. Evaluation**	**Mid Sem. Evaluation**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	*To enable students to aware about the generation of energy from the waste.*						
Course Outcomes (CO)							
CO1	*Students should able to learn the Classification of waste as a fuel.*						
CO2	*Students should able to learn the Manufacture of charcoal.*						
CO3	*Students should able to carry out the designing of gasifiers and biomass stoves.*						
CO4	*Student should able to learn the Biogas plant technology.*						

Unit I

Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit II

Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

Unit III

Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit IV

Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

References:

1) Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
2) Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3) Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.
4) Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.

MTSE-209 A Dissertation Phase – I

(Credits 0 : 0 : 20 =10)

Teaching Scheme

Lab work : 20 hrs/week for Dissertation Phase- I
Mid Semester Evaluation weightage- 30% and End Semester Evaluation weightage- 70%

Course Outcomes:

At the end of this course, students will be able to

1. Identify structural engineering problems reviewing available literature.
2. Identify appropriate techniques to analyze complex structural systems.
3. Apply engineering and management principles through efficient handling of project

Syllabus Contents:

The dissertation-I will have mid semester presentation and end semester presentation. The mid semester presentation will include identification of problem based on literature review on the topic referring to latest literature available.
End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions and must bring out individual contribution.
Continuous assessment of Dissertation-I and Dissertation-II at mid semester and end semester will be monitored by the departmental committee.

Guidelines for Dissertation Phase – I and Phase-II

As per the AICTE directives, the dissertation is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June.

The dissertation may be carried out preferably in-house i.e. department's laboratories and centers OR in industry allotted through department's T & P coordinator.

After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred literature should preferably include IEEE/IET/IETE/Springer/Science Direct/ACM journals in the areas of Civil Engineering, Structural Engineering and Analysis and any other related domain. In case of Industry sponsored projects, the relevant application notes, while papers, product catalogues should be referred and reported.

Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.

Phase – I deliverables: A document report comprising of summary of literature survey, detailed objectives, project specifications, paper and/or computer aided design, proof of concept/functionality, part results, A record of continuous progress.

Phase – I evaluation: A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q & A. In case of unsatisfactory performance, committee may recommend repeating the Phase-I work.

During phase – II, student is expected to exert on design, development and testing of the proposed work as per the schedule. Accomplished results/contributions/innovations should be published in terms of research papers in reputed journals and reviewed focused conferences OR IP/Patents.

Phase – II deliverables: A dissertation report as per the specified format, developed system in the form of hardware and/or software, A record of continuous progress.

Phase – II evaluation: Guide along with appointed external examiner shall assess the progress/performance of the student based on report, presentation and Q & A. In case of unsatisfactory performance, committee may recommend for extension or repeating the work

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